Learning through escape room design

School Break Handbook 3
www.school-break.eu

Co-funded by the
Erasmus+ Programme
of the European Union

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1. Introduction

Designing an escape room (see School Break Handbook 2) is a complex activity encompassing creativity, precision, problem-solving skills, and collaboration. Moreover, designing an educational escape room requires a thorough focus on didactical content. It's an *authentic* activity which generates an artifact - the room - that could be used with another class or another group of students. For all these reasons including an escape room in class could offer interesting opportunities.

Learn to fail

When looking at students learning through designing escape rooms it should be remembered that there should be an environment that feels safe; as part of this process, students should accept to fail and then through repeated testing learn how things work. To do this you need to initiate the students into how to play puzzles first. The students then learn to test puzzles, repeatedly (minimum of 3 times up to optimum of at least 10 times) to understand how the puzzle plays out in different scenarios.

In previous interactions with students, in the early stages it was found that students do not like to repeat tests, however, the students quickly learned the value of this and in particular enjoy when their own teachers struggle. It is important that the environment is not focussed on evaluation but rather have the students work towards a goal of completion. To this end the scenarios that the students come up with are more professional and as a consequence are much more constructivist in approach and therefore are more real world examples.

Getting students to work together and collaboratively design puzzles and provide good learning opportunities. It should be remembered that small groups involve students who are more proactive and keen against students who sit in the background. So whilst providing the options for students to self-select the groups in which they join - it may be necessary to manage the groups so that all students are actively participating equally rather than observing passively.

2. Learning through failure

The importance of *Learning through Failure* has been lost in the classroom in favour of rigorous assessment and grading. This way of thinking is outdated and does not give students a friendly environment in which they can fail without consequence. Humans learn best through failure and by creating this environment that encourages success first, students can feel as though they are being left behind.

Escape rooms are the perfect tool to implement the *Learning through Failure* philosophy. Learning through failure falls very much into the Design Thinking domain – the idea that one can innovate quickly through testing ideas and improving them with feedback (see *Figure 1*). Design Thinking encourages people to work in groups so that they can benefit from different perspectives, brainstorm ideas quickly and then try and test their ideas as soon as possible so that they can use the feedback and what they have learned to further develop their idea. It is an iterative process that involves the following stages or modes:

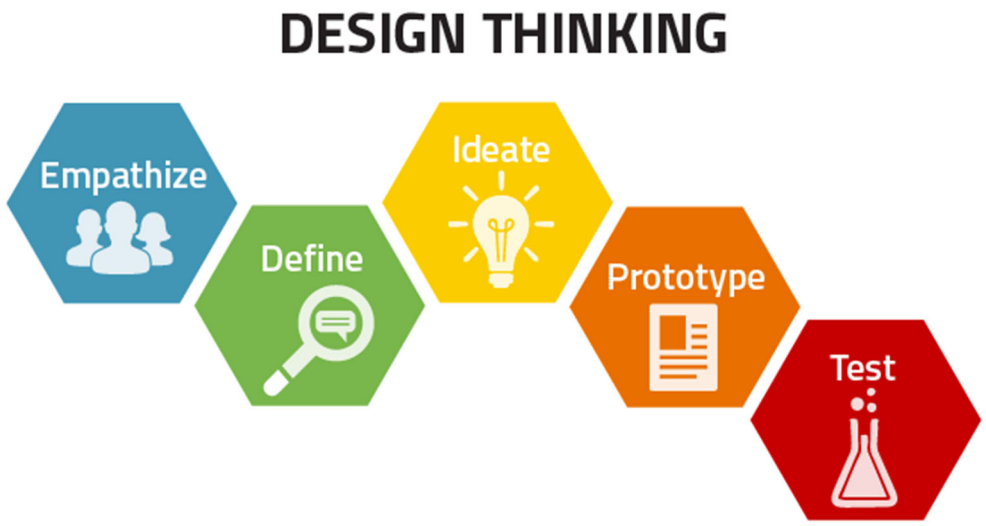

Fig 1: A model for design thinking

1. *Empathise* – understand your users / target audience
2. *Define* – define the problem that needs to be solved
3. *Ideate* – come up with ideas
4. *Prototype* – create a basic prototype (paper, sketches, lego, etc.…)
5. *Test* – test and get feedback

By using this *fail fast* philosophy, better ideas are finalised more quickly and it is overall a more efficient way of developing solutions.

We can see a link to the *Learning through Failure* idea that to come to conclusions quickly and more naturally, it is better to go through an iterative process. By getting students to solve puzzles that they are expected to fail before they succeed, they are learning more each time and so moving towards success at a rate that is better suited to them personally. This instils more confidence in each student as they feel they are *allowed* to fail without consequence. In fact they understand that it is necessary to fail in order to benefit. There is no formal assessment in this form of learning, however there is a formal endpoint. This is important as it gives the students something to accomplish.

In formal education there is often a reticence to let students fail, as it is viewed negatively rather than an inevitable part of a progressive learning process. However, developing escape rooms gives learners the opportunity to fail - because it is practically impossible to design a perfect game at the first attempt - testing and redesign is a core part of the development process. However, it is important that students are well-prepared for the prospect of failing, and can respond appropriately to constructive feedback without impacting on their motivation or confidence.

Figure 2 shows a model for learning through failure in escape rooms developed as part of the EduScapes Project (http://eduscapes.playthinklearn.net/) that sets students up with clear expectations of a process in which failure is a key aspect.

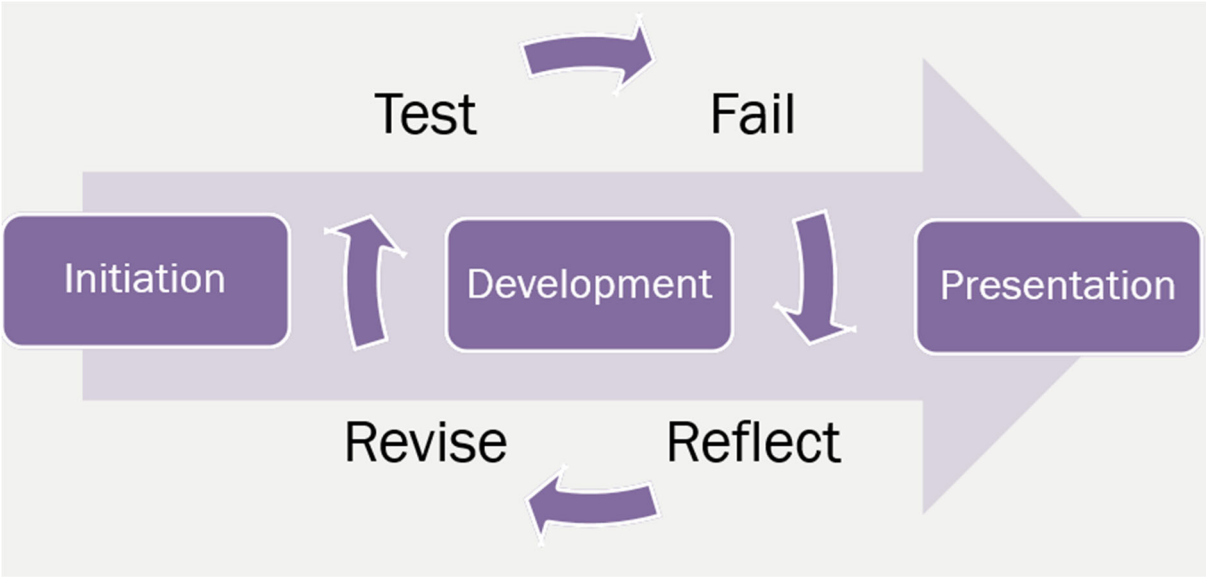

Figure 2: A model for failure-based learning through escape room design

3. A process for developing escape rooms

The process described in the previous section is broken down in more detail in Figure 3 below, which shows each of the three steps - initiation, development, and presentation - in more detail.

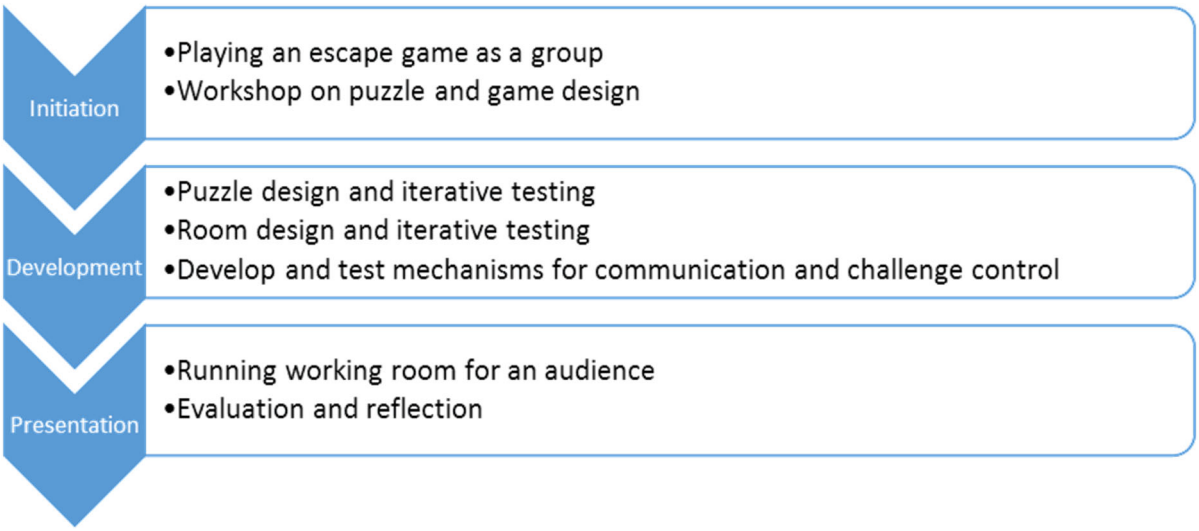

Figure 3: The initiation, development, and presentation phases of escape room design

Creation of escape rooms provides a rich challenge, bringing together creative, problem-solving, and technical design skills in a safe space, where the outcome doesn't really matter (although the process may be assessed). Three key elements of the approach:

1. Designing escape rooms is necessarily iterative and it will be impossible to create a perfect room first time. Only repeated testing of puzzles and their integration in practice will lead to a workable room. This creates a cycle of productive failure, building resilience and creating continuous improvement.
2. Collaborative problem-solving and design support teamwork and communication skills.
3. The playful and open-ended nature of the task, in a safe space where there are no correct answers, supports measured risk-taking, creativity and innovation.

There are different ways in which an escape room building design activity can take place from an intensive week or fortnight, to an hour a week over several months. It is important to make sure that there is adequate time for each phase:

Phase	**Minimum recommended time**
Initiation	½ day - 1 day
Development	The bulk of time will be on this phase, and it can be intensive or spread out, but must include time for: - Generating initial ideas - Developing and testing puzzles - Developing and testing full room As a rule of thumb, 3-5 full days minimum, or equivalent spread out over time
Presentation	½ day - 1 day

The size of the cohort will also be important when thinking about the design of the process. For example a cohort of three teams (~12 students) will require less individual support time than a cohort of eight teams (~40 students) but the former will need more support in finding people to test their puzzles and games.

Initiation phase

The initiation phase is where the student groups get to know one another and learn how to work together. We recommend group sizes of 3-5, although smaller and larger can work also, either in existing friendship groups or randomly allocated. Given the nature of the project, playing a commercial escape room is a great way to do this, but if this is logistically impossible, the School Break project provides many example escape rooms that can be used in the classroom. It is important that students play an escape room before they start the project so that they have a frame of reference and know what they are aiming for.

We then run a short (4-hour) training course that covers the basics of escape room design and puzzle design. These materials are available on the EduScape web site. By the end of this phase, groups are usually in a position to identify a theme and setting for their rooms and have initial plans for puzzle ideas.

Development phase

In the development phase, students build up their rooms and test them iteratively. There are several steps in the development phase, as shown in the second School Break handbook. When working with a class, these steps do not have to be followed to the letter but we recommend something like the process shown in Figure 4 below.

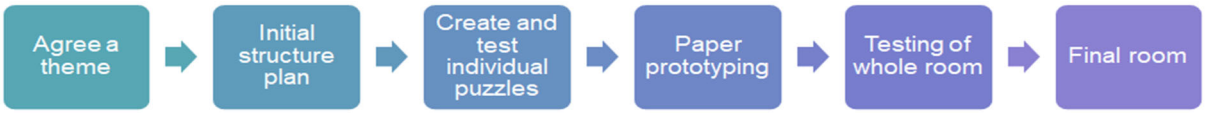

Figure 4: A process for developing escape rooms

Agreeing a theme and developing an initial structure early on gives the group something concrete to work on from the start and creates a shared vision and frame of reference. Then three stages of design and testing follow:

1. Create and test each of the individual puzzles in the room
2. Create and test a paper prototype of the room using paper, envelopes, file cards, etc.
3. Create and test a final version of the room with actual boxes, locks, props, etc.

Each of these testing phases should aim to test and refine a minimum of three times (although we recommend that ten or more is ideal). It is also important to test with a variety of different groups - ages, nationalities, backgrounds, and abilities. Importantly, the game should be tested with as many players as possible from the target demographic. Students always underestimate the number of times they will need to test their games, so some structure and support is useful here.

The paper prototyping phase is key for getting the elements in the room to work together before expenditure on equipment. It is useful to have at least one ‘expert evaluation’ during the process (either late in the paper prototyping or in the testing of the whole room), which provides a semi-formal formative opportunity for feedback as well as creating a concrete milestone for students to work towards.

Although failure in game design is inevitable, students may not be prepared for it so it is important that you make sure that they are able to give meaningful and constructive criticism to one another, take on supportive feedback, and act on it. This is not always easy for some students and may require some support and preparation. Building the resilience to get things wrong, but learn from those mistakes, take on feedback, improve, and try again is a key learning outcome from this process, but one that has to be supported and scaffolded.

Presentation phase

The presentation phase provides a formal, authentic end to the project, with real audience who can play the game. It does not provide the high pressure - and artificial nature - of a formal assessment, but instead a real-life outcome, with an actual deadline that students need to work towards.

In the EduScapes project, students presented their games for delegates at the Playful Learning conference, which was a great opportunity to show their creations is a safe and supportive

environment. Another possibility might by at a parents' evening or any other school event that is open to friends and family.

4. Practical considerations

In this final section, we highlight some of the practical things that you will also need to consider.

Cost

Escape Room and puzzles can be developed at nearly zero cost using digital methodology or even just using paper and envelopes. This gives the students a better understanding of the puzzle rather than worry about having equipment, tools etc. Once the understanding of puzzle design, building and testing is gained then cost implications could be incurred by purchasing specific tools and again retesting the scenario and puzzles in that context.

Using digital tools (for example, creating web pages with passwords instead of physical locks) requires some technical proficiency, but it could help reducing costs and making the room easily replicable/portable. Using digital tools with respect to physical objects clearly has a strong impact on the perception of the theme/narrative.

Timing

Before setting out how much time the students will have to work on puzzles in the escape room it is important to consider the impact that time length will have on the students' progress. It has been found that shorter escape rooms (10 mins) have a very high output, but leave little to no time for reflection afterwards. Longer escape rooms (~ 1 hr) tend to lose momentum. However it should be noted that both types are still extremely effective for helping students to learn through play. Students working over longer periods require more structure and support, particularly in the early stages of the project as they get started.

Design brief

It is important to have a clear brief, from the very beginning, that states the age group that the games are aimed at. Students will also need to know early on where the final game will be played and how many players it is aimed at. When working with an educational escape room, it is important to define as early as possible the educational content the group will face.

Other Considerations

It is important to emphasise the iterative nature of the testing, and make sure that students take responsibility for organising multiple playtests and revisions. Students must play an escape room before or at the start of the project in order to gain an understanding of what is expected. You will need to provide support for group working and managing meetings, and make sure that you are on hand to offer support if group relations break down. If items (boxes, keys, padlocks, etc.) are to be ordered it is important to do this in plenty of time for the final presentation.