Lessons Learned While Escaping From a Zombie: Designing a Breakout EDU Game

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WE WERE TRAPPED IN A ROOM with a zombie. It was like a scene from *The Walking Dead*, except it was our reality. This hungry, brain-eating monster was screaming and clawing at us. Drool dripped from his disfigured decomposing mouth, but this did not stop him from pursuing his prey. When I got too close to him, he lunged at me in an attempt to take a bite out of my leg. Although he was chained to a wall, he was terrifying. We knew we had only sixty minutes to get out of this precarious position. The situation grew increasingly more perilous as each moment passed. To make matters worse, every five minutes, the zombie's chains loosened—allowing him to inch closer to us while we inched closer to finding a way out. The situation seemed hopeless. Indeed it was. In the end, we failed to escape the room and the clutches of the zombie.[1]

Although we physically survived the ordeal and our first experience with an escape room, I blame Breakout EDU for luring me into that room with the zombie. I discovered Breakout EDU over a year ago while researching innovative teaching methods that spark student engagement. Breakout EDU is an open-source project created by James Sanders and Mark Hammons, two educators and

leaders in educational technology. The inspiration for Breakout EDU emerged after Sanders had played an escape room game with a group of friends. Escape rooms are a type of live-action social game that require groups of four to ten individuals to work together to solve a series of puzzles in order to escape from a locked room. Sanders and his friends enjoyed the experience and noticed how engaging the game was not only for themselves, but also for the group of teenagers who they were teamed with. Reflecting on the collaboration and critical thinking skills required to complete the games, Sanders wondered how they might be adapted to an educational setting. This became the basis of Breakout EDU. Although students are not locked in a room, Breakout games require students to solve a series of puzzles that will help them "breakout" by opening the Breakout EDU box.[2] Over the past two years, the idea has spread quickly and inspired a community of educators who are actively designing, developing, and testing games for various subject matters in their own classrooms.

As a former high school history teacher, I understand how difficult it can be to truly engage students and get them excited about history. As history buffs, we might find the process of deconstructing primary sources titillating, but our students are rarely as excited by the idea of yet another primary source analysis activity or DBQ project. Sparking their interest is crucial to their engagement. As a current university professor working with pre-service teachers, I also recognize the importance of equipping future teachers with a variety of out-of-the-box pedagogical strategies to add to their teaching toolkit to help them address the unique needs of the diverse learners in their classrooms. Movement-based activities that encourage students to get out of their seats and work collaboratively to solve unique problems are especially important instructional strategies that every new teacher should master. Firmly believing in the importance of play and the value of games in history education, I found the Breakout EDU idea intriguing and wanted to try it in my own classroom. At the time, there were only a few Breakout games on the website, intended primarily as general interest games or for use in language arts, math, or science classes. I wondered if a breakout game could be used effectively to introduce students to concepts of historical thinking, engage them in the process of analyzing primary sources, or ignite their interest in the process

of doing history. I quickly realized, however, that I really didn't have any idea of how to go about creating a game, or even of the basic premise of escape rooms. Before delving into the process of designing a breakout game for the history classroom, I decided that it was essential that I understand the escape room phenomena. In the process, I learned a lot about my own learning strengths and weaknesses, and about designing effective Breakout EDU games for history students.

My research into escape rooms began with the academic approach. I started reading scholarly articles on game-based learning. The importance of experiential, inquiry-based learning is not a new idea and is the basis of constructivist theory.[3] The concept of using games as instructional tools is an extension of these educational theories. In recent years, digital games have received a lot of attention for their potential to engage digital natives in the learning process.[4] Research on digital and non-digital games has further suggested the value of collaborative games to develop social skills.[5] Inspired by computer games, escape games have evolved into live-action, face-to-face, problem-solving adventures intended more for recreational than for educational purposes. In "Peeking Behind the Locked Door," Professor of Game Design and Development Scott Nicholson surveyed over 175 escape rooms in Asia, Europe, Australia, and North and South America. Nicholson explained that live-action escape rooms emerged as early as 2007 and now operate in hundreds of cities all over the world. The trend continues to spread, especially in urban areas with a large tourist industry. Nicholson has spoken and written extensively on the significance of games and escape rooms beyond their recreational value and suggests the potential educational value of these type of games to help kindle interest in academic subjects such as history.[6]

Reading about escape rooms was very interesting, but did little to help me understand a player's experience or the potential educational components of the game. So I decided that the next step in my research was to actually play a few escape games myself. I recruited a friend to help in this endeavor, and that is how and why we came face-to-face with the zombie described in the introductory paragraph of this article. After failing to flee the clutches of the rabid zombie in our inaugural escape room experience, we resolved to try again. Our second game was much more enjoyable and we

quickly recognized the potential of these games as an educational learning experience. We decided to play as many games as possible and to reflect on and debrief our reactions after each game. Luckily for us, the next few games did not include the added horror of a zombie chained to the wall. The theme of each game we played varied substantially, from escaping from an Ancient Egyptian tomb in Hayward, to trying to pull off a bank heist in Denver, attempting to stop a nuclear war in Los Angeles, breaking out of Alcatraz in San Francisco, escaping Dracula's library in Toronto, locating Mona Lisa's missing diamond in Paris, fleeing a medieval monastery in Budapest, solving a murder mystery in Prague, landing a hijacked plan in Helsinki, stopping a terror plot in St. Petersburg, and finding our way out of the Viking underworld in Stockholm. At the present moment, we have played over 150 different games in over forty different cities. Each game was completely different, and no two puzzles were the same. Our success rate on games also varied substantially: sometimes we escaped, sometimes we did not. Regardless of the outcome, we noticed a gradual development in our critical thinking, collaboration, communication, and resilience through repeated game play and by reflecting on each game afterwards. During our post-game debriefs, we discussed the level of challenge in each puzzle, our own personal and team areas of strength and weakness, and ways in which we would modify the game or puzzles to work in the history classroom. This reflection was an important part of the learning process and essential in helping to focus in on the key elements we wanted to emulate in our own games.

We quickly noticed that critical thinking and collaboration were essential to successful game play. Players could flit around the room glancing momentarily at diverse clues or puzzles, but solving the puzzles required patience and focus on individual tasks. To unravel the mystery, players had to take the time to evaluate each clue meticulously, work through possible solutions, and eliminate irrelevant information. This was rarely accomplished without collaboration. It was essential to recognize early on that no one person had all the answers. Acknowledging that we needed the help of others was another key to successful game play.

We also learned that communicating our thoughts and findings and actively listening to the theories and conclusions of other players

was also crucial to our success. In one particularly unsuccessful game, two team members failed to share that they had located several key clues. As a result, critical minutes were lost as others searched for the same clues. Lessons like this taught us that sharing information that you have gathered, along with actively listening and learning from others, leads to greater success. Teams that communicated well, acknowledging, affirming, and even congratulating each other, tended to contribute to a better overall learning and playing experience.

We discovered that resilience was also an important skill to develop in playing escape-style games. Sometimes, in the stress of an escape room environment, individuals would reach a level of frustration and conclude that they could not complete a task. At this point, it was important to try all possible alternatives, get input from others, and then, if necessary, move away from the puzzle to work on another task. We learned that if an individual does decide to temporarily stop working on a task, the player should ask another team member to attempt the puzzle and share what they already know or have attempted with their colleague. Even at this point, players should not give up, but quickly find something else productive to do so that each individual is always contributing to the team and to the end goal of escaping the room.

After reflecting on our experiences, the relevance and applicability of these skills to education seemed apparent. The skills directly align with the Common Core English Language Arts College and Career Readiness Anchor Standards for Speaking and Listening. CCSS.ELA-LITERACY.CCRA.SL.1 asks students to "prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively." Furthermore, CCSS.ELA-LITERACY.CCRA.SL.2 asks students to "integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally." History teachers may also design puzzles that allow students to practice specific literacy skills tied to the ELA standards for Reading Informational Text and/ or Literacy in History/Social Studies.[7] The added potential of these games to teach discipline-specific skills motivated me to attempt to design my own Breakout EDU game focused on introducing historical and social science analysis skills to my students.[8]

Historical Mastermind: The Game

Using the knowledge I learned from my escape room experiences, and guided by the design templates on the Breakout EDU website, I began the process of designing a breakout game for a history classroom. The community of Breakout EDU educators on social media provided valuable advice and assistance in the process, as well as a forum for vetting ideas. My university-level teacher preparation students tested the game and refined some of the puzzles. In the end, we created the game *Historical Mastermind* with the intent of introducing students to the basic concepts of analyzing historical sources. The game narrative introduces students to the antagonist: a maniacal history professor bent on changing the course of history. Once the game begins, students race against the clock to stop the professor from carrying out his evil plan. The premise of the game is that the maniacal professor has carefully encrypted the details of his evil plan through a series of perplexing puzzles hidden in the classroom. Students then must search the room, uncover the clues, and solve the puzzles in order to prevent him from carrying out his evil scheme, all within a short forty-five-minute time frame.

In the initial search phase, students recover a series of hidden boxes, bags, and clues. The boxes and bags, however, are locked with an assortment of combination locks. The students quickly realize that they must work together to solve puzzles in order to open the locks. First, they discover a series of historical photographs depicting significant historical events in United States history. A hint prompts them to place the images in the correct chronological order. Correctly constructing the chronological sequence reveals a code that allows them to unlock a combination on a locked pencil box. The box opens to reveal a flash drive containing a link to the second puzzle. Players must open the flash drive on a computer and follow the link on the drive to open up a geography game that charts the locations of the professor's recent travels. By correctly identifying significant historical landmarks and noting their correct geographic location, players discover a sequence of directions (north, south, east, or west) that, when correctly ordered, unlocks a directional lock on a backpack that they should have discovered in the game-play area. Once opened, the backpack reveals a disarticulated version of a "Reading Like a Historian" chart that guides students

through the typical questions asked in sourcing, contextualizing, corroborating, or closely reading historical sources. Players must correctly reconstruct the chart and discover the code to a number lock on a notebook. Once opened, the notebook reveals five historical documents that students must source and contextualize in order to determine the author, point, audience, and historic context. Correctly doing so reveals the code to a locked box and the final puzzle involving a black light and a series of hints written in invisible ink on posters hidden around the room. Once players solve this puzzle and locate a hidden key, they are able to open the Breakout EDU box—revealing a congratulations poster and confirming their success foiling the maniacal history professor's evil plan.

   The limited time frame for completing the game adds an element of intensity and competition that fuels the excitement of the group. The teacher can help facilitate the process by offering hints as necessary to keep the game flowing. Generally, however, learning works best when groups struggle through the process and discover a collaborative strategy that works for the group. The pace and anticipation tends to build so that in the final moments of the game, as students open the last box, they typically spontaneously erupt in clapping and cheers, fully empowered by their success. Groups that do not complete the mission in the time frame tend to experience frustration, regularly followed by a "let's try that again" attitude. Regardless of the outcome, the teacher follows up with a classwide debrief encouraging students to reflect on what they learned from each individual puzzle and to discuss ways to improve their collaboration in the future. The game is intended as a fun way to introduce students to more complex historical thinking concepts such as the process of sourcing and contextualizing primary documents. In addition to introducing them to the academic language used by historians, puzzles encountered throughout the game offer opportunities to begin practicing sourcing documents by identifying the author and intended audience. Clues also require them to contextualize the evidence by discerning when and where the documents were created. Students also wrestle with other basic social science skills, including reading maps and thinking chronologically. As a hook activity, the game introduces students to the process of history as inquiry and the tools that historians use in analyzing historical documents. However, these concepts and skills are introduced at only a basic level and the game is in no way intended

as a substitute for deeper-level inquiry projects. The game serves as a bridge to subsequent lessons using a wide array of instructional strategies from problem-solving group work to structured academic discussions and writing prompts that delve more deeply into the topics and further focus on developing students' historical thinking skills.

History Teachers as Game Designers

The process of designing a game proved an enlightening and extremely challenging learning experience. In struggling through the process of writing a narrative, developing puzzles relevant to subject-matter, and scaling the complexity of the challenges, I engaged in the difficult process of creating a meaningful educational game experience. History teachers and students around the country have playtested *Historical Mastermind*, and thanks to their feedback, it has and will continue to be revised to improve the quality of the experience. Individual teachers often modify aspects of the game to fit their own classroom environments and to meet the learning needs of the students in their classrooms. I have also experimented with designing games aligned to specific historical content standards intended as review activities following specific thematic units. A breakout game on the Transcontinental Railroad, for example, reviews not only the story of the railroad's construction and its historical significance, but also the controversies created by the growth of the Southern Pacific monopoly. Through the game experience, players have the opportunity to review relevant content matter, practice historical thinking skills, and work collaboratively to solve problems.

For new teachers who are interested in trying out a breakout game, I recommend that they first play a few of the existing games designed by teachers and posted on the Breakout EDU website. Ultimately, individual teachers should attempt to design their own games not only because they are the most qualified to evaluate the needs of their students, but also because through the actual process of designing a game, teachers develop crucial knowledge and skills themselves. Collaborating with a group of educators and subject matter experts to edit and refine the games is also a crucial component of game design. If you do decide to create your own game, here are the top ten things to keep in mind:

1.   The principles of good game design are the same as the principles of good lesson plan design. Begin with your learning objectives. What do you want students to take away from the game? What content do you hope to cover?   What discipline-specific analysis skills do you want students to develop?   In designing a breakout game for the history classroom, for example, the primary goal might be to develop students' historical thinking skills through puzzles that encourage students to source and contextualize clues, develop chronological thinking, examine causality, weigh evidence, eliminate irrelevant details, and reach logical conclusions based on the evidence. The game narrative and flow can also help build content knowledge about a specific historical event.

2.   Once you have defined your learning objectives, work backwards to design your puzzles.[9] Tie them back to the content you are introducing in the unit under study and into your larger game narrative. Design puzzles that require students to use the analysis skills they will need to develop in order to think like a historian.

3. Scale the level of challenge in each successive puzzle. Begin with small, achievable tasks and then create puzzles that are progressively more complex.   In this manner, you can help build players' confidence and sense of competence, and encourage students to take on increasingly more difficult challenges.

4. Test the game before playing it in your classroom. Try it out on friends, family, and colleagues. Look for issues in the game narrative and puzzle flow. Consider if students will be learning the content and practicing the skills you want them to learn through the puzzles. Make adjustments as necessary. Engage with the Breakout EDU community or others for advice and inspiration.

5. In moderating the game in your classroom, don't be afraid to let your students struggle. Avoid offering hints until students request them, and only after they have put in the effort to solve the puzzles on their own. Hints should help lead them to the solution without outright providing the solution. As Carol Dweck argued, "sustained effort over time is the key to outstanding achievement." Students should learn to enjoy the challenge.[10]

6. Encourage students to celebrate each other's efforts and achievements. Affirming collaboration and hard work encourages active game play and promotes effective teamwork. Model enthusiasm as students apply new knowledge and skills and work together to take on challenges.

7. Debrief, debrief, debrief! After the game has concluded, allow students to express their feelings and experiences in playing the game. Walk students through the puzzles again to ensure their understanding of the process and to allow individual students to see things they may have missed during the game. Affirm students' laudable efforts and recognize areas of struggle. Prompt them to discuss their successful collaboration and problem-solving strategies and consider strategies for improvement in the future.[11]

8. During the debrief, help students reflect on what they have learned. Encourage them to make connections between game elements and concepts they have already learned in the class. Guide them in recognizing how the disciplinary skills employed in the game recreate the real-world skills that professional historians use in their research.[12] Walk them through the process of setting strategic goals in playing games in the future, and in developing analysis skills in the future. Remember that the game is only a hook intended to draw students into the deeper academic analysis skills you will develop in subsequent lessons. Students can then proceed to inquiry-based historical thinking activities that build on the ideas in the games.

9. After the game and debrief are over, take the time for yourself to reflect on what worked and what did not. Did you find that some puzzles were too easy or others too hard? Were students able to take shortcuts that limited their ability to practice a specific skill? Adjust puzzle elements as necessary to ensure a relevant and challenging learning experience for your students. Plan on revising the game multiple times.

10. Embrace the challenge of the process of creating, testing, and revising your game. Share the process, your reflection, and your completed game with other educators, including the Breakout EDU community.

Breakout games have the potential to help students develop critical thinking, collaboration, communication, resilience, and, most significantly, discipline-specific analysis skills. Breakout games can be used in a variety of academic subjects, but especially in history courses to introduce students to working with primary sources and begin developing their historical analysis skills. With more practice and collaboration, educators can create games to introduce specific content knowledge while focusing on developing disciplinary thinking. Breakout games serve as useful hooks in history classes to get students engaged in the learning. Following their breakout experience, students can delve more deeply into the process of deconstructing documents and analyzing and weighing evidence. The mystery and puzzle-solving framework gets students excited about the process and allows the instructor then to move into subsequent activities that more closely resemble the real-world processes employed by historians in unraveling historical mysteries.

When it comes to instructional strategies, it is beyond time that we break out of the box. Challenge yourself and your own thinking about teaching. Breakout games are only one tool in my teaching toolkit. It is one of hundreds of strategies I employ in the classroom to create engagement and excitement about learning. Many of the concepts presented in the games could easily be completed as boring worksheets that students work on individually and silently in their desks. However, the point of the game is to break out of the mold and reconsider traditional approaches to teaching and learning. The goal is to challenge students to work together to solve problems collectively and, therefore, achieve greater results. Games such as these can be used to ignite student interest in the process of historical thinking and help guide them into deeper levels of analysis. Are you ready to teach outside the box?

Notes

1.   *Trapped in a Room with a Zombie* is an escape room in San Francisco, California run by Beyond Escape, LLC. See <http://www.beyond-escape.com> for more information.

2.   To learn more about Breakout EDU visit <http://www.breakoutedu. com>. There is also a Facebook group of educators who are actively designing their own games or testing the games of others. The group shares information and resources to support each other in the process of game design and play.

3.   John Dewey, *Experience and Education* (New York: Kappa Delta Pi, 1938); Jerome Bruner, *The Process of Education* (Cambridge, MA: Harvard University Press, 1995); Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes* (Cambridge, MA: Harvard University Press, 1978); Jean Piaget, *To Understand is to Invent: The Future of Education* (New York: Grossman Publishers, 1973).

4.   Marc Prensky, *Digital Game-Based Learning* (New York: McGraw Hill, 2001).

5.   Osvaldo Jiménez, "Leveraging the Social Aspect of Educational Games," *Theory Into Practice* 54, no. 2 (2015): 101-108. For recent work on the value of face-to-face games, see Tatjana Vasileva-Stojanovska, Marina Vasileva, Toni Malinovski, and Vladimir Trajkovik, "The Educational Prospects of Traditional Games as Learning Activities of Modern Students," proceedings of the 8th European Conference on Game Based Learning, Berlin, Germany, October 9-10, 2014, 749-756.

6.   Scott Nicholson, "Peeking Behind the Locked Door: A Survey of Escape Room Facilities," 2015, <http://www.scottnicholson.com/pubs/erfacwhite.pdf>.

7.   National Governors Association Center for Best Practices, Council of Chief State School Officers, *Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects* (Washington, D.C.: National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010), <http://www.corestandards.org/ wp-content/uploads/ELA_Standards1.pdf>.

8.   For more on the importance of historical thinking, see Sam Wineburg, *Historical Thinking and Other Unnatural Acts: Charting the Future of Teaching the Past* (Philadelphia, PA: Temple University Press, 2001). Peter Stearns, Peter Seixas, and Sam Wineburg, eds., *Knowing, Teaching and Learning History: National and International Perspectives* (New York: New York University Press, 2000).

9.   Grant Wiggins, Jay McTighe, *Understanding by Design* (Alexandria, VA: Association for Supervision and Curriculum Development, 1998).

10.   For more on resilience, see Carol S. Dweck, *Mindset: The New Psychology of Success* (New York: Random House, 2006).

11.   Scott Nicholson, "Completing the Experience: Debriefing in Experiential Educational Games," proceedings of the 3rd International Conference on Society and Information Technologies, Winter Garden, Florida, March 25-28, 2012, 117-121.

12.   Ibid. Maja Pivec, "Editorial: Play and Learn: Potentials of Game-Based Learning," *British Journal of Educational Technology* 38, no. 3 (May 2007): 387-393; Scott Nicholson, "A RECIPE for Meaningful Gamification," in *Gamification in Education and Business*, ed. Torsten Reiners and Lincoln C. Wood (New York: Springer, 2015).