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Escape Room as Learning Environment: Combining Technology, Theater and Creative Writing in Education

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Abstract: Meaningful learning activities can challenge pupils to work, cooperate, face appropriate and contextualised challenges and help them understand problems and different situations. Learners need to develop cognitive, emotive and scientific objectives and highly thinking and metacognitive skills relating to analysis, synthesis and evaluation. Creativity in schools needs fresh ideas and students that have communication and collaboration skills and are highly interested and motivated in order to fully participate in a project. This paper reveals how escape rooms can be used as a learning environment even at the stage of design. It presents the outcomes of a questionnaire that students answered at the beginning, concerning their opinions about the school and escape rooms. It highlights the design steps and the difficulties that arouse during this procedure, that took place in a Vocational School in Greece. It reports on the benefits of a project about an escape room that challenges students to use different tools such as new technologies, theater and creative writing. Finally it provides a new insight into a multilevel cooperation between teachers and pupils of different Specialties and argues that these capabilities can be understood, learned and applied by others engaged in same projects, in order to contribute to future studies of school innovation and success.

Keywords: escape room, theatre, technology, creative writing, vocational school, design

1. Introduction

A learning environment at school, in order to offer the building blocks of design, improvement and innovation, should follow certain fundamental principles (OECD, 2017):

- Learners are the core participants, with active engagement and understanding of their own activity as learners.
- It is based on the social nature of learning and it stimulates well-organised cooperative learning.
- The learning professionals are highly attuned to the learners' motivations and the key role of emotions in achievement.
- It is extremely sensitive to the individual differences among the learners in it, including their prior knowledge.
- It devises programs that demand hard work and challenge from all without excessive overload.
- It operates with clarity of expectations and emphasis on formative feedback to support learning.
- It strongly promotes "horizontal connectedness" across areas of knowledge and subjects, as well as to the community and the wider world.

Creativity is brought into schools, in such environments, not only in the way of doing but also in the way of thinking. The acceleration of school life in digital world demands innovation, redesign, flexibility and abilities to manage and disseminate knowledge. (Harris, 2016). Teachers as experiential beings seek out opportunities for tactile and embodied experiences of the new (Harris, 2016). A considerable challenge for them is the use of synthetic approaches by which creativity can thrive (Harris, 2016).

One area of concern is arts, where collaboration, imagination, and out-of-the-box thinking are expected. They can impact powerfully on accomplishment of multiple areas of the syllabus, provide experiences to students that line up with "real world" expectations, enhance their achievements and influence their wellbeing (Gulish & Elfstrom, 2017; Caldwell & Vaughan, 2011). Arts integration helps school people to reach out community

resources, transfer knowledge between different areas and connect them to the school curriculum (Burnaford, Aprill, & Weiss, 2013).

Another area of concern is technology, which supports students' developments with multiple tools and empowers them (consciously and unconsciously) to take advantage and shape those tools in order to help them in their daily practices (Lieberman, Paternò, Klann, & Wulf, 2006). It also enables learners to be educated on their own terms (Collins & Halverson, 2010), to connect, interact and communicate with the other students, with the educators and cooperating institutes in order to ease joint learning, cooperative projects, product prototyping (Jiang, Han & Yang, 2019, 159).

Theater elements help educators to implement interactive theatre practices into their school life, to improve and widen their educational experiences and to increase their communication skills (Carlson, 2012). Very important is the opportunity of having reflections in action, which means playing and failing within the secure world of the fiction (Alraek & Baerheim, 2005). Meaningful learning activities that challenge pupils to work in roles, make them face appropriate and contextualised challenges and help them understand problems and different situations (McGregor et. al, 2019). According to Dorion (2009) role-plays can enhance the nature of interaction between learners to develop cognitive, emotive and scientific objectives and highly thinking skills relating to analysis, synthesis and evaluation.

The teaching of personal development skills helps students to develop self-awareness, self-discovery, and self-actualization (Boud, Keogh & Walker, 2013). Helping them conquer skills of literacy leads taking control of their own life (Casterton, 2005). It is noted that "...what a writer does during composing is best understood in relationship to the social event that he or she is in the process of accomplishing" (Skains, 2017). During dramatization creative thinking, cognitive and metacognitive skills are cultivated, since children assume, identify, improvise and evaluate the dramatic situations. They are involved in the dialogue, control the information and look for logical reasoning. Through critical thinking they deal with problems and multiple fantastic situations and conditions (Παπαδόπουλος, 2005).

Students desire learning and projects that are more active, more social, and more applicable to the real world. Creativity is defined as the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others and entertaining ourselves and others (Hensel, 2018). Escape rooms are live-action team-based games where players discover clues, solve puzzles and accomplish tasks in one or more rooms, in a limited amount of time trying to accomplish a specific goal, usually escape from the room (Nicholson, 2015). By their nature they provoke creativity in education and provide people with opportunities to practice a range of communication and collaboration skills (Pan, Lo & Neustaedter, (2017).

This paper presents the design steps of an action plan that took place on a Secondary Education Vocational School in Greece. This project included the transformation of a classroom into an escape room using a rare combination of tools such as creative writing, theater and technology. A survey was conducted before the design, in order to explore students' opinion and knowledge about the whole idea.

The program "New beginning at EPAL" (started experimentally in October of 2017) included co-financing from Greece and European Union for this Vocational School project, since it linked (Vocational Education Training) VET with local community and established cooperation with the greater educational and scientific society (Minedu, 2017).

This paper offers a different context of an escape room that was co-designed by students of different ages and specialties.

2. Foundations -Aims

This study supports the thesis that students' capacities to learn should expand mostly from the view that learning and teaching systems must be designed to cultivate their potentiality. Such learning environments can empower and stimulate students' balanced thinking, capacities and mentality evolving them to out-of-the-box thinkers. Each of them should collect a lifelong lasting knowledge base and skills needed, to utilize them in order to become flexible and adaptive thinkers, who can find out creative solutions in the challenges that emerge, and deal with complexities that lie ahead successfully.

The basic aim of the paper is to examine students' perceptions, abilities and interest about the use of their creativity in a project that comprises the design of an escape room including the transformation of a laboratory using technology, creative writing and theatre elements. It investigates how a multimodal form of education consisting of multitudinous tools. Simultaneously, can act as a differentiating factor in students' school life. Finally this paper wants to present an original action plan that focuses on exploring school innovation and provides a new insight into a multilevel cooperation between teachers and students of Vocational Education. It highlights the steps and difficulties at the design, before the stage of implementation and argues that these capabilities can be understood, learned and applied by others engaged in same projects, in order to contribute to future studies of school innovation and success.

3. Pro-evaluation and Design Methods

Vocational School of Aiginio (EPAL Aiginiou) consists of 29 teachers and 120 students. Its Sectors and Specialties are:

- Administration and Economy - Administrator and Financial Officer
- Electronics, Electronics and Automation - Technician of Electrical Systems, Installations and Networks, Technician of Electronics and Computing Systems, Installations, Networks and Telecommunications
- Health, Welfare & Wellness - Assistant to Nurses
- Agriculture, Food and the Environment - Plant Production Technician

The school's mainstream discussed and finally agreed to support the idea of an escape room as a learning environment. The Lead Author of this paper was appointed as the coordinator of the action plan. After sending the proposed schedule and budget to Noesis (Thessaloniki Science Center and Technology Museum), the project was approved and co-financed from Greece and the European Union with the amount that was requested.

3.1 The questionnaire

Students from the school were asked to answer an online questionnaire in order to gather information according school and escape rooms. The results came out from Excel and online Google Forms. A total of 70 pupils volunteered to do so, at the beginning of the project. The sample represents 64% of 110 students that attend to lessons, from which 38.6% (27) are female and 61.4% (43) are male. About 24.3% of the sample are A' class students (almost all of them), 41.4% are B' Class and 34.3% are C' class students. Only 11.4% (8) of the sample knows well escape rooms and have played the game. All of the rest (62) have heard about it but never played. Half of the students have heard about escape rooms from school, most of them when they were filling out the questionnaire. The rest heard about it from their friends, from the internet and other sources. About 31.4% of the sample (an interesting number of 22 pupils) didn't believe that such a game can be created at school. From those only 1 is student of A' class. 21.4% of the sample (15) disagrees that escape room should be based on school courses. From those all are male and only 1 is student of C' class.

About 22.9% of the sample (16 students) didn't want to participate neither in the design nor in the whole project.

Cost is the most significant factor for not creating an escape room, according to the opinion of 35 students (50%), 26 (37.1%) of them believe that time is a negative factor, 21 (30%) that it's students' refusal and 16 (22.9%) teachers' refusal. From 69 students that answered the question about school and how interesting seems to them 8 (11.6%) don't like it and the same number likes it, 10 (14.5%) students like it a lot, 19 (27.5%) a little and 24 (34.8) enough. Only 8 (11.6%) of the 69 students don't think that cooperation between school students in creating an escape room won't be successful.

In terms of differentiation and actions that make school stand out from others, 52 (74.3%) students agree that such actions are done, 50 (71.4%) believe that actions that make it more interesting to them are done and 54 (77.1%) believe that actions that open school to the community are done too. The basic courses that pupils believe that could be used for the creation of an escape room are Language, Mathematics, Anatomy, Physical Education and IT.

As far as theater in escape room is concerned, 50 students (71.4%) answered that it's very interesting and only 39 (55.7%) would play a role in it. Regarding their own creativity 57 (81.4%) students have participated in a play (not necessarily at EPAL Aiginou) and 47 (67.1%) have written a poem, a play, a fairytale or a story at school, at home or anywhere else.

It seems very logical for students living in a small village, not to be aware of the existence of this live-action team-based game. This is why most of them learned about it in school. It is interesting that 21 students from B' and C' Classes, that had already taken part in school projects the former years, believed that this game couldn't become a reality in EPAL Aiginou. Considering the answers to the courses that can be used as puzzles it seems that robotics, virtual reality and informatics, in general, were not taken into account entirely by the pupils, perhaps because they are only taught in C' Class.

Cost for many of the pupils was the most inhibiting factor in the creation of the game, since none of them new about the founding. Over 50% percent of the sample find school interesting and over 70% agrees that it's open to community, does exciting projects and that cooperation for the game would be successful.

3.2 The design

Based on the results of the inquiry 9 students from 4 specialties of the school where selected to use their knowledge, their fantasy and their abilities in order to design an escape room in EPAL Aiginou. They should be prepared and positive to cooperate with the 21 students of A' Class, as tutors, in order to show them how a knowledge gained from each field can be used enriched and linked to personal experiences, so to create a project that can potentially be a future professional goal. Also, 10 teachers from different specialties discussed about the subject and agreed to help this project to be implemented. The students of A' Class were separated in groups such as actors, programmers, cooks, marketing managers, electricians, writers and designers.

Two teams of 12 students were finally defined as the designers. Only 3 of them were from A' Class. With the escort of two teachers, they visited and played in professional escape rooms of different scenarios and one of them had an actor inside, who played three different roles (Figure 1). It was important to play in such a game, because theater elements would be used in the new escape room. In the next meeting they recorded all the puzzles that they could remember, discussed about their experience and they agreed that it revealed to them a meaningful experience.



Figure 1: Real life escape room-visit with students

Since game master's role, actor's role and rules of escape room were defined, the work-team decided that the theme should be based on the Spanish heist television series "La Casa de Papel", which includes crime and mystery, in order to satisfy players' expectations with new offerings. Online research, at that time, showed that no escape room with such subject existed in Greece. The theme was unique and helped to create the context of the room. Since role plays would exist and immersion should be enhanced, relative customs were necessary. Students made a market research and bought 8 thief uniforms with Dali's masks (Figure 2). The game would concern players from the age of 15 and over.



Figure 2: Buying costumes "La casa de Papel"

For the preparation of the act, school cooperated with the theater company "ΜΩ", which sent a volunteer actor to play theatrical games with the students (Figure 3). "EL GRECO", School of Fine Arts accepted to collaborate and help students create Dali paintings for the decoration of the room, in order to motivate students and keep their interests at high levels.



Figure 3: Theatrical games

The next step considered the design of the room. It was decided that Computer and Network Laboratory is the best place for the designers to meet, since members of the group

had for many hours relevant lessons in there and the other teachers wouldn't be bothered. Students used the trial version of Roomsketcher Software (Figure 5) and after three phases of comments, evaluations and amendments they ended up to the final, most easy to use, design. Final photos were printed in order to be used in the future at the implementation stage.



Figure 4: Designing the escape room before & after

The settings of the riddles would be based on the design of the room and students used a variety of them, after taking into consideration the types of puzzles Nicholson (2015, 19-20) records. Taste riddles (Figure 5), out-of-the-box thinking, robotics, VR and 360° videos and QR codes, team communication, observation, blue light, hidden objects, creative writing, improvisation, puzzles, physical experiments and music riddles were suggested, other simple and easy and other more difficult. Each puzzle would be created from the corresponding team, should have a purpose and add a substance to the narrative of the room and should be evaluated from the whole team. Students preferred to put them in sequence. This meant that each puzzle should be connected with the previous one. According Nicholson (2015) this type of puzzle organization fits best for small rooms, like the Laboratory. A storyline was created along with the placement of the puzzles to help them during this procedure.



Figure 5: Taste and VR puzzles

The scenario had two specific roles. Two of the thieves should interact with the players in an engaging way, helping them or not, instead of the game master, who should give instructions at the beginning, and get them dressed, with their eyes closed. Team thought that the engagement of the players with the actors was very important. They suggested that the actors would have to define which role they would play from the series and that the writers should write down phrases for each puzzle that would be helpful to players. The game master in the entry would try to engage groups in the story, to make it real and believable to them and create positive emotions. It was finally decided that each player would respond, after the game, to an online inquiry in the matter of all of the above.

Marketing managers in order to awake the interest of the target group, suggested to make big posters, invitations and informative triptych and show a presentation about the design and the idea of the escape room in an open event on May. At the same period during the informing of high school students, another presentation of the whole procedure should be shown. They proposed that the scenario based on “La casa de papel” and the use of combined elements of writing, theatre and technology would make the marketing message clear, interesting and unique.

Electricians in cooperation with the designers should search the internet, in order to find out equipment for proper illumination of the room. After that with the help of their teachers-instructors they would complete the installation. By this time the design was completed.

4. Conclusions

This paper presents the framework that was followed from the beginning of the idea until the phase of design. EPAL Aiginou is a very creative and active school. This year for example it run an ERASMUS+ A01 program in Barcelona and a twinning program with a school in Italy. The fact that many of the students and teachers were missing because of their trips abroad, bureaucratic work and preparation, evaluation and many other tasks took a great deal of time. The actual implementation of the two projects started in February, in the same period with the design of the escape room. All these factors could have become a barrier throughout the process, but fortunately this didn't happen.

During the courses, each team recorded, tested and evaluated every information, in order to decide if and how it could be used as a puzzler in the escape room. Students' observation during their dialogues showed that they enjoyed the procedure and they were constantly trying to combine knowledge to implement a remarkable and unique escape room. It was impressing that they were looking for the teachers in order to meet and go on with the design of the room and they participated full of interest, suggestions (each one from his specialty), tastes, fun and fantasy. Snapshots of the “La casa de Papel” gave them many ideas for clues, such as the use of mobile phones and the accounts of money.

Some students, on their own initiative, searched about software (Roomsketcher) that learned to use by themselves. They found out VR videos and encourage other classmates to use VR glasses, they proposed to create led electronic systems and automatic door lock. The experience in real life escape room was so intense, that rouse students' interest from other classes.

The results of this project until now showed that, even from the stage of design, escape room follows many of the fundamental principles of learning environments. It also motivates students, gives them opportunities for out-of-the-box thinking and the chance to combine different type of learning. It's crucial the guidance from the beginning to be strong and the goals to be clear. This was achievable since the coordinator of the project had great experience as a player in real-life escape rooms.

The difficulties that revealed during the design stage are the following:

- Groups could not meet in the afternoon, because pupils come from neighboring areas and their moving is difficult.
- The basic team consisted of students of the C' Class, which means they had many examination and specialties lessons.
- Many teachers come from distant regions.
- The approval process was time consuming.

The results of those difficulties were the above:

- Physics experiments were not implemented because of the lack of time, although the corresponding professor and project coordinator met twice, searched for experiments and selected those that would be easy to implement by the students and to be chosen, by the design team, as riddles.
- There was no time to meet the painter for painting lessons, so the design group decided to use printable Dali's paintings.
- Tutoring never took place, so most of the students of A' Class didn't have the opportunity to use experiential learn into courses of the sectors and specialties, in order to decide what is best to follow for next year.

In the near future students and teachers have to co-operate in order to implement the outcomes of the design stage and transform the Computer and Network Laboratory into an attractive escape room. Final riddles should be chosen and put in the correct order, locks, special lenses, lighting and blackout systems should be bought, evaluations and tests should run from experts, target groups should be informed and impressions and comments of players should be recorded.

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