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Escape Rooms as a Collaborative Problem-Solving Environment

Ioannis Papadopoulos, School of Primary Education, Aristotle University of Thessaloniki, Greece
https://orcid.org/0000-0001-6548-1499

Eirini Tenta, School of Primary Education, Aristotle University of Thessaloniki, Greece

ABSTRACT

Escape room games are a popular recreative activity that recently started gaining popularity as both a means for conducting research studies and a teaching and learning environment. This paper follows a group of 16- to 17-year-old students in an escape room while they encounter logical challenges in order to escape from the room in a limited amount of time. Their ability to work effectively as a team and complete activities quickly is a key element to success. In this setting, the aim was to examine in what ways this innovative environment might help students benefit in terms of social metacognition. The findings gave evidence that during collaborative problem-solving in an escape room, cognitive demands are distributed among the players. This makes metacognition visible, facilitates shared management thus improving individual cognition, facilitates reciprocal scaffolding, and enhances motivation.

KEYWORDS

Collaborative Problem-Solving, Escape Rooms, Social Metacognition

INTRODUCTION

When using problem-solving as an approach to teaching, it is important to examine what kinds of authentic experiences the students have through problem-solving (Nunokawa, 2005). The importance of authenticity in the problem-solving process has been emphasized as a means to direct students' attention to desirable behaviors and scaffold their solving activities (Forman & Steem, 2000; Verschaffel & De Corte, 1997). Escape rooms can be seen as innovative means to provide authentic experiences that facilitate solvers to exhibit certain problem-solving and metacognitive behavior in a collaborative setting. Escape rooms games constitute a very recent and popular way of entertainment for young people that integrates technology. They are live-action single-player or team-based games where players must escape from a place under time constraints by discovering clues and solving puzzles (Nicholson, 2015). Some researchers suggest to use them as a form of an educational environment to teach mathematics or problem-solving (Pan, Lo, & Neustaedter, 2017). Indeed, escaping from a game room requires certain problem-solving skills (Muir, Beswick & Williamson, 2005) such as 'interpreting information, planning and working methodically, checking results, and trying alternative strategies' (p. 229) in the context of collaboration and communication between the participants.

In this landscape, the aim of this paper is to examine in what ways escape rooms can facilitate aspects of social metacognitive behavior in groups of high school students.

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THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Escape Rooms – What are They

The experience of an escape room starts with an introductory meeting between the game master and the participants. Each escape room is based on a thematic story and therefore the players are introduced to this story and the rules by the game master. After that, the door is closed and the countdown begins. The players must explore the room (always under time pressure) seeking everywhere for possible clues that will help them. The nature of the clues varies according to the specific room. It might be some numbers, or symbols, or a painting on the wall, or the placement of some objects in the room. The difficulty is that there is no hint about the effective use of these clues. So, the players have to discuss, exchange ideas, examine these ideas in order to understand the role of each clue towards them exiting the room. Players are free to explore the room that very often includes the usual equipment found in an ordinary home, such as drawers, boxes, clocks, and some clothing. Almost always they discover a puzzle and then again they have to collaborate to advance their solution. Sometimes these puzzles are accompanied by notes in the form of riddles. Other times the puzzle might be a digital device that must be unlocked or must be set in function. However, there are no instructions given to the players. Solving one puzzle usually leads players to another. Each one helps them to get closer to exiting the room by opening a door, unlocking a device, revealing a piece of hidden information necessary for further steps. In case the group is stuck they can ask for hints from the game master.

Ernest (1986) suggested reasons for the inclusion of games in the ordinary mathematical classroom and these also fit in the case of escape rooms, namely they generate enthusiasm, motivate players, cannot be played passively, demand collaboration, they contribute to the development of problem-solving skills.

The design of the escape rooms puzzles must satisfy certain criteria (Wiemker, Elumir, & Clare 2017) such as:

1. Escape rooms are about group activities and therefore puzzles must allow every member of a team to contribute in a meaningful way.
2. Puzzles must be related to the theme of the room.
3. Puzzles must be understood by the players based exclusively on the information available within the room and consequently can be solved using only this information.
4. Puzzles must be an integral part of the storyline.
5. The provided clues must be logical.
6. Puzzles must add to the atmosphere of the room.

Escape rooms have only been recently researched with most of the relevant papers focusing on recording the current state of the art (Nicholson, 2015; 2018; Wiemker, Elumir & Clare 2015). Only lately the research shifted focus on the use of escape rooms for educational purposes. At this point the distinction between recreational and educational escape rooms should be made clear. The first ones —as described above— are often heavily themed real-world games and inspire teachers to adapt this popular entertainment for educational purposes (Sanchez & Plumettaz-Sieber, 2019). Educational ones (that might be real or virtual) are classroom specific and designed for a particular target group aiming to achieve certain learning goals such as specific content knowledge, general skills, and affective goals (Veldkamp et al., 2020). The number of the relevant research papers is small given the diversity of the topics that are covered under the umbrella of this new broad research topic. So they have been used to educate college students to be prepared for earthquakes (Novak, Lozos, & Spear, 2019), to understand undergraduate students' searching behavior in different environments (Choi et al., 2017), or to develop some generic skills such as the students' ability to work in time-demanding group settings (Craig et al., 2020). The use of escape rooms to develop or foster certain skills in a variety of educational domains has been researched sporadically. An escape room teaching game