Utilizing a Digital Escape Room to Improve Students' Grasp and Understanding of Qualitative Research Methods

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Abstract: Utilizing the potential in game mechanisms for learning purposes is not new. This version of gaming for learning is about developing a Digital Escape Room (DER) revolving around a specific subject: qualitative research methods. Qualitative research methods have proved to be a difficult topic for many UG and PG students. It is thus important to develop tasks that will enable these students to obtain a deep learning experience. The significance of this project lies in that both qualitative and quantitative research methods seem to be difficult to learn for students. It seems to be a curriculum that the students need to invest more time learning than they expect and are willing to spend. Hence, seeking to utilize the potential that lies in immersive gaming. One of the aims of this project is to investigate if and how the DER approach will suit the step-by-step approach that is often used in qualitative research methods courses. Will this approach of solving puzzle-by-puzzle, and then combining answers in order to unlock the next level enable an emergence of more understandings of what the qualitative research is about? In this theoretical paper (work-in-progress), we will look at the DER literature and describe how the different components of the DER will contribute to pedagogical support regarding learning outcomes. In this next phase of this project, we are planning to develop our DER based on the current literature and previous evaluations of DERs, we will also conduct more semi-structure interviews, and further investigation is underway.

Keywords: Digital Escape Room, Pedagogical Support, Games-based Learning, Higher Education, Research Methods.

1. Introduction

Teaching scientific research methods have proved to be difficult and there have been different approaches to making students learn how to do research in an ethical, reliable and valid manner (Boger and Tufte, 2009). Students seem not to understand the importance of learning about research methods until they have to utilize

this in their bachelor or master's degree theses. In our experience, students attend the first day of the course and then turn up for the last lecture summing up the curriculum, with a few exceptions. Hence, several students fail the course every semester. Many efforts have been made to make students understand the value of working on the different approaches within the area of scientific research methods, even the use of games (Haave and Vold, 2018; Slyman, 2018, 2019, 2022).

Gamification has, however, seemed to make students become motivated and engaged. Recent studies have focussed on a particular type of games that has had a short history: Escape Rooms.

The potential that lies in this way of playing for learning has gained popularity and momentum. In the last few years, the number of scientific experiments have increased significantly (See Taraldsen et al., 2022). For example Slyman, (2022) and Taraldsen et al. (2022) recognize the invaluable impact of this on motivation and 21st-century skills.

As we have a large cohort of students who are studying online, we would like to develop a digital version of an escape room. This will also serve as an additional learning resource for our on-campus students

Hence, our aim is to develop a digital escape room that motivates students to engage with the curriculum and also support the learning outcomes of the course in qualitative research methods.

This paper will firstly present the theory that has enlightened our study, and then suggest guidelines for a proposed digital escape room.

2. Theoretical Foundations

Gamification has proved to be supporting learning in several different areas of education (Dittman et al., 2021, Hellerstedt and Mozelius, 2019; Shaffer et al., 2005; Prensky, 2003). According to Plass et al. (2015) gamification trigger cognitive, affective, behavioural and sociocultural engagement, hence supporting an immersive learning experience as well as making the learning more comprehensive.

In the last 10 years escape rooms have become increasingly popular (Fotaris and Mastoras, 2019). What is recognized as the first escape room is "Behind Closed Doors" developed by John Wilson in 1988 (Ascalon, 2021). This was a text-based game with a player trapped in a room. In 2004 the "Crimson Room" was developed by Toshimitsu Takagi, a Japanese game creator (Ascalon, 2021). The Crimson Room is a free digital escape room. The first physical escape room opened in 2007 and was created by Takao Kato (Ascalon, 2021). The most well-documented escape room is, however, The ''Real Escape Game developed' by SCRAP. Since then, several escape rooms have emerged in most major cities (Nicholson, 2015).

Nicholson (2015) has defined an escape room as a: "live-action team-based game 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" (p.1). This coheres with Salen and Zimmermann's (2004) definition of a game as "a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome" (p.80).

The majority of the HE research studies on the use of escape rooms have emphasised its significant beneficial role for education (Taraldsen et al., 2022). For instance, we find research on, for example, language education (Bellés-Calvera and Martínez-Hernández, 2022), teaching mathematics (Slyman, 2022; Stohlmann, 2023; Pg Abu Bakar et al., 2023) and health science (Cruaud, 2023).

The social cognitive theory suggests that human functioning, such as the construction of knowledge, emerges from a dynamic causal relationship between three key determinants: behavioural, environmental, and personal (Bandura, 2012, Bandura, 1997). Behavioural determinants involve the human tendency to participate in activities and collaborate with others (Bandura, 2012). Personal determinants encompass affective, biological, and cognitive factors, including motivation, genetic makeup, thinking, and communication skills. Environmental determinants, on the other hand, can be imposed, selected, or constructed by individuals (Bandura, 2012, Bandura, 1997).

In one of the pioneering books on the psychology of video games, Loftus and Loftus (1983) and Gee (2007, 2011) delved into players' motivations, examining what makes video games enjoyable. Drawing heavily on behaviourist theories, they noted that video games often provide rewards or successes intermittently, aligning with an intermittent reinforcement schedule, which is known to produce the highest response rate. They also highlighted that effective games strike a balance: they are neither too easy, which can bore players and lead them to stop playing, nor too difficult which can frustrate players and cause them to quit. Instead, good games find the "sweet spot," where players can achieve success but only with some effort, creating a state of "flow" (Csikszentmihalyi, 1990). In the context of learning, well-designed games aim to be within a player's zone of proximal development.

Adapting the concept of games to the educational context has proven challenging. Researchers in education debate whether games should be used to teach specific subject matter concepts and facts or to support the overall learning process (Prensky, 2003, Chee, 2016). The former approach is known as game-to-teach, while the latter is referred to as game-to-learn (Chee, 2016). In the game-to-teach paradigm, game-based learning is defined as the integration of educational content with computer games. The idea is that combining video games with educational material can achieve results equal to or better than traditional learning methods (p. 145–146). This approach focuses on engaging students with games to achieve learning outcomes.

Conversely, the game-to-learn paradigm involves designing games as scaffolds to guide students through an inquiry process (Chee, 2016). This method includes multiple layers of activities, such as reformulating problems in contextually appropriate ways to construct meaning. While the debate between these two paradigms may not be resolved here, it is important to note that game-based learning aims to leverage the potential of games to enhance the teaching and learning process.

As games and related digital media have become more complex and intentionally instructional, efforts have been made to incorporate the natural scaffolding that occurs during play into the digital environment to support learning. The concept of scaffolding was first introduced by Wood et al. (1976) to describe how an adult or expert helps someone less skilled solve a problem or complete a task. Scaffolding occurs when an expert manages parts of a task that are beyond the learner's abilities, enabling the learner to accomplish something they couldn't do alone. Although Wood et al. did not explicitly connect scaffolding to Vygotsky's zone of proximal development, it is clear that effective scaffolding requires the task or problem to be within the learner's zone of proximal development (Bruner, 1985).

Modern entertainment games excel at guiding new players through the learning process. Typically, these games begin with a tutorial level where players' actions and outcomes are closely monitored. Players receive targeted feedback and support in areas where they struggle, providing dynamic feedback to facilitate learning. As players progress and succeed in the tutorial, the provided extra-support is gradually removed, effectively fading the scaffolding. While this scaffolding process is relatively straightforward and effective in entertainment games, it has been more challenging to implement successfully in educational games. This is partly due to the increased complexity of conducting the dynamic assessments required for learning-focused games (Plass et al., 2015).

When viewed from a sociocultural perspective, game-based learning recognizes that learning is socially constructed and motivated (Wenger, 1998; Bandura, 2002; Slyman, 2018; Slyman, 2022). Games offer opportunities for social engagement and create environments where peer interactions can enhance learning (Squire and Gee, 2011; Squire, 2006). Learning designs emphasize that social and cultural aspects focus on how learners can work in groups, leverage collective knowledge to achieve goals, connect learning to cultural norms and identities, and use social and cultural influences as motivators. These features are integrated into both immediate and broader gameplay contexts.

Cruaud (2023) has analyzed the interactions in three escape room games. The outcome of the research shows that it may be difficult to steer the discussions, and unless the game provides feedback or there is a game master that can provide clues, participants may go astray and become uncertain about what to do next and whether they have the correct answers. Hence, the importance of game testing and a game master to be present for the time of the gaming, making sure there is adequate and good feedback provided to the participants.

Videnovic et al. (2022) have suggested a design thinking approach to develop educational digital escape games. This implies five phases: the first phases are "empathize" and "define" which is about identifying and understanding the problem from a student's perspective, then the "Ideate" follows which is about determining what the game should be about, lastly there are the phases of "prototyping" and "testing".
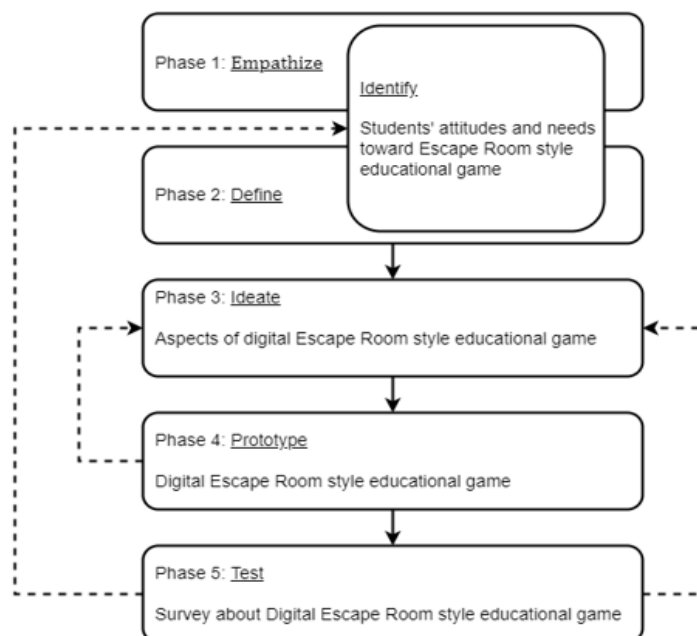

Figure 1 Design thinking methodology used in the development of a digital escape room (Videnovik et al., 2022)

According to Veldkamp et al. (2020), the goal for the game should differ from the goal of the education. Also, in an examination of the impact of the gameful experience done by Vigerdor (2021) in a digital escape room on motivation, Vigerdor found a significant effect driven by intrinsic motivation. Students viewed the digital escape room as a learning incentive, engaging with it purely for the enjoyment of playing and learning, without any external pressure. They also experienced immersion in the game which boosted their motivation and sense of playfulness. Research supports the link between intrinsic motivation and gameful experiences, indicating that intrinsic motivation arises from enjoyment, the excitement of the game, or the desire to improve skills (Vidergor, 2021). While students associated collaboration with the gameful experience, particularly group efficacy, they did not see collaboration as mediating the relationship between gameful experience and motivation. Teamwork helps in mastering challenges and enhances feelings of competence. Belief in group's capabilities and supports, known as group efficacy, could contribute positively to students' confidence in handling assignments (Vidergor, 2021).

3.   Research Questions

This paper describes how the different components of the DER will contribute to pedagogical support regarding learning outcomes. One of the aims of this project is to investigate if and how the DER approach will suit the step-by-step methodology that is often used in qualitative research methods courses. Will this approach of solving puzzle by puzzle and then combining answers in order to unlock the next level enable an emergence of the understanding of what qualitative research is about? To develop the DER we will look at development methods and follow up on previous evaluations of DER's.   Our research questions, based on the gaming literature review, are as follows:

How does DER approach fit the step-by-step methodology that is often used in qualitative research methods courses.*?*

Will the DER approach enable an emergence of a greater understanding of what qualitative research is about (i.e. help students to understand qualitative research method)*?*

In the following, we will present our method of inquiry, our initial findings from the literature, and discuss briefly the next phase of our future research.

4.   Method of Inquiry

We will use the proposed design thinking methodology (As discussed above) as a point of departure. Hence, thorough investigations as to understanding what the problem with learning qualitative research methods is about.

The data is from interviews with the main respondent, conducted both in person and via zoom. The zoom-meeting was recorded and transcribed. The respondent has agreed to the recording. The coding was done manually using categories and sub-categories.   We will thus interview students using a semi-structured interview guide (Dalen, 2011). In addition, we will investigate their attitudes and needs towards the DER. Furthermore, there is a need for inviting the students to the development process for developing and testing the prototype for the DER.

5.   Initial Findings and Future Research

5.1   Developing the Digital Escape Room for Qualitative Research Methods Course

As seen above, a typical Digital Escape Room generally starts with an introduction and an explanation of the rules. This may either be a game master, a video or a written message (Taraldsen et al., 2022).

One important feature of the game will be to follow the suggestion of separating the goal of the game with the goal of the education (Veldkamp et al., 2020). It will, however, have to be balanced so that they do learn what we aim for. Although fun and engagement are important, it is equally important that they actually learn the intended learning objectives and that they experience not only motivation but are able to utilize what they have learned & applied it posterior to the gaming.   Furthermore, we will have to be vigilant regarding the caution made by Cruaud (2023) about the need for input, tips and hints. We will therefore provide feedback on all of

students' answers, especially when they are wrong, so that they get appropriate hints and tips to proceed in the game. We might also explore whether we can establish an AI solution that are able to understand and cater for the students' needs during the gameplay. In the preliminary stages we might have to monitor and personally supply the students with hints and tips when needed. If we fail to provide appropriate feedback, the students may become disconnected from the gaming, loose interest and hence break the *flow* (Csikszentmihalyi, 1990).

The participants need to work together as a team to solve problems within a constrained time limit. In this next phase of our research, we will use the proposed design thinking methodology (As discussed above) as a point of departure. Hence, thorough investigations as to understanding what the problem with learning qualitative research methods is about. We will thus interview students using a semi-structured interview guide (Dalen, 2011). In addition, we will investigate their attitudes and needs towards the DER. Furthermore, there is a need for inviting the students to the development process for developing and testing the prototype for the DER.

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