Building Digital Tools Assisting Escape Room Owners
Survey and Analysis Stage, COM3610

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Signed Declaration

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Abstract

Escape rooms are physical, interactive experiences in which a group of participants must solve puzzles to escape a locked room, solve a mystery, or otherwise meet some goal in a particular timespan. This paper uses various studies into applications of escape rooms to discuss the priorities of well-made escape games, and marks my current progress in research into my dissertation topic as in the title. It focuses on the difficulties in applying technology in escape rooms and priorities that should be held in order to mitigate these. On this basis, it serves to document universal requirements to bear in mind when developing hardware or software for escape rooms.

Contents

Chapter 1

Introduction

The aim of this project is to build tested tools to meet the needs of escape room owners. Research will be focused towards exploring the needs of escape room owners, such that a product can be designed and built to target one or several of these. These needs may be related to issues such as making sure a timer is visible to the group, or to processes that currently take more time than necessary, such as posting photos of teams to social media (Woff (2019)).

In order to guide the focus of my project, I will use this paper to discuss the features of escape rooms and analyse their implementation across existing research. I intend to do so guided by my chosen research questions.

Research Questions

I have identified two research questions, which this stage of the project will be focused towards answering:

RQ1: How are concepts used in escape rooms applied in different environments?
RQ2: Based on this, what can we establish as the requirements for escape games, independent of their environment?

Chapter 2

Background and Motivation

Escape rooms are physical, interactive experiences in which a group of participants must solve puzzles to escape a locked room, solve a mystery, or otherwise meet some goal in a particular timespan. They are a phenomenon that has existed since around 2007 (Nicholson (2015)), and are a growing industry. Escape rooms are run both by enthusiasts as solo ventures, and as franchises across the country. Nicholson (2015) documents escape rooms as the culmination of a variety of media. Of those he has listed, I feel the puzzle or treasure hunt genre shares the most fundamentals with escape rooms - a team-based problem-solving challenge done in person. Various others have lent features to escape rooms, such as immersion in a story as the "hero", which DuPlessie (2013) reports as being something participants enjoy.

Escape rooms have grown popular in many locations across the world as a recreational activity (Nicholson (2015), Stasiak (2016)), even serving as a tourist attraction (Dilek and Kulakoglu Dilek (2018)). Nicholson reports that the *Real Escape Game* by SCRAP was the earliest well-documented activity branded as such. SCRAP has gone on to develop escape rooms at a much larger scale than the typical escape room, which serves teams of an average size of 4.58 people (Nicholson (2015)).

My goal in writing this literature survey is to understand not just the state of the commercial escape room industry, but the application of escape rooms in education and other contexts. The major difference between these contexts is that the commercial escape room industry is most regularly founded on permanent fixtures, and educational escape rooms are often applied in a classroom environment. These different environments dictate some differences between escape room experiences - for example, López (2019)'s escape room was designed for multiple groups to attend at once, whereas most commercial escape rooms accept only one team per room. However, as I intend to show in the literature survey, inspiration can be taken from both contrasting environments and applied universally.

Chapter 3

Literature Survey

Escape room owners are able to apply technology to varying degrees. On the outside of the escape room experience, owners implement leaderboards, share team photos to social media, and interact with the team via a screen or handheld transceiver in the room. Inside the room, entire puzzles can be based on technology, if the owner has the necessary expertise. Some more unique applications within the room are also possible, such as using a hidden camera to take a photo of the team, apply filters, and display the photo among works of art as in The Gallery. However, there is a general aversion to the use of technology in escape rooms, for a variety of reasons. Woff (2019) suggests that the time investment and necessary expertise are some of the greatest contributing factors. DuPlessie (2013) approaches this from the perspective of immersion - with 70% of escape room games being purely physical activities (Nicholson (2015)), DuPlessie recommends movement away from what he calls the "glowing rectangles" as our medium of choice.

The increasing application of IT in education means that computers are often part of the school environment, and can be used as a tool when building an escape room experience for educational purposes. Several studies cover the use of escape rooms as a means for education (López (2019); Rouse (2017); Peleg et al. (2019), Beguin et al. (2019)). Rouse (2017) applied technology to an escape room in the classroom using a game loaded from a memory stick. This application seems understandable, as Rouse's audience was likely to have some basic level of expertise in, and enthusiasm for, handling computers as part of the digital native generation. However, in practice, it brings to mind the image of a small group of people crowding around a screen. Woff (2019) warns against situations like this, saying that visibility of the puzzle to the entire team should be a priority.

However, ill implementation should not be excluded from escape room environments. Instead, I feel technology has the potential to inspire change in escape rooms. Escape rooms and technology are inherently linked - digital escape-the-room games such as *Myst* precede and inspire physical escape rooms (Nicholson (2015)). These forms of escape room lack a shortcoming that is one of physical escape room owners' greatest anathemas - resetting these rooms is as simple as resetting the game. Whether this is done by restarting an attempt, restarting the game, or removing save files and starting over, it is often trivial compared to how long it takes to reset escape rooms. Woff (2019) suggests that resetting rooms can often take as long as 15 minutes, and that it is something escape room owners seek to optimise; the shorter a reset takes, the more time is available to welcome customers.

Commercial escape rooms are often permanent fixtures. This means that more immersive environments and more complex physical puzzles can be built. However, puzzles of a physical nature usually need to be reset by the room owner back to their original state, so that more than one group can attend a room in the same day. Contrary to this, escape rooms built in a classroom environment are usually of a temporary nature, and may even try to allow for multiple groups to attempt the room at once, at the cost of immersion and interactivity. A study by López (2019) organised its puzzles in a manner whereby puzzles could be completed in any order, allowing multiple groups to attend the room at once. One example puzzle given in the study was an exercise likely done on paper - exercises in this form make resets trivial, as a fresh worksheet is all that is necessary, but they also demonstrate the lack of immersion. Commercial escape rooms regularly employ more physical interaction - 78% of escape rooms employ a search for physical objects as part of the experience (Nicholson (2015)). Some varieties of commercial

escape room visit the other end of this spectrum, such as those developed by Tuzak, an Istanbul company developing portable escape games (Gündüz (2018)). Portable or temporary escape games often trade immersion for greater logical challenge.

Application of technology in escape rooms comes with some uncertainty, and a break in the flow of the escape room experience can shatter participants' immersion and lead to negative reviews (Woff (2019)). This also creates some difficulty when it comes to visibility - unless monitors are suitably placed and large enough to be viewed by a full party, the whole team may not be able to interface with a puzzle that applies technology. This is particularly an issue if a single typical workstation is set up - Nicholson (2015) warns of the danger of removing just one player from the "mental space".

Woff (2019) theorises that VR escape rooms such as Exit Berlin may be the next stage for the industry, which would allow immersive rooms to be created while effectively eliminating the issue of resetting the room as above. This would bring the escape room cycle full circle, reincarnating the modern wave of physical escape rooms in the digital form that inspired them.

Keywords

I identified the following keywords for use in my search. The search was conducted using the Google Scholar search engine.

- escape room / puzzle hunt
- owner / host
- implementation
- software
- education / classroom

This led to the following searches.

- escape room owner
- escape room host
- escape room software
- escape room education
- escape room classroom

Chapter 4

Requirements and Analysis

The objective of my project is to build a tool for the escape room community. This may come in the form of hardware, software, or some combination of the two. I will survey the escape room community on Facebook to determine what to do here - I have a selection of ideas, which I was able to discuss with an escape room owner (Woff (2019)).

This has evolved from the initial proposal, which was to build an escape room exclusively using technology. After much discussion with my supervisor, we determined that this was too vast of a goal for the project. This would have been a distributed system using a variety of networked technology. The next phase of this idea was to create a framework for digital puzzles, which would use a variety of inputs and outputs - using the Quando framework developed by Stratton (2016), I would quickly be able to construct interactions across many media. Quando has support for the Leap Motion ("Leap Motion," n.d.) hand-tracking device, micro:bit ("Micro:Bit Educational Foundation," n.d.), and a variety of in-browser technology. However, the project may use a closed-source license in future (Stratton (2019)), which meant that I found it difficult to rely on for my work. Additionally, Woff (2019) warns that digital uptake in escape rooms may be middling due to the inherent risk, as discussed in the literature survey.

My next step is to survey the industry, which is subject to the approval of an ethics review of my questionnaire. A questionnaire will be sent to the Facebook group created and maintained by Nicholson (2015). This will help to solidify the direction of my project.

Chapter 5

Progress

I have been able to make good progress in defining my scope this semester. The most important thing I have had to do is to get in contact with the escape room community - I have been able to reach out to all of Sheffield's escape rooms, though only one has returned any interest in supporting the project. This was The Lockup Escape Rooms in Sheffield.

I got in contact early in November, which was a busy time for all rooms. In initial communications with The Lockup, Liam offered a free attempt at the escape room pro bono. I took up this offer on the 29th November with a group of friends. The experience was enjoyable for all, and I found it refreshing to see some science applied within the room - one of the puzzles relied on mixing chemicals and using the colours of the resultant reactions to solve the next puzzle.

Before this, I met with Liam on the 20th November to discuss the challenges he faces as an escape room owner, and his philosophy in developing the rooms he offers at The Lockup. Engagement, visibility and breakability all inspire his approach: the entire party must be able to interact with, and be engaged by, puzzles in the room, and the puzzles should not take long to reset to their initial state for the next party that attends the escape room (Woff (2019)). Liam and I discussed some areas that could be targeted, which will inspire a survey I send to the Facebook group created by Nicholson (2015).

Nicholson runs a Facebook group[1] for escape room enthusiasts, encompassing both owners and participants, to which I sought and gained access as part of my work. The majority of posts, at the time of writing, seem to be from enthusiasts who report back from rooms they have attended, though I have seen posts about types of puzzles that can be implemented. I intend to survey this group, as it appears to be a central hub for what may be a sparse online community.

Though I have not yet locked in my approach, I have been learning to develop for the ESP32 microcontroller and the unPhone platform (Cunningham (2019)). This provides a strong framework for IoT development at a low cost and may be an outlet to explore in the development of my artifact.

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[1] https://www.facebook.com/groups/608883549212939/

Chapter 6

Conclusions and Project Plan

It is difficult for me to provide a detailed plan at this stage, since I have not been able to calibrate the scope of my project in time for submission of the literature review. However, I should be able to define this once I understand from my survey what the industry wants. Independent of what I choose to build, I intend to:

- Break the task down into epics and tickets, as explained by .
- Refine the tickets. The goal is to be able to pick up any given ticket and to have left myself enough information that I could comfortably progress with it.
- Estimate the tickets using story points. Of course, these would be subjective estimates, but I have no doubt that they will assist in helping me to prioritise and schedule work. They will give me confidence in being able to predict how much I should be able to complete by the end of the project.
- Begin work, focusing in particular towards research into unknown areas. Should I choose to use a tool that I don't yet have full knowledge of, I will first make sure that my knowledge and capabilities in using it are adequate.

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