Unlocking Learning: An Overview of Game-Based Learning and Escape Rooms

***Dr. Navdeep Kaur & **Mrs. Maninder Pal Kaur**
*Assistant Professor, Department of Education, GNDU Amritsar
**SRF, Department of Education, GNDU Amritsar,

Abstract

This paper attempts to provide an overview of escape rooms, a new educational pedagogical approach. The entertainment business was the first to introduce escape rooms. Toyota Company Japan published the first escape room in 2007. Dr. Scott Nicholson, who conducted a survey of 175 escape rooms worldwide, gives a detailed explanation of the idea of escape rooms, as well as their many features and design elements. Additionally, the study shows that escape rooms are essential for improving learning outcomes, student engagement, motivation, and the development of soft skills in classrooms.

Keywords: *escape room, design characteristics, recreational and educational escape room*

Introduction :

New ways to engage students in learning can be most meaningful if we provide opportunities for them to engage with each other and forge an understanding of the narrative behind the lessons.

Game-based learning (GBL), a term coined by Prensky, is a relatively new term for the paradigm of using games and play as systems for representing and simulating real-life conditions, imparting knowledge and moral teachings, and generally nurturing social evolution. In reality, this approach has existed for thousands of years under very different names.

The earliest game currently known to man is Senet, which was used to symbolize (and positively teach) the then-current theological perspective on the transition to the afterlife. Historical evidence of early (boards) games can actually be traced back to the Predynastic burial tombs in Egypt, which date to around 3500 BC. The fact that Senet and other early board games have been discovered in a wide range of historical contexts and cultures (such as the Royal Game of Ur in Mesopotamia, Go in China, and Patolli in pre-Columbian Mesoamerican cultures) highlights the importance and fascination that people have had—and still have—with regard to games and play. The classic discussion of play and culture brought forward from Huizinga in his seminal ``Homo Ludens'' even reverses the intuitive chronology of history and games, in that, he argues, it is in fact culture and civilization that themselves arise in and from ``the play spirit.''

Although it is seen as an alternate medium, game-based learning does not take the place of traditional learning. When Prensky first proposed the idea of game-based digital learning (GBL) in 2001, it sparked a movement for GBL and had a significant impact on how academics created GBL standards and requirements for classrooms. According to Tang and Hanneghan (2011), game-based learning is a novel approach to education that is based on the usage of computer games with educational value or other software programs that employ games for learning and education. By bridging the gap between the everyday culture of digital natives and their education, game-based learning aims to make learning more engaging and relevant, which will encourage students to gain transferable knowledge and skills.

Escape Room:

The escape room is one modern game type that educators are looking at using in the classroom. Puzzles in escape rooms must be solved within a set amount of time in order to "escape," or win. According to Nicholson (2015a, p.1), escape rooms are "live-action team-based games in which players find clues, solve puzzles, and complete tasks in one or more rooms in order to accomplish a specific goal (usually departing the room) in a limited amount of time."In order to produce a compelling experience, escape rooms incorporate aspects of chance, social interactions, and time pressures (Kolar, 2017).

Live-action role-playing, point-and-click adventures, puzzle and treasure hunts, interactive theatre and haunted homes, adventure and game show movies, and a themed entertainment sector are some of the precursors of escape rooms, according to Nicholson (2015). A relatively recent pastime, escape rooms first appeared in Japan in 2007 (SCRAP, 2007). The popularity of escape rooms has grown quickly in recent years, and many companies now provide them as a fun group activity all around the world. According to Dilek and Dilek (2018), there are at least 4,096 escape rooms spread across 1,769 locations in 68 different nations. Teams of people of various sizes are intended to use escape rooms. According to a survey of 175 escape room companies worldwide, the average team size is 4.58 (Nicholson, 2015). Teams typically consist of two to eight people (Cohen et al., 2020). Teams are frequently given a set amount of time to finish the challenges or puzzles in the escape room in order to alleviate time pressure throughout the activity. These challenges or puzzles can be given in a number of ways, such as several puzzle kinds for participants to solve or ways to arrange how these puzzles are presented to participants.

Nonetheless, research on the efficient application of escape games is still in its early stages. Researchers have only recently started looking into the possible advantages of escape games (Humphrey, 2017). Whether escape games are an activity that could concurrently foster engagement, teamwork, critical thinking, and knowledge generation is still up for debate. Educational escape rooms yield surprising learning outcomes for undergraduate students. According to educators, children gained soft skills including communication, problem-solving, and teamwork while playing the game (Humphrey, 2017).

The Rise of Escape Rooms in Education:

Around the world, escape rooms are becoming more and more common in classrooms (Breakout EDU, 2018; Sanchez &Plumettaz-Sieber, 2018). Escape rooms are team-based, live-action games where participants must overcome obstacles to finish a mission within a set amount of time. In the first-generation games, the tasks were "escapes" from a room. These days, the missions change; players might have to break into a vault or solve a murder investigation (Nicholson, 2015). In addition to their enormous appeal in the entertainment sector, escape rooms are becoming more and more well-liked as settings for instruction and learning. It is noteworthy that the creation of educational escape rooms began at the bottom, with passionate educators sharing their resources on websites like Breakout EDU, which boasts 40,000 members (Breakout EDU, 2018; Sanchez &Plumettaz-Sieber, 2018).

Based on their expertise in recreational escape rooms and escape room video games, teachers create the rooms (Franco & DeLuca, 2019). According to Borrego, Fernandez, Blanes & Robles (2017), Cain (2019), and Hermanns et al. (2017), their goal is to design escape rooms that experiment with an active learning environment that is believed to boost students' motivation or engagement and stimulate learning while utilizing or developing teamwork and communication skills. Learners value the variety of puzzles that need problem-solving and exploration skills, as well as the necessity of physical characteristics and teamwork. Additionally, students reported feeling more active, having to think more deeply than they would in a typical class, and relishing the sense of independence (Cain, 2019; Giang et al., 2018; Lopez-Pernas, Gordillo, Barra, & Quemada, 2019; Watermeier&Salzameda, 2019).

One study with 84 participants tested for gender bias (Lopez-Pernas et al., 2019). No gender bias was detected in any of the questions in the surveys that addressed the escape room activity.

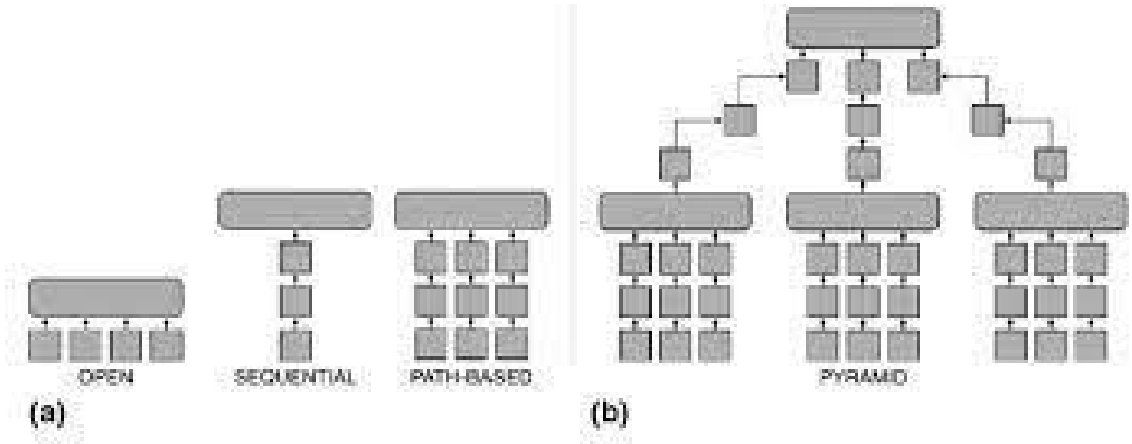
Perceptions of teachers and students appear to align with Linn's four criteria for facilitating knowledge integration: making learning accessible, making thinking "visible," assisting students in learning from one another, and encouraging independent learning (Linn, 2013). Teacher-reported implementation obstacles and limits in the classroom, including budgetary constraints, classroom availability, and preparation time, were compiled in a systematic evaluation of educational escape rooms (Fotaris&Mastoras, 2019). The big groups and the limited amount of time to set up a game present logistical obstacle. Furthermore, it is important that the activities closely correspond with the curriculum (Cain, 2019; Giang et al., 2018; Lopez-Pernas, Gordillo, Barra, & Quemada, 2019; Watermeier&Salzameda, 2019).

The idea behind escape rooms in education is to provide engaging experiences that primarily foster a positive attitude toward learning rather than only promoting cognitive material. Additionally, escape rooms are starting to draw interest as a possible tool to support team-based research and improve team performance (Cohen, Griggs, Keebler, Lazzara, Doherty, Kanji, Gewertz, 2020). In recent years, escape rooms—a game where a group of players must "escape" from a room full of obstacles in a set amount of time—have become more and more popular (Wiemker, Elumir, & Clare, 2015).According to Wiemker et al. (2015), playing an escape room game requires the use of a variety of techniques and abilities, such as seeking, observation, discernment, correlation, memorization, math, language, pattern recognition, and compartmentalization. These kinds of games align with the ideas of cooperative, interdisciplinary, learner-centred, and problem-solving-oriented education (Brown, Darby, & Coronel, 2019; Cain, 2019; Gómez-Urquiza et al., 2019; Kinio, Dufresne, Brandys, & Jetty, 2019). because they demand that players employ integration, logical reasoning, and observation to recognize and resolve issues. Thinking and problem-solving skills are essential for preparing kids for obstacles in the future (Sung, 2017). Given the advantages of game-based learning and innovative teaching methods for students, the popularity and quick growth of escape rooms in the general public, and the challenge, excitement, and motivation that these activities provide, as

well as the paucity of research on the application of this learner-centred, game-based, and problem-solving-oriented approach in elementary education, it may be beneficial to create a science-related teaching exercise.

The Escape Room Concept and Design Characteristics:

As demonstrated by Nicholson's inventory of 175 recreational ERs (2015), there are many different scenarios that could occur in ERs. Players must transition from their real-world surroundings—such as a murder scene or an old submarine—into the gaming scenario. As a result, player immersion during gaming is crucial. The process of drawing a player into a narrative or specific issue is known as immersion (Douglas & Hargadon, 2001). It is employed in instructional games to engage students in completing tasks and overcoming obstacles (Annetta, 2010). To avoid cognitive dissonance, it is advised that the game's setting (time and location), player characters, activities, tools, and props all be consistent (Nicholson, 2016). All activities are referred to as puzzles in ER literature, and they follow a straightforward game loop that consists of a difficulty, a solution, and a reward (such as a lock code or knowledge required for the next puzzle). Puzzles fall into one of the following categories: a) cognitive puzzles, which require players to use their reasoning and thinking abilities, b) physical puzzles that need to be solved by manipulating artifacts, like navigating a laser labyrinth; and c) meta-riddles, which are the game's ultimate puzzles where the final code or solution is determined by the answers to the earlier puzzles (Wiemker et al., 2015). In emergency rooms, cognitive difficulties appear to be common (Nicholson, 2015).



(Nicholson, 2015).

A wide variety of problems have been used in escape rooms. The most popular puzzle types used in escape rooms around the world are discussed in detail by Nicholson (2015). Some typical examples include looking for physical objects hidden in the room, noticing something "obvious" in the room, using something unusually, or looking for objects in an image.

A puzzle's successful completion typically serves as a step toward a more difficult meta-puzzle that must be solved in order to fulfill the game's win condition (i.e., escape the room). But

it's not always necessary to do things in a straight line. As shown in Fig. 1, Nicholson (2015) distinguished four methods for arranging the riddles. Players can solve multiple puzzles simultaneously in an open format. The last puzzle must be answered before the others. The problems are presented in a sequential fashion, with each puzzle being completed to unlock the next, until the meta-puzzle is solved. There are multiple puzzle paths in the path-based framework. A complicated, hybrid structure, such as a pyramid, can be created by combining several of the fundamental components. Players need to be able to search, observe, correlate, memorize, reason, do math, read, and recognize patterns in order to solve the puzzles (Wiemker et al., 2015). Following playtime, the gamemaster gives the players a debriefing on their progress and accomplishments (Nicholson, 2015; Wiemker et al., 2015). ERs may be utilized in education, as suggested by the skills needed and the reflection on the work completed.

Escape rooms might have a straightforward set of chores or puzzles with no theme or storyline, meaning that there are no narrative components and each puzzle has no thematic connection to the others. On the other hand, an escape room's story or topic can also influence how its puzzles are developed. Without a recurring theme that links the puzzles in the room, escape rooms frequently use an engaging story that assigns team members to distinct task tasks within the escape room. An escape room might have a recurring theme without a storyline, much like a movie set without a script. For example, an escape room can feature both a consistent narrative and theme, wherein narrative elements of the room are accompanied by puzzles that are related to the room's theme (Nicholson, 2015).

Recreational Versus Educational Escape Rooms:

Goals : Educational escape rooms are primarily intended as learning spaces, as opposed to escape rooms used in the entertainment sector. In order to achieve the desired learning objectives, students must possess the necessary topic knowledge and abilities, and puzzles must be in line with the curriculum (Cain, 2019; Lopez-Pernas et al., 2019). In contrast, players of escape games are more concerned with finishing the game within the allotted time and less with reaching learning objectives (Hermanns et al., 2017). Therefore, the design must guarantee that learners accomplish the established educational goals by completing the game goal. Constructive alignment is the term used by Biggs (2011) to describe alignment in elements of an educational design. A resulting design criterion for educational escape rooms is to align learning goals and puzzles.

Pedagogy : The idea of an escape room entails a shared objective and the necessity of teamwork to overcome obstacles and reach that objective on schedule. Social constructivists in education support the idea that students build knowledge via their interactions with one another. Teachers use escape rooms, which are based on social constructivism, to encourage collaborative or team-based learning (Fotaris&Mastoras, 2019; Hermanns et al., 2017). Ensuring active team engagement is a resultant design objective for educational escape rooms.

Team Organization : Teams typically play consecutive games in recreational escape rooms (Nicholson, 2015). Because it saves time and space in classrooms, teachers in educational contexts prefer to play with all teams simultaneously in one classroom rather than one team at a time (Cain, 2019; Fotaris&Mastoras, 2019). Teams may be more competitive and put in more effort if they play simultaneously. However, it has several disadvantages with regard to immersion in the game setting, such a "specific" call for the squad to save someone, and it may also divert players. Constrained learning spaces are a resultant design requirement.

Location : An escape room in the entertainment sector often takes place in one or more permanent, connected rooms. Classrooms are used for various classes and courses in an educational context. Teachers are therefore pressed for time when it comes to setting up and taking down activities (Cain, 2019; Fotaris&Mastoras, 2019). Enabling quick and simple handling is a major design goal for educational escape rooms.

Materials : Budgets in education are typically constrained. Teachers choose reusable and multifunctional teaching and learning materials since they have limited time and resources for (creating) instructional materials (Fotaris&Mastoras, 2019). Creating sustainable materials is, in essence, the ensuing design requirement.

Staging : A classroom setting reduces immersion in the gaming atmosphere and restricts staging (props and scenery). The context of the game is crucial since it meaningfully connects the problems. Furthermore, as education aims to teach students in a wider context than the classroom, a game context can help students see the world more broadly and face socioscientific or real-world problems, such the plastic soup—the term for the pollution of the sea caused by plastics. As suggested by educational game design literature, the design criterion that helps learners transition from the classroom setting to the game context is to promote immersion (Anneta, 2010; Visch, Vegt, Anderiesen& Van der Kooij, 2013).). In addition, immersion is also important to draw the learner into the activity, as it is not as voluntary as a recreational escape game.

Guiding : Game masters oversee and direct teams from nearby rooms in the entertainment sector (Nicholson, 2015). Instead of leading teams from a separate room, teachers would rather lead teams in the same room (Cain, 2019; Hermanns et al., 2017). Video monitoring restricts their ability to see and hear group dynamics and students' conceptual growth. Thus, the difficulty in educational escape rooms is striking a balance between the students' sense of independence while playing the escape room and the teacher's guidance (Giang et al., 2018; Visch et al., 2013). As a result, we established the design criterion to encourage learners' autonomy.

Conclusion

In this chapter, we have explored the transformative potential of game-based learning and escape rooms as innovative approaches to education. These strategies, rooted in principles of

engagement, collaboration, and problem-solving, offer a dynamic alternative to traditional instructional methods. By merging play with pedagogy, they create immersive environments where learners actively participate in their own education, fostering critical thinking, creativity, and teamwork.Game-based learning leverages the universal appeal of games to make learning enjoyable and impactful. When integrated with educational objectives, it promotes motivation, enhances retention, and bridges the gap between theoretical knowledge and practical application. Similarly, escape rooms, with their interactive and time-sensitive challenges, immerse learners in scenarios that encourage active engagement and cooperative problem-solving, reinforcing skills that extend beyond the classroom.

As we advance into an era of personalized and experiential learning, the importance of designing meaningful and inclusive game-based activities cannot be overstated. Educators and instructional designers must thoughtfully align these methods with curricular goals and diverse learner needs. While challenges such as resource allocation and accessibility persist, the potential benefits—ranging from increased learner engagement to the development of 21st-century skills—underscore the value of embracing these approaches.In conclusion, game-based learning and escape rooms represent more than just trends in education; they are powerful tools for unlocking learning. By integrating these methods, we can reimagine the educational landscape, equipping learners with the skills and enthusiasm needed to navigate a rapidly changing world. The journey of learning, when gamified, becomes not only a process of acquiring knowledge but also an adventure filled with discovery and growth.

References :

Annetta, L. A. (2010). The “I's” have it: A framework for serious educational game design. *Review of General Psychology*, *14*(2), 105–113.

Bakker, A. (2018). *Design research in education: A practical guide for early career researchers*. New York, NY: Routledge.

Biggs, J. B. (2011). *Teaching for quality learning at university: What the student does*. Maidenhead, UK: Open University Press.

Borrego, C., Fernandez, C., Blanes, I., & Robles, S. (2017). Room escapes at class: Escape games activities to facilitate the motivation and learning in computer science. *JOTSE*, *7*(2), 162–171.

Clarke, S., Peel, D. J., Arnab, S., Morini, L., Keegan, H., & Wood, O. (2017).EscapED: A framework for creating educational escape rooms and interactive games for higher/further education.*International Journal of Serious Games*, *4*(3), 73–86.

Daemen, J. W. M. J., & Van Harskamp, M. (2018).Hoe krijgen we de betastudentvoor de klas?Welkeinterventieslevereneenpositievebijdrageaan het imago van de docent? [How do we attract science and mathematics graduate students into the classroom? Which interventions foster the image of teachers?] *Poste presented at Onderwijs meets onderzoek conference* (11 October 2018). Utrecht, the Netherlands.

Douglas, J. Y., & Hargadon, A. (2001). The pleasures of immersion and engagement: Schemas, scripts and the fifth business. *Digital Creativity*, *12*(3), 153–166.

Eukel, H. N., Frenzel, J. E., &Cernusca, D. (2017).Educational gaming for pharmacy students-design and evaluation of a diabetes-themed escape room.*American journal of pharmaceutical education*, *81*(7), 62–65.

Fotaris, P., & Mastoras, T. (2019). Escape rooms for learning: A systematic review. In *ECGBL 2019 13th European Conference on Game-Based Learning*. Denmark: Academic Conferences and publishing limited.

Guigon, G., Humeau, J., & Vermeulen, M. (2018). A Model to design learning escape games: SEGAM. In *10th International Conference on Computer Supported Education* (pp. 191–197). Funchal, Madeira, Portugal: SCITEPRESS—Science and Technology Publications.

Healy, K. (2019). Using an escape-room-themed curriculum to engage and educate generation Z students about entomology. *American Entomologist*, *65*(1), 24–28.

Hermanns, M., Deal, B., Campbell, A. M., Hillhouse, S., Opella, J. B., Faigle, C., & Campbell, IV, R. H. (2017).

Using an "escape room" toolbox approach to enhance pharmacology education.*Journal of Nursing Education and Practice*, *8*(4), 89.

Jaaskelainen, R. (2010). Think-aloud protocol. In Y. Gambier, & L. van Doorslaer (Eds.), *Handbook of translation studies* (pp. 371–374). Amsterdam/Philadelphia: John Benjamins Publishing.

Jenkins, H. (2004). Game design as narrative architecture. In N. Wardrip-Fruin,& P. Harrigan (Eds.), *First person: New media as story, performance, game* (pp. 118–130). Cambridge, MA: MIT Press.

Monaghan, S., & Nicholson, S. (2017).Bringing escape room concepts to pathophysiology case studies.*HAPS Educator*, *21*(2), 49–62.

Nicholson, S. (2016, October). Ask why: Creating a better player experience through environmental storytelling and consistency in escape room design. *Paper presented at Meaningful Play 2016*. Lansing, MI.Retrieved from http://scott nicho lson.com/pubs/askwhy.pdf

Nicholson, S. (2015).*Peeking behind the locked door: A survey of escape room facilities*. Retrieved from http:// scottnicho lson.com/pubs/erfac white.pdf

Sanchez, E., &Plumettaz-Sieber, M. (2018, December). Teaching and learning with escape games from debriefing to institutionalization of knowledge. In *International Conference on Games and Learning Alliance* (pp. 242–253). Cham, Switzerland: Springer.

Simonsen, J., & T. Robertson (Eds.) (2012).*Routledge international handbook of participatory design*. London, NY: Routledge.

Visch, V. T., Vegt, N. J. H., Anderiesen, H., & Van der Kooij, K. (2013). Persuasive game design: A model and its definitions. *CHI'13 Conference Proceedings*. Paris, France: ACM.

Watermeier, D., &Salzameda, B. (2019).Escaping boredom in first semester general chemistry.*Journal of Chemical Education*, *96*(5), 961–964. https://doi.org/10.1021/acs.jchem ed.8b00831

Wiemker, M., Elumir, E., & Clare, A. (2015). Escape room games: "Can you transform an unpleasant situation into a pleasant one?". In J. Haag, J. Wei.enbock, M. W. Gruber, M. Christian, & F. Freisleben-Teutscher(Eds.), *Game based learning* (pp. 55–68). St. Polten, Austria: Fachhochschulest Polten GmbH.

Zhang, J. P. (2008). Hybrid learning and ubiquitous learning.In J. Fong, R. Kwan, & F. L. Wang (Eds), *Hybrid Learning and Education.ICHL 2008* (LNCS, Vol. *5169*). Berlin, Heidelberg: Springer.