

USE OF A DIGITAL ESCAPE ROOM (DER) TO ASSESS STUDENT LEARNING, COMMUNICATION SKILLS, AND ENGAGEMENT IN A CORPORATE FINANCE COURSE

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Extended Abstract
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ABSTRACT

This research examines the use of a digital escape room (DER) to reinforce accounting concepts, strengthen interpersonal communication skills, and increase student engagement among business students. Upper-level undergraduate business courses build on concepts introduced in the first- and second-year requirements. In more advanced business courses such as accounting and finance, it is expected that students have a solid grasp of what data is shown on a firm's financial statements as well as the relationships between the various documents. To aid in reinforcing accounting concepts, a hands-on digital escape room (DER) was designed and administered to students in a corporate finance course at a small comprehensive institution in the northeast of the US. This exercise reinforces content learned in basic accounting classes and promotes learning, communication, and engagement.

INTRODUCTION

The use of games in higher education is not a new phenomenon. Evidence suggests that this teaching tool improves student engagement and facilitates learning in students regardless of discipline. It has also motivated educators to rethink their teaching methods to accommodate the learners of today (Clarke et al., 2017). With the increased availability of computers and internet technology on and off campus, one specific form of gaming, digital escape rooms (DERs), are gaining in popularity because of their effectiveness in aiding with instruction, providing opportunities for student interaction, and increasing student engagement (Eukel et al., 2020). As noted by Clarke et al. (2017), with the use of game based activities

“...it is possible to develop and present learning challenges to students by considering game-play mechanics, dynamics and aesthetics so that students interact and produce understandable, fun and engaging results.” (p. 84)

COVID-19 has made its mark on how instructors facilitate learning in their courses. Increasing the use of DERs in courses whether they be fully in person, partially online, or fully online can boost student learning, communication skills, and engagement.

LITERATURE REVIEW

Teaching methods using game elements have been occurring both in the physical and digital learning environments and at all levels of education for some time. Known as ‘gamification’, this is defined as exercises that involve one or more players, present some form of obstacles to participants, and require users to follow a set of rules (Beatty et al., 2021). In addition, games should provide a clear set of learning objectives as well as guidelines for instructors to follow. It is argued that incorporating games into one’s set of teaching techniques can enhance learning and increases the level of engagement of learners. There is also evidence that when these activities require collaboration and teamwork students’ social and communication skills are strengthened (Stone, Z., 2016).

Escape rooms (ERs), while initially created for entertainment purposes, are becoming a more acceptable teaching tool in schools and universities. We can define ERs as,

“...live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited amount of time.” (Nicholson, 2015, p. 1)

ERs, first created for entertainment purposes, are generally physical locations where participants are locked in a room and tasked with solving puzzles or finding clues which eventually allow them to unlock a door and ‘escape’. In an education setting, ERs usually take the form of a group exercise where teams solve puzzles or answer questions correctly to open a locked box or save a fictitious character from harm. ERs have been used for some time to teach healthcare professionals how to diagnose an

illness or determine the proper sequence of a procedure (Adams, 2019; Eukel, et al., 2020; Healy, 2019, Roman, 2020). The benefit of these exercises for healthcare students is that they provide challenging scenarios with no harm done if the decisions made are incorrect (Cain, et al., 2015). Only recently are ERs gaining in popularity in other disciplines such as computer programming (Borrego, et al. 2021, Lopez-Pernas, 2019) and communication (Clarke, 2017).

In business education there may be suggested ER activities for select courses (Din, 2022) but this author could not identify any formal study that examined the use of this tool in a business program. With strong evidence that ERs create learning environments that are engaging, challenging, and interactive (Makri et al., 2021) this is an ideal time to assess these exercises in the business curriculum. We know that the COVID-19 pandemic forced universities to move to a digital platform for their course offerings. As a result, online and hybrid course offerings are likely to remain on the course schedules of universities for some time. Developing digital teaching methods, such as escape rooms, should appeal to instructors who can use the same exercise in all sections of their course regardless of modality.

RESEARCH QUESTION

Past research indicates that game-based learning is gaining in popularity and use across all disciplines in higher education. Less often have we heard of how escape rooms can strengthen student learning, improve interpersonal skills, and increase student engagement. Digital escape rooms (DERs) fall under the 'escape room' umbrella are even less common but they offer a unique method to engage students since they are designed to be completed as a fully online experience and can be used as is in either a face-to-face or virtual setting. Since their use has not been as frequent as other forms of games there are very few studies that looked at their use in business schools/programs. The proposed research describes the design and administration of a DER whose content is focused on two major financial statements - the Income Statement and Balance Sheet. Students enrolled in the principles of finance course complete the exercise and offer feedback about the experience.

The following three areas are studied in this research:

- How the learning process is perceived by students using a DER
- How student-to-instructor and student-to-student communication play a role in the use of a DER
- How students engage with the material and each other using a DER

METHODS

Details about the proposed Digital Escape Room (DER) and its administration are explained in the sections below.

Context

A DER was developed to assess students' understanding of the relationships between data presented on two common financial statements – the income statement and balance sheet. Participants were enrolled in a corporate finance course and had completed at least one basic accounting course. Material covered in a corporate finance course builds on prior knowledge and assumes learners have an understanding of financial statements and what the data on each represents for a firm. The content of the questions used in the DER was based on material taught in previous accounting courses and reinforced in the early chapters of the corporate finance text.

Design

The DER was developed to assess students' understanding of financial statements, communication skills, and level of engagement. The learning objectives for this exercise are the following:

- Recognize specific financial data on a firm's financial statements
- Explain the relationship between specific data on the financial statements
- Assess the strengths/weaknesses of a firm's financials
- Utilize listening skills in a group setting
- Communicate information in a group setting
- Demonstrate teamwork in responding to questions

Through the use of Google Slides and Google Forms students are asked to make their way through various rooms of a house to meet up with friends for a bar-b-que. To begin the digital exercise the instructor sends students a link which takes them to a page with an introduction about the exercise along with some general instructions (See Appendix A). Once this information has been read students click on a link to begin their journey through the house.

All the questions in the DER are related to financial statements (See Appendix B). Working in teams, participants must correctly answer a set of three multiple choice questions in each of three rooms to eventually make it out to the patio, their final destination. When they answer a question correctly they will receive one part of a 3-item code to unlock the lock of the room they are in. This allows them to move forward. Incorrect answers will keep them in the same room – until they answer all questions correctly, obtain the code, and enter it in the proper order to open the lock.

Participants

The DER was piloted to roughly 40 students enrolled in a hybrid corporate finance course at a comprehensive university in the Northeast US. This involved two classes with each class meeting one day per week in person and the other day virtually, asynchronous, with students completing assignments on their own. The DER was completed during one of the in person classes during the 2022-2023 academic year. It was administered at roughly the mid-way point of a 15-week semester with the goal of reinforcing concepts learned in prior courses and introduced during the first several weeks of the current class. Students earned 5 participation points for completing the exercise.

Administration & Student Feedback

The instructor administered the DER during one of the in person class meetings. The instructor offered a short introduction and displayed to the class the initial page of instructions they would soon be viewing. They explained the purpose of the exercise and offered some general guidelines to participants. Students were asked if they had any questions after which they were sent to a private space to work in a group. They were to each open the exercise on their laptop and jointly discuss and answer all questions. They all progressed through the house at the same pace.

Prior to the exercise students were already working in groups of 3-4 to complete a class project so these were the groups who worked together on this. Since this was a pilot study, groups were given 20-40 minutes to complete the exercise. All teams completed the task in 20 to 30 minutes. Following the successful completion of the DER, students returned to the classroom for a debriefing and to complete a short survey about the experience (See Appendix C). At the debriefing the instructor repeated the purpose of the exercise and asked if there were any questions or initial reactions from students. After a brief discussion, participants were sent a link to provide their individual feedback about the experience. Responses to the survey were gathered anonymously.

RESULTS AND DISCUSSION

Data continues to be analyzed. The results and discussion will be presented at the ABSEL 2023 Conference. Suggestions for future research will also be presented.

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APPENDIX A

Financial Statement Escape Room - Instructions

You have been invited to attend a bar-b-que at your friend's house. However, to get to the back patio where everyone is gathering you have to progress through three (3) rooms by responding correctly to several questions about accounting - your favorite subject. These questions are tied to two common financial statements - the Income Statement and the Balance Sheet. For a few questions you may be shown data to review. These will help you answer correctly.

You must correctly answer three questions in each of three rooms to reach the patio. You will progress through the living room, kitchen, and dining room. Search each room for three objects that reveal a question. Do the following. Move your cursor over various objects in the room. When your cursor shows a 'hand' (rather than an arrow) you should stop and click on that visual to view a question. Answer correctly and you will receive part of a 3-item code to open the lock to exit that room. If your answer is not correct, return to the room and select a different answer.

For each correct answer you will see one part (letter or number) of a 3-item code to get you out of that room. Put the code together based on the order of the questions (Quest. #1, Quest. #2, Quest. #3). To open the lock to get to the next room, click on the lock, enter the 3-item code in the correct order, and you'll move forward.

When you are ready to start, click on the link below. Good Luck

APPENDIX B

Living Room – Question 1

The Income Statement of a firm can capture sales, expenses, etc. for up to what length of time?

- a) One day
- b) One year
- c) One month

Living Room – Question 2

Which of the following statements is NOT cumulative?

- a) Statement of Stockholders' Equity
- b) Income Statement
- c) Balance Sheet

Living Room – Question 3

The capital structure of Target and most firms consists of Debt and _____.

- a) Equity
- b) Liabilities
- c) Bonds

Kitchen – Question 1

From a firm's Income Statement you can determine its Daily Sales. Looking at Target's financials for the last few years, what can you say about Daily Sales in 2020 compared to those in 2018? You may have to look up the formula to remind yourself how to compute Daily Sales. Also, enlarge the screen if you want to see the numbers more clearly.

- a) Daily Sales were roughly 25% greater in 2020 than in 2018.
- b) Daily Sales declined between 2018 and 2020 by roughly 10%.
- c) Daily Sales in 2020 are roughly double what they were in 2018.
- d) Daily Sales calculation cannot be determined.

Kitchen – Question 2

The greatest Expense on a firm's Income Statement will tend to be which of the following?

- a) Income Taxes
- b) Cost of Sales
- c) Selling & Administrative Expenses
- d) Taxes

Kitchen – Question 3

Looking again at Target's Income Statement, which Expense for the firm (and all firms) is a non-cash outlay?

- a) Depreciation
- b) Interest
- c) Cost of Goods Sold

Dining Room – Question 1

Many business transactions involve one company selling to another company with the seller sending an invoice to the customer. Once a customer pays their bill, what happens to the seller's balance sheet?

- a) Fixed Assets increases while Accounts Receivables decreases.
- b) Cash decreases while Accounts Payable increases.
- c) Accounts Payable decreases and Fixed Assets increase.
- d) Accounts Receivable decreases and Cash increases.

Dining Room – Question 2

Comparing Target's Current Assets (CA) to Current Liabilities (CL) for the year ending 1/30/21, what general statement can you make?

- a) Target has an issue. CA for a typical firm should generally be two times (2X) the value of CL.
- b) Things look ok for Target since CA and CL are in line with one another for the year.
- c) The company is strong in this area. CA for the typical firm are usually about half of what CL are.

Dining Room – Question 3

This is the Consolidated Statement of Financial Position (Balance Sheet) for Target, Inc. Looking at the capital structure of this firm – debt vs. equity – on 1/30/21, what can we say?

- a) The split between debt and equity is about 50-50 (50% each).
- b) The firm has no debt. All of the company's assets are financed with equity.
- c) The firm is financed with more than twice as much debt as equity.
- d) Equity has to be repaid while debt does not.

APPENDIX C

Student Feedback - Financial Statement Escape Room

Please answer the following questions about this class exercise.

For the following items indicate your level of Agreement (5 = Strongly Agree; 1 = Strongly Disagree)

1. The introductory remarks by the instructor prior to starting this exercise helped me understand the purpose of the escape room.
2. At the website, the initial page of instructions was clear.
3. The process of answering each question and receiving feedback was easy to understand.
4. The process of entering the code to move to the next room was easy to do.
5. The number of rooms you had to move through (3) was adequate for this exercise.
6. Finding the hidden questions in each room was easy to do.
7. The goal for completing the exercise - to get to the patio for a bar-b-que - made this exercise more fun.

What did you learn? Indicate your level of Agreement (5 = Strongly Agree; 1 = Strongly Disagree)

1. The escape room reinforced concepts about two major financial statements (Income Statement & Balance Sheet) that I need to know for this course.
2. I think my learning improves more when instructors provide this type of interactive exercise to cover course material rather than lectures, PowerPoint slides, or recorded lectures.
3. I think I was prepared enough to succeed in the escape room.
4. My overall knowledge of financial statements improved by completing this exercise.

Timing and Group Participation: Indicate your level of Agreement (5 = Strongly Agree; 1 = Strongly Disagree)

1. The length of time of the escape room was adequate.
2. I liked working in a group to complete this exercise.
3. All members of my group were equally involved in answering the questions in each room.
4. I would have preferred to work on my own to complete this assignment.
5. I'd like to see more of this type of class exercise in my courses.
6. (Open Ended Question) If you have 1 or 2 suggestions to improve this escape room, please share them here. (Not Required.)

V. Final Questions

In which class did you complete the Escape Room?

Principles of Finance _____

Capstone _____