The Proposal

Some topics covered in the biology classroom are not as captivating to students as are others. However, those topics still must be covered and students must display an understanding of those concepts. Research has shown that the more engaged students are with material, the more likely those students are to remember and apply those concepts. In addition to engagement, research also suggests that the more learning styles that an activity contains, the more that students will become engaged. To address these concerns, I proposed to create Escape Room Scenarios to implement in the classroom of my Introductory Biology I and II lab courses. These escape rooms covered plant, animal, and microbiology diversity. These are topics that were normally approached in the lab courses as more of a lecture based show and tell style instead of a hands-on approach seen in most other lab exercises.

Escape Rooms

“Escape rooms” originated in Japan in 2007, eventually traversing the ocean to America in 2012. These physical locations “lock” patrons into a situation and allow them to use context clues, physical hints, and scattered materials to “escape.” Usually, patrons receive information that includes the scenario, rules, time limit, and number of clues before entering the room. These rooms are found all over the United States, offering patrons an opportunity to experience black lights, secret passages, and trapdoor features, in addition to the standard riddles and puzzles. Thanks in part to websites such as Breakout EDU and escapED, escape room scenarios are becoming
more popular in schools and colleges. These rooms allow students to leave the world of
screens and engage face to face. In addition, because the rooms are composed of
different types of puzzles, riddles, mazes, etc., they are effective in reaching different
learning styles. Each student can show off his or her skills with the different tasks.

Building the Escape Rooms

Once this idea was introduced, myself and two colleagues began the task of
making these escape rooms. We decided to use folders to house all clues, game
boards, and puzzles for each room. In addition, we utilized Google Forms for students
to input codes instead of using costly physical locked boxed with combinations. We
used a divide and conquer approach by dividing each set of material among the three of
us. Each person was in charge of creating 3-5 clues for six groups of students. These
clues covered the important material the students were expected to learn from each lab.
To assist students, they were given a lab handout on their eLearn course content page.
We used many tools to create the clues (Table 1). Clues created included mazes,
crossword puzzles, scavenger hunts, fake text messages/receipts/airline tickets,
cryptogram messages, YouTube videos, etc. Some examples of these clues can be
seen in Figures 1-5. An example game board can be seen in Figure 6. Once all clues
were made and placed in folders, it was time to introduce them to the students.

<table>
<thead>
<tr>
<th>Table 1. Apps and Web tools to Create Clues</th>
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<tbody>
<tr>
<td>Emoji codes</td>
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<td>Fake airline tickets</td>
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<td>Fake newspaper headlines</td>
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<td>Fake letters</td>
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<td>Fake text messages</td>
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<td>Activity</td>
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<td>Fake sales receipts</td>
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<td>Decipher codes</td>
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<td>Generating QR codes</td>
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<td>Specific places</td>
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<td>Word puzzles</td>
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<td>Online jigsaw puzzles</td>
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<td>Jigsaw puzzles (word)</td>
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<td>Mazes</td>
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<td>Morse code</td>
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<tr>
<td>Scavenger hunts</td>
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<tr>
<td>Snotes (secret notes)</td>
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<tr>
<td>Videos and quizzes</td>
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Figure 1. Fake newspaper clipping created using
https://www.fodey.com/generators/newspaper/snippet.asp

![Fake newspaper clipping](https://www.fodey.com/generators/newspaper/snippet.asp)

Figure 2. Fake airline ticket created using http://omatic.musicairport.com

![Fake airline ticket](http://omatic.musicairport.com)
Figure 3. Fake text message created using http://www.fakephonetext.com

Figure 4. Fake grocery receipt created using http://www.fakereceipt.us/sales_receipt.php
Figure 5. Secret note created using https://snotes.com
Introducing Escape Rooms to Students

Many students had never heard of or participated in any type of escape room game. This led to a lot of apprehension. This was seen especially in my non-traditional students. As one student told me before the first escape room, “I am not going to do well with this…I need you to explain things to me.” To ease some of the tension, I made several videos to introduce the material the escape rooms would be covering. This allowed students, such as my non-traditional from above, to have the “lecture” portion before interacting with the escape room.

Once it was time for the escape room, students were placed in groups of 4 or 5 and assigned a group number. Each group received a room folder and a QR code to
their group’s code entry Google Form. The forms were created using response
validation. This ensured that each group had to input the correct answer before entering
the next room (i.e. receiving the next folder). Groups were told they had 75 minutes to
escape all rooms. A countdown clock was put on the projector screen to add a sense of
urgency to the game. Groups interacted differently with their rooms. Some groups
divided clues and had one or two members working on each clue. Other groups worked
together on each clue. To increase the competition, I would say things like “oh group 1
is on FIRE! They are going to escape fast!!!!” This would cause the other groups to work
harder. This also led to some “trash talking” between the groups, especially groups with
athletes. They were determined to beat their teammates. Things went so well that I had
a couple groups that wanted to stay after class time was over because they “just have
one clue left!” I have never had students want to stay after class time to continue
working!
Photos of Escape Rooms in Action
Student Surveys

Students were asked to complete an eLearn quiz survey after their exposure to the first escape room. This quiz asked their opinions of the escape rooms and asked for ways they could be improved. Students overwhelmingly supported the addition of escape rooms over having normal lecture for those sets of material (92%). Comments included items such as, “so much fun,” “I want to do a real one of these,” “this made plants fun,” and “my heart was beating just like I was really trying to escape.” When asked what changes should be made, there were several suggestions. These included items such as wanting to pick their own groups, the addition of hints to the game, and prizes for the fastest teams.
**Student Exam Results**

It was nice to hear students say they had fun and enjoyed the escape rooms. However, the real test was to see how they performed on the assessment for the material. In the Fall 2018 semester, I saw a 5% point increase in the exam covered by the escape room. In the Spring semester of 2019, I saw a 9% point increase in the exam covered by the escape room.

**Going Forward**

I will continue utilizing escape rooms in my introductory biology lab courses. However, I do plan to make some modifications. I plan to add more clues, so that groups do not have the same clues. I also plan to incorporate the option of “hints” that will cost the group a time penalty to utilize. Lastly, I plan to give “medals” to the winning team(s). I will continue to expand and modify based on student feedback.