The impact on nursing students' opinions and motivation of using a "Nursing Escape Room" as a teaching game: A descriptive study

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A B S T R A C T

Background: According to previous studies on nursing education, although the use of games can produce positive results, the vast majority are based on questions and answers or on clinical situations. As an alternative, the 'Escape Room' teaching game is a much more dynamic option to asses theoretical and practical knowledge, and it may also promote teamwork and the ability to perform under pressure.
Objectives: To analyse nursing students' opinions and study motivations after using the nursing 'Escape Room' teaching game.
Design: Cross-sectional descriptive study.
Participants: Second-year nursing students enrolled in the 'Adult Nursing 1' subject.
Method: After completing the teaching game, the students who had taken part in it were asked to fill in an ad-hoc questionnaire on the matter. In this game, students have 30 min in which they must solve the riddles and puzzles presented, and thus escape. In doing so, they must demonstrate both theoretical and practical knowledge, and a teacher will remain in the classroom to assess whether the nursing techniques in question are correctly performed.
Results: The nursing students who took part in the game strongly believed that this 'helped them learn the subject' (4.8 points) and that 'more games of this type should be included in their nursing studies' (4.8 points). Overall, they considered that 'the game was enjoyable' (4.6 points), 'helped them in the exam' (4.6 points), and 'motivated them to study' (4.5 points).
Conclusions: The 'Escape Room' is a useful game; it stimulates learning, is fun to play, and motivates studying.

1. Introduction

University teaching techniques are changing as educationalists seek to achieve both quality learning and more effective teaching (Biggs et al., 2011). In reaction to the classical teacher-centred approach, new methods aim to enhance knowledge acquisition by more actively involving students in their learning, thus achieving greater motivation and commitment (Chi and Wylie, 2014).

Various methods have been proposed to increase students' involvement. For example, in problem-based learning, a problem is presented and students must investigate it and offer possible solutions (Sayyah et al., 2017). In flipped learning, part of the syllabus is worked on at home before the corresponding class. This approach is used as a dynamic means of applying the knowledge gained (Greenwood and Mosca, 2017). Finally, in gamification, the principles of the game are oriented towards processes or objectives, which may be non-playable in themselves, to make them more attractive. This approach can improve motivation and thus enhance the learning experience (Day-Black et al., 2015).

2. Background

Game-based learning, in which games are used as a means of heightening students' motivation and contributing to the acquisition and assessing of knowledge and skills, has attracted much research interest in recent years (Gallegos et al., 2017) and in many fields,

including that of university nursing studies. According to Garris et al. (2002), games can stimulate motivation, one of the fundamental principles of learning, thus raising interest and promoting active involvement and student thinking skills.

Numerous studies have been conducted to determine the influence of games on nursing teaching. For example, the television game Jeopardy, adapted and renamed "Nursopardy", has been used to review the basics of nursing knowledge, and students have reported this to be a useful method, both when revising for exams and as for the complete learning experience (Boctor, 2013). Another activity, the "PICO Game", in which questions are posed using cards related to clinical situations, has also been welcomed (Milner and Cosme, 2017). For clinical reasoning and decision-making, nursing students have found it useful to play an online, individual 'serious game' as a complement to traditional teaching and lab practice (Johnsen et al., 2016). In this respect, Koivisto et al. (2016) proposed a 30-min online game for nursing students, who were presented with postoperative situations, aimed at improving their clinical reasoning. In similar games, '3D GameLab' and 'Rezzly', which are focused on evidence-based practice, groups of students gain experience points by solving questions and performing tasks. According to researchers, these activities produce positive outcomes as for satisfaction, motivation, and learning (Davidson and Candy, 2016; Gallegos et al., 2017).

Taking into account the benefits of game-based learning, the popularity and rapid expansion of Escape-Room-type games among the general population and the challenge and motivation they bring about, together with the lack of evidence of the use of this game in university teaching (in any discipline), we believed it useful to devise such a game for its use in nursing studies, specifically in the 'Adult Nursing 1' subject.

In summary, the aim of this study is to measure students' satisfaction with the Escape Room as a teaching game aimed at helping them in their learning process and towards the exam preparation, as well as to assess its impact on motivation towards studying.

3. Method

3.1.1. Study Design and Sample Selection
A descriptive, transversal, quantitative interventional study was carried out. The study population was composed of nursing students from the University of Granada (Spain). The sampling was intentional, including students enrolled in the 'Adult Nursing 1' subject ($n = 115$) from the second year of the Nursing degree and who voluntarily took part in the Escape Room game ($n = 105$). All of the students were from the same level; second year of the Nursing degree.

3.1.2. Rules and Design of the Escape Room Game for Nursing Students
The Escape Room game for nursing students was developed to be used in the same classroom where the theoretical-practical classes are taught and for the 'Adult Nursing 1' subject. This subject is included in the first half of the second year of the Nursing degree, and it is developed during 16 weeks, including theory and theoretical-practical classes. The Escape Room game was called 'The Florence Nightingale Code', and the players' objective was to locate a falsified document that claimed that Florence Nightingale and Virginia Henderson were not nurses, with the final objective of saving the nursing profession. The trailer of the nursing Escape Room is available on YouTube by clicking on the next link:

https://www.youtube.com/watch?v=qmgZx1f1hPg

To participate in the game, students were organised in groups of five and given 30 min to solve the puzzles presented in the room, find the exit key, and escape. Each group was given two clues related to the development of the game; one after 20 min, and the other one after 25 min. To prevent students' conferring with other groups, the fastest

group to escape was awarded 0.5 points of the maximum possible of 6 points in the subject exam. Those who finished in second place were awarded 0.4 points, and those in third place received 0.3 points.

Among the subject knowledge and techniques that students were required to demonstrate in the game in order to solve the riddles and puzzles, unlock padlocks and find certain objects, we could find cardiopulmonary resuscitation, taking and reading an electrocardiogram, donning sterile surgical attire, blood sample collection, and insertion and removal of sutures with staples. For example, one of the tests to unlock a padlock with three digits indicated the clue 'heart rate'. In a computer located in the classroom, there was an electrocardiogram, with which the heart rate could be calculated, thus obtaining the three digits required to open the padlock.

3.2. Playing 'Escape Room'

After the theoretical planning of the game, and once all the necessary elements had been placed in the classroom, the groups of students were called to enter, one by one, every 45 min (30 min to play the game and 15 min to relocate all the elements in their original positions). Before the definitive study with the second-year students was carried out, two groups of senior students were invited to participate so as to pilot the premises and to confirm that all the stages of the process would correctly take place. No changes were made after the pilot phase. In total, 21 groups of five students each played the Escape Room game.

During the course of the game, while each group was in the classroom, a subject teacher was also present to assess their performance and to ensure that the techniques required were being correctly carried out. This teacher did not give any assistance, but only spoke to provide the two clues and, if necessary, to indicate that a technique was not being correctly performed and should be repeated before further progress could be made. The teacher was the same for all the groups as he deeply knew the different processes and the objects' location. A video summary of the groups' participation in the game can be found on YouTube by clicking on the next link:

https://youtu.be/_iLebqShoYI

3.3. Study Variables and Data Collection

The study data were collected using an ad hoc online questionnaire created on the Moodle platform for the subject. On the day after the game was performed and also seven days later, as a reminder, all the students involved were sent an e-mail inviting them to complete the questionnaire. To prevent students from responding more than once, only one response per Moodle platform user was allowed.

The sociodemographic variables 'sex' and 'age' were collected. As outcome variables, and based on a questionnaire used in similar previous studies (Boctor, 2013), the responses to the first six questions were assessed on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree, as follows:

1) Playing the game helped me learn the subject.
2) I enjoyed playing the game.
3) I think the game will help me in the exam.
4) I remembered and applied subject knowledge during the game.
5) There should be more games of this type in nursing studies.
6) The game has motivated me to further study, although the exam is still 6 weeks away.

The study data were collected in December 2017.

3.4. Ethical Considerations

The participation in the study was voluntary. Groups of students who voluntarily agreed to be recorded and gave their signed informed consent for the use of those images were included in the video that

Table 1
Mean scores for the questionnaire items.

Item	Mean score
Playing the game helped me learn the subject.	4.8
I enjoyed playing the game.	4.6
I think the game will help me in the exam.	4.6
I remembered and applied knowledge of the subject during the game.	4.7
There should be more games of this type in nursing studies.	4.8
The game has motivated me to further study, although the exam is still 6 weeks away.	4.5

1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree. 4 = Agree; 5 = Strongly agree.

summarises the Escape Room.

4. Results

A total of 21 groups ($n = 105$ students) took part in this activity, and 66.5% percent of the groups were able to escape from the nursing Escape Room. The questionnaire was completed by 89 participants, representing a response rate of 84.76%. Most of these students (87.3%) were female and their average age was 19.5 years. The mean time to escape from the room was 27 min and 24 s, and the fastest group escaped in 23 min and 18 s. As shown in Table 1, the answers to all questions produced an average score of ≥ 4.5. The two responses with the highest score (4.8 in each case) were 'Playing the game helped me learn the subject' and 'There should be more games of this type in nursing studies'.

5. Discussion

The aim of this paper is to analyse students' opinions on the use of the Escape Room game in university nursing studies. To our knowledge, this type of game has not been previously employed in nursing studies or in any other university discipline. According to the students consulted, this pioneering educational game is really enjoyable and useful, helps them recall and apply knowledge, and promotes teamwork. In their opinion, there should be more initiatives of this kind in nursing teaching.

The value of this game in nursing studies, the enjoyment produced, and the students' wish for more games of this type to be applied in other subjects all support the findings of previous studies on the use of games such as 'Nursopardy' (Boctor, 2013) and the online gaming platform Rezzly (Gallegos et al., 2017).

However, although the students' opinions and reported experiences are also very positive for other games, all previous reports in this area have described games based on sets of question or on online simulation platforms (Fonseca et al., 2015; Johnsen et al., 2018; Koivisto et al., 2018; Maheu-Cadotte et al., 2018). The Escape Room, on the other hand, is more dynamic and realistic; the entire classroom is available, the students have complete freedom of movement and must work against the clock. Together with the need to work as a team, the time limit adds a further positive element to the game, requiring participants to appropriately react under pressure, being both of these competences highly important for nursing professionals (Babiker et al., 2014; Hughes, 2008). Nevertheless, and unlike some other games, the Escape Room does not simulate any specific clinical situation, an aspect that other authors report to have achieved positive results among Health Sciences students (del Blanco et al., 2017).

The low cost of the Escape Room is another positive aspect when compared to games based on clinical simulation or on online question-and-answer platforms, for which appropriate software must be developed and maintained (Olszewski and Wolbrink, 2017). The Escape Room, however, takes place in a classroom using the material which is commonly available in practical classes, and it requires just a small investment to buy some padlocks and lockable boxes.

5.1. Other Implications of Developing the Escape Room

The planning and preparation of the Escape Room requires a considerable time to devise and interconnect the tests involved. Its application also entails extra time for the teacher when compared to the delivery of lectures in a 'master class' format since each group is composed of just five students who have 30 min to solve the game, after which 15 more minutes are needed to prepare everything for the next group. This might be considered a disadvantage as compared to other games in which all students can participate at the same time via website or any online platform (Pront et al., 2018). However, once the game has been developed, it can be further applied in successive years. Moreover, when the dynamics are well understood, it is easier to devise tests for different subjects.

5.2. Study Limitations

This study presents certain limitations. Although the study sample used in this case was larger than in previous research in the field, it was nevertheless small due to the limited number of students enrolled in the subject. As it was done in similar studies (Boctor, 2013: Johnsen et al., 2016), an ad hoc questionnaire was used to determine students' satisfaction with the game as it was individualised for this purpose. Finally, as the participation in the study was voluntary, the sample selection was intentional and not random.

5.3. Future Lines of Research and Implications for Practical Uses

Future research could be done to determine the effectiveness of this type of game in other academic subjects, its impact on teamwork, or even to assess how the use of this game, in combination with others, might influence academic performance. It would also be useful to assess the opinions of other teachers on the use of the Escape Room game when teaching nursing studies. Teachers in this subject area should consider including a game such as the Escape Room in their class activities, thus making use of a combination of different teaching methods to enhance students' learning and motivation.

6. Conclusions

According to the nursing students consulted in this study, the Escape Room game is a highly useful learning activity which allows them to recall and apply the knowledge gained in class. Moreover, it motivates them to study despite the fact that no exam is imminent, considering that it is enjoyable and promotes teamwork. In short, more activities alike should be incorporated into the nursing studies.

Contributions

All the authors have contributed in the design, data collection, data analysis, manuscript writing and have read and approved the final version of the manuscript.

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