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NON-DIGITAL GAME-BASED LEARNING: THE DESIGN AND IMPLEMENTATION OF AN EDUCATIONAL ESCAPE ROOM IN HIGHER EDUCATION

Zarina M. Charlesworth*

*Professor and EMBA Program Director, HEG Arc School of Business, University of Applied Sciences & Arts Western Switzerland (HES-SO), 21 Espace de l'Europe, 2000 Neuchâtel, Switzerland

zarina.charlesworth@he-arc.ch,

ABSTRACT

Education is moving slowly but surely into the 21st century and as it does educators in higher education need to look for ways in which to develop the competencies that today's students will be called upon to use in their future professional lives. Developing such competencies calls for innovation in educative practice, sometimes pushing the boundaries. This paper looks at non-digital game-based learning as a way in which this can be successful. An educational escape room was designed for third-year Bachelor students working on their final dissertations (n=20) in order to explore the process of reviewing the literature. Findings, going from the creation to the use and impact of the escape room are presented. The entire process is detailed, and the student feedback analysed. Finally, suggestions for educators interested in pursuing this path are provided.

INTRODUCTION

Educational paradigms are currently undergoing change and this due to several factors. Two of these, and not the least of which, are: ease of access to information and the evolving time-distance conundrum. The impact on student motivation and engagement is unequivocal. Without entering into the intrinsic versus extrinsic motivation debate, the onus in the Western European higher education classroom is largely on the shoulders of the educator to provide motivation and provoke the kind of engagement that will result in learning. Game theory gives us some insight into student perceptions (Barata, Gama, Jorge, & Gonçalves, 2013; Cheong, Filippou, &

Cheong, 2014), on how participation might be improved. Within the realm of games, one finds serious games, simulations and more recently classroom escape rooms. This practice-based research focuses on the latter for the development and implementation of an escape room.

LITERATURE REVIEW

The past few decades have seen a number of instructional design initiatives aimed at diversifying and ultimately improving learning (Barata et al., 2013). These include forays into blended learning, flipped classrooms, and MOOCS among others. Yet surprisingly as it may seem, much of what is proposed stops short of "any further efforts to make the experience more engaging and rewarding for the students" (Barata et al., 2013, p. 1). Other techniques, however go further looking at how instructional design can impact student motivation and engagement. One of these, which has provided the background for this research, is that of gamification.

Gamification

The concept of applying game principles and design elements to learning has become increasing popular in the past ten years (Cheong et al., 2014; Deterding, Dixon, Khaled, & Nacke, 2011; Kapp, 2012). At the start the focus was on "the use of video game elements (rather than full-fledged games) to improve user experience and user engagement in non-game services and applications" (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011). Interest grew, however, and the idea of gamification went past the use of video to spill over into areas from business to education in the hopes that for the user, whether customer, client, or student, engagement would increase (Deterding, Dixon, et al., 2011; Zichermann & Cunningham, 2011).

With this increase in interest came a need to define what exactly gamification and game elements were. One of the most frequently referred to definitions in the academic literature is that of Deterding et al. "gamification is the use of game design elements in non-game contexts" (2011, p. 10). A subsequent analysis provided by Groh (2012) draws largely on this same source (Deterding, Dixon, et al., 2011; Deterding, Sicart, et al., 2011). As gamification, or at least the use of the term, has entered into other circles, see for example Huotari and Hamari (2012) who look at gamification in relation to services marketing, Deterding et al. go one step further suggesting that it might be more appropriate to use the term 'gameful design' (2011, p. 13). By this they suggest that gamefulness can be seen as a complement to playfulness in the way it is now being used for the design of the overall experience. This idea of overall experience has in turn led the way to the gamification of learning. The underlying idea being "to stimulate the same motivation and engagement that

gamers have towards games in learners towards education" (Cheong et al., 2014, p. 233). One direction that this has taken has been the development of pedagogical escape rooms.

Escape rooms

Escape rooms have become popular in recent years, after the introduction of first video escape game *Crimson Room* in Japan in 2004 by Toshimitsu Takagi (Lock Academy, undated), the concept was adapted for use in a live escape room in 2007, also in Japan. From there the trend spread across Asia, Europe and North America. After their initial use, primarily as a leisure activity, escape rooms began to make their way into the classroom and are now increasingly used as a pedagogical tool. One can say that an escape room "follows the principles of gamification wherein the features of games (e.g. rules, challenges, immediate feedback, permission to fail) are applied in contexts normally not associated with games and play" (Carrion et al., July 2018).

This type of activity is meant to be used with one or more teams and is conducive to the development of soft skills (Clarke et al., 2017) such as collaboration and team-work (Zhang et al., 2018). An escape room can also be used in preparation for a more technical exam (Carrion et al., July 2018; Vörös & Sarkozi, 2017).

Given the versatility of an escape room it seemed an obvious choice for this project. The objectives were two-fold: to find a way in which to increase both student engagement and motivation in the dissertation process with a focus on the development of a literature review and at the same time develop their research skills. In order to reach these objectives, the design of a bespoke classroom escape game was called for after which the practice-based research questions addressed were:

a. To what extent might the use of a classroom escape room increase student engagement / motivation?
b. Can a classroom escape room help to develop students' online research skills related to the use of:
    i.   Article search
    ii.   On-line libraries
    iii. Data-base usage
c. What were student perceptions of game-based learning in this specific context?

METHODOLOGY

Three basic action research steps: *intention*, *action* and *review*, (Dick, 1993; du Preez, 2011), all of which are detailed below, were followed in the construction of this project. A Business school at the University of Applied Arts and Sciences of Western Switzerland (HES-SO) was the field with the sample being third-year Bachelor degree students (n=20). Data collection was carried out in a Bachelor Dissertation Workshop part of an optional series offered to third-year students. Attendance for these workshops was, unfortunately, very low with sometimes less than ten, out of a possible 50, individuals signing up.

The research design went through two main phases. The first one called for the design and development of a pedagogical escape room where the literature on educational game design proved to be invaluable (Annetta, 2010; Arnab & Clarke, 2016; Clarke et al., 2017; Nicholson, 2015). The process of designing the escape room prior to its implementation, all part of the *intention* phase, went through several key steps, explained below.

Intention: Designing the Escape room

As mentioned previously, the intent was to increase student engagement and motivation all the while developing their research skills. To this end it was decided that an escape room format might not only provide an answer but also increase attendance.

An escape room implies the creation of puzzles to be solved by the participants and, its design calls for going through a number of steps as set out below. One thing to keep in mind is the path of puzzles that will be created. There are three main options: a linear path, an open path or a multi-linear path (Wiemker, Elumir, & Clare, 2015). This means that in the case of a linear design the puzzles must be solved one after the other; in the case of open design the puzzles can be done in any sequence but generally lead to a final 'meta' puzzle which integrates solutions already found; and in the case of the multi-linear path a combination of the previous two. In the case of the pilot class it was planned to have three different scenarios going on simultaneously and so the first option was chosen as the simplest. Once that was set, the first step was to establish the objectives.

1. Objective setting

Probably the most important of all the steps is that of setting the objectives. In the case of this project the theme of the escape room was reviewing the literature. The sample comprised students in their 3rd year of study just starting on their Bachelor dissertations. Despite the project work and on-line research called for throughout the programme, information-seeking remains key albeit often under-developed,

competency for the successful completion of a dissertation. Closely linked to information-seeking are related competencies including those of critical thinking and problem-solving. Finally, it seemed appropriate to encourage collaboration through the implementation of a team activity.

For each objective there was also the question of what skills the students were expected to put into practice as shown below in Table 1.0.

Table 1
Objectives and skills to be put into practice during the Escape room

Objectives	Skills called upon
Use of the internet as a search engine	Problem solving
Use of the school library web-site	Information-seeking
Use of the on-line data-bases	Critical thinking
Team activity	Collaboration

Having established what the students would be expected to do the next step, and not the least, was to imagine a way in which to link these activities together whilst at the same time familiarizing students with the skills that they would need for the literature revue component of their dissertation. Which takes us to the next step.

2. Scenario creation

Escape rooms, whether pedagogical or just for fun, tend to have a theme or a story line running through them which not only adds interest but links all the pieces of the puzzle together for the participants. In order to come up with a suitable scenario the starting point was previous student dissertations. Three topic submissions from previous years having to do with marketing, strategy and, human resources, were chosen. These provided the basis for the three scenarios that were then developed.

3. In search of clues

Once the outline for three separate scenarios had been done, the next step was to think of what kind of clues would allow the students to use the skills that had been identified as desirable. As an example, if one takes the case of the strategy scenario, is that students were told that they would need to find a management guru to help them. They had been given a basic instruction from the start that the workshop would call essentially for on-line searching coupled with clues in the room itself. An on-line search gave rise to many gurus but only one born on the day on the birthday card and having the correct name. In order that they narrow down the search, one clue in the team area was a birthday card with the person in question's first name and just the day of his birth e.g. May 24th on it.

4. Consider lock options

As things start to come together, one must think about lock combinations, what numbers, colours or symbols might be used. To continue on with the same example a four-number lock was used and the combination that the students needed to find was the management guru's birth year. As this was not on the birthday card, nor directly on much of what was found on-line finding the answer called for both further search strategies and team collaboration. It is important to think about what type of clue for what type of lock. If one is going to be using symbols, shapes or colours it is important to keep this in mind from the start.

Action: Taking it to the classroom

Information was sent out to the students that a workshop related to reviewing the literature would be held and that it would be in the form of an escape room. Although the workshop was optional, sign up was mandatory with a maximum of twenty places available. Success! The workshop filled up quickly and was carried out successfully. In order to finalize the activity, step 5 of the escape room design process was conducted immediately after the escape room activity but still during the allocated class time.

5. Extend with follow up activities

In the above example one can see how one group of the students started out by searching for management gurus online. They must work together as a team in order to figure out which guru is the one that they are looking for. This starts them down the path of searching for something precise online whilst collaborating.

It is of utmost importance to extend the escape room experience with follow up activities so as not to leave too much of a game connotation in the minds of the students and in order that the skills be really put too use. In the case of this example the action of searching was gone over, students were asked how they had gone about their search, what worked and what did not. This was just the first clue in one of three scenarios. The debriefing, which covered much of what had been done during the escape room, took a considerable amount of time yet was invaluable.

FINDINGS

Results from this pilot class, based on classroom observation, discussion with the participants, and followed up with a short feedback questionnaire support the idea that:
- Student perception of the use of game-based learning was positive;

- Such as approach can make a difficult or uninteresting subject easier to present;
- Student motivation to come to an elective workshop was positively impacted.

The findings were compiled before being coded and clustered resulting in three axes of interest for a future iteration and in relation with our research questions. Some of the most representative comments from the questionnaires and the debriefing sessions are shown below:

Impact on motivation or an "Attention getter"

Keep the idea of an escape room to introduce the subject
It got me to sign up
I ended up doing things that I had not done before
I liked doing things differently
It was good to work as a team
Could have spent more time on it
Needs to be more developed, why did we do this?

Despite being an *attention getter* it was interesting that the students had high expectations on both the 'wanting to have fun' as well as the learning fronts. In other words it is not enough to get them into the classroom if one hopes that the skill and competency development road that the students have been sent down does not come to a dead end.

Impact on online research skills

Made me use new resources
I used the library data-base for the first time ever
Would have been good to have done this earlier on
Becoming aware that this kind of thing takes practice
Difficult to see the link to my topic
I didn't know we had access to those articles

Whether there was any impact on research skills in the long term is impossible to say. What is clear is that the students did engage in practices that were, even at this stage of their education, new for some. This suggests that such workshops need to be held early on in the curriculum and perhaps with greater frequency in order to ingrain some of these competencies in the students learning approach.

Student perceptions of game-based learning in this context

Fun to do things differently
Need to make the link to the dissertation process clearer
More time needed after the activity for follow up
Not clear how this will help me with my dissertation

Was not at all related to my topic

From the above comments it became clear that insufficient time had been allowed to debrief and go over the what and the why of the exercise. For a future iteration this will definitely be taken into account.

DISCUSSION

The literature often provides educators with suggestions on the use of various tools but addresses the question of their creation or successful implementation much less frequently. The scenario-based approach taken here shows how a particular tool, in this case an escape room can be used to:
- Develop selected competencies;
- Motivate students to work on a subject in which they often have little interest
- Push students to go past the basics.

Findings from the pilot class suggest that an escape room can indeed engage students and encourage the development of selected skills. The design and implementation of an escape room is extremely time-consuming but allows for the creation of a bespoke game which can, in many instances, be used over again. There are also a number of options now available commercially, however, the choice of scenarios for those in higher education is rather limited. In this case not one classroom escape room relating to reviewing literature was found. It is worth noting, however, that many of the free online games are worth looking through forgetting ideas.

The findings presented here address the issue of innovation in education as a means to improve student motivation and engagement. They suggest a way in which educators can add value to the classroom experience for their students based on actual practice. Emerging issues that we are dealing with today are related to changing student expectations of what the higher education classroom should offer. Clearly students want added-value from attending classes otherwise, in many instances, there is no need to come on campus. What is suggested here not only increases student involvement but is collaborative and practice-based and can positively impact the learning experience.

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