Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Research article

A gameful blended-learning experience in nursing: A qualitative focus group study

Carmen Ropero-Padilla a, b, Miguel Rodriguez-Arrastia a, b, c, Adrian Martinez-Ortigosa c, Pablo Salas-Medina a, b, Ana Folch Ayora a, b, Pablo Roman d, e, f

a Faculty of Health Sciences, Pre-Department of Nursing, Jaume I University, Castello de la Plana, Spain
b Research Group CYS, Faculty of Health Sciences, Jaume I University, Castello de la Plana, Spain
c Emergency Department, Virgen de las Nieves University Hospital, Granada, Spain
d Faculty of Health Sciences, Department of Nursing Science, Physiotherapy and Medicine, University of Almeria, Almeria, Spain
e Health Research Centre, University of Almeria, Almeria, Spain
f Research Group CTS-451 Health Sciences, University of Almeria, Almeria, Spain

ABSTRACT

Background: The COVID-19 pandemic has posed significant challenges around the world, affecting over 1.5 billion students in 191 countries. This situation has forced faculties and health-related degrees in particular to be innovative, flexible, and agile when transitioning to online or blended learning.

Objective: The aim of this study was to explore nursing students’ experiences and perceptions of the use of game elements in two full-nursing subjects using a blended-learning teaching strategy.

Design: A qualitative study was conducted through sixteen focus group interviews between November 2020 and January 2021.

Setting: This study took place at the Jaume I University with students enrolled in Adult and Elderly Health Programmes and Chronic Processes in their second and third year, respectively.

Participants: One hundred forty-nine second- and third-year undergraduate nursing students took part in the focus group interviews.

Methods: A blended-learning teaching approach with game elements was developed for two full-undergraduate nursing subjects. Focus groups using a semi-structured interview protocol were conducted after delivering the teaching content. A content analysis was used to analyse the focus group interview data.

Results: The qualitative analysis revealed four major themes: (i) teaching transition in the COVID-19 pandemic scenario, (ii) game elements to retain student attention and learning, (iii) gameful designs for competency-based team training, and (iv) blended learning vs face-to-face learning including gamification.

Conclusions: This study yields, for the first time, findings about the use of game elements in blended learning. This strategy was shown to be useful for teaching other key clinical or teamwork-related skills such as creativity, innovation, team-based communication, and responsibility, in addition to supporting the use of this innovative teaching strategy to reduce online fatigue and stress and increase student engagement in online classes.

1. Introduction

The coronavirus disease (COVID-19) outbreak in late December 2019 posed serious challenges worldwide in a short period of time (Choi et al., 2020). In an initial attempt to restrict the spread of this disease, most countries imposed nationwide lockdowns for their entire population, establishing a quarantine period with the declaration of a global pandemic on the 13th of March 2020 (World Health Organization, 2020a). Although the first and most pressing challenge was to contain the public health emergency, subsequent extraordinary measures such as social distancing, school and university closures or mobility restrictions were required (Coccia, 2021), hindering not only the healthcare sector but also other areas such as the economy and education (Department of Universal Health and Public Health, 2020).
In response, educational institutions observed how they were forced to abruptly change their relationship and interaction with students, affecting over 1.5 billion students in 191 countries (World Health Organization, 2020b). Faculties had to go through a rapid transition process in a very short period of time, and face-to-face classes had to be moved online. This situation has been especially complicated for health sciences studies and other health-related degrees, where a minimum amount of practical training is required (Collado-Boira et al., 2020). Nursing educators, for example, have had to be flexible and innovative when transitioning to an online format, as well as provide alternative clinical experiences and redefine how student performance could be evaluated (Jackson et al., 2020). Many strategies have been used to shift from face-to-face to online classes, but blended learning has been the most widely used teaching strategy among these health-related faculties, as opposed to an online-only teaching format (Morin, 2020). In contrast to this online-only teaching format, blended learning can be considered a temporary delivery mode in face-to-face faculties due to exceptional circumstances in educational planning, though faculty members in both cases must develop the skills to work in an online environment where faculty support teams play a critical role (Hodges et al., 2020).

Blended learning, according to Staker and Horn (2012), is defined as a formal education program in which students learn at least in part through online-content delivery and may have control over some elements such as time, place, and path of learning. This type of teaching combines traditional learning with new technology-based learning as tools for mediating between educators, students, and information sources (McCutcheon et al., 2015). However, the use of this teaching strategy does not always imply active learning, which allows students to participate in their learning process (Prince, 2004). In an online context, educators must cope with their own and students’ fatigue as a result of long hours spent in front of a computer screen while implementing effective teaching pedagogies that promote active learning (Bailenson, 2021).

In this sense, gamification has become increasingly relevant from the standpoint of teaching-learning strategy when it comes to achieving active learning in face-to-face classes (García-Viola et al., 2019). Gamification is defined as the process of incorporating game elements into the class in order to promote effective and active learning, particularly when students are intrinsically motivated to learn (Gentry et al., 2019; van Gaalen et al., 2020). When applied to more traditional learning environments, this methodology has been found to have a positive relationship with key elements of the learning process such as motivation, attention, and interaction with students, as well as the opportunity to develop transversal competencies in health sciences such as problem-solving skills and critical thinking, among others (Mackavey and Cron, 2019; Roman et al., 2020). To date, however, no study has specifically looked at the implementation of these game elements in a full-nursing subject using a blended-learning approach for a COVID-19 pandemic scenario. Thus, the aim of this study was to explore nursing students’ experiences and perceptions of the use of game elements in two full-nursing subjects using a blended-learning teaching strategy.

2. Methods

2.1. Design

A qualitative design was used, with focus group interviews conducted between November 2020 and January 2021, to gain deeper insights into this complex, new, and relatively unexplored area, as well as to uncover novel problems or opportunities that the use of game elements in a blended-learning approach may offer (Creswell and Creswell, 2018). The study was performed at [Hidden for blinding purposes] with undergraduate nursing students enrolled in Adult and Elderly Health Programmes and Chronic Processes in their second and third year, respectively. Data were collected at the end of the first semester after each subject was completed, which were taught using a blended-learning approach with game elements.

2.2. Intervention

The subjects had both online classes (theory sessions and game sessions) and practice classes (laboratory sessions) in accordance with institutional guidelines for transitioning to blended learning classes as result of the COVID-19 pandemic. The blended learning classes were scheduled to work in base groups until the end of the term, addressing the five principles of gamification (Floryan et al., 2019) and the most common of game elements (Wang-Sze-Cheng et al., 2019) (Fig. 1). Students were initially divided into groups to work in the virtual

![Fig. 1. Intervention protocol for a blended-learning approach with game elements.](image-url)
classroom using the university-supported Google Meet platform and competed in the game in groups of 5-6 members of their choice, resulting in 13 groups of 5 students and 23 groups of 6 students. Each group had to design a banner with a picture, a group name, and a motto that represented them as a team. During the classes, each team had to complete an activity related to the relevant topic that was designed to help students collaborate on and understand subject concepts, as well as generate two topic-related questions that would be used in the game sessions. Based on this, each team received a ranking score based on their grade, which was exhibited in a scoreboard that the lecturer updated after each activity or game session to track their progress. There was approximately one game session after every four theory sessions, with different rules for each session. Once the subjects were completed at the end of the term, the three winners in each academic year received a surprise reward (e.g., post-its, pens, markers, etc.) (Table 1).

Taking this into consideration, the aim of the gamification process was for participants to win each one of the three scheduled game sessions to score points and get as many points as possible from the activities performed during the classes. Therefore, these students had to demonstrate their knowledge in order to earn points and move up in the class ranking, which included content from the subjects based on the academic year of the participants. It is worth noting that each subject is worth 6 credits on the European Credits Transfer and Accumulation System (ECTS).

2.3. Participants

Participants were selected using a convenience sampling method. The inclusion criteria were those students who: (i) attended at least 80% of lessons and (ii) were willing to provide written informed consent prior to participating in this study.

2.4. Data collection

Sixteen focus group (FG) interviews were conducted, with 8 to 12 students participating in each interview. The FGs were placed face-to-face to facilitate interaction, data collection, and observation. All of the FGs were conducted at the university in accordance with COVID-19 capacity as well as health and safety protocols. Each focus group was led by two researchers, one of whom was an expert in lead group dynamics, and an observer who assisted and took field notes. All researchers agreed on a semi-structured interview protocol designed to encourage participants to give in-depth answers (Supplementary Table S1). Each focus group was audio recorded and lasted 40 to 60 min. Data collection came to an end when data saturation was reached and no new themes emerged. Before the analysis, the participants were given the opportunity to review the transcripts.

2.5. Data analysis

The interview transcripts were analysed with ATLAS.ti 9.0 software, conducting a content analysis to provide an in-depth analysis. In this regard, the data analysis method developed by Graneheim and Lundman (2004) was used, which includes the following steps: (i) review and become familiar with the data; (ii) code interesting features across the entire data set; (iii) collect codes into potential themes and gather all data relevant to each potential theme; (iv) generate a thematic “map” of the analysis and check the themes relevance in relation to coded extracts and entire data. This step will reveal the common patterns or trends of the data that offer; (v) a complete and in-depth overview of participants’ feelings and ideas about each theme and each participant; and (vi) allow the researcher to develop the report (Fig. 2).

2.6. Ethical considerations

Approval was obtained from the Ethics Committee at the Jaume I University (CD/71/2020) and all ethical principles established by the Declaration of Helsinki were followed at all times. The data collection was designed to ensure confidentiality and anonymity, and participants provided informed consent before conducting the study with the possibility to withdraw at any time. Furthermore, the participants were informed that their experiences, perceptions, and perspectives would have no impact on their academic grades.

2.7. Rigour

The consolidated criteria for reporting qualitative research (COREQ) recommendations were followed. Trustworthiness of the study was maintained by adhering to the Lincoln and Guba (2006) criteria. To ensure transferability, a detailed description of the methodology and data collection process was provided, as well as direct quotes when presenting the findings. The opinions of the participants were checked at the end of each FG interview to ensure accurate reflections. Conformability was achieved by having both of the first authors (CR and MR) independently analyse transcripts before meeting together to compare, correlate, and discuss the emerging themes. A third researcher (PR) was consulted in case of any discrepancy to ensure reliability and congruence in the collected data.

3. Results

3.1. Participant characteristics

One hundred forty-nine second- and third-year undergraduate nursing students participated in 16 FGs, with a participation rate of 73.4% (N = 203 s- and third-year students). The students ranged in age..

Table 1

| Classes                  | Duration | Distribution | Planning |
|--------------------------|----------|--------------|----------|
| Online classes (30h)     |          |              |          |
| Theory sessions (27 h)   | 12 sessions (2 h) |              | Each team had to complete topic-related activities as well as create two questions. These activities were created to assist students in comprehending concepts and preparing for the game session. |
|                          | 1 session (3 h) |              | The topic-related questions (e.g., true or false: “ulcerative colitis is polygenic and unifactorial in nature”) had to be posted in the section of the university-supported Moodle platform. |
| Game sessions (3 h)      | 3 sessions (1 h) |              | The lecturer created each game session based on a set of questions posted by each team. |
|                          |           |              | Rules |
|                          | First session (2nd week): earn 300 points for each correct question |          |
|                          | Second session (4th week): earn extra point card worth between 100 and 1000 points for each correct question |          |
|                          | Third session (6th week): each team had to choose another team to steal or give 300 points, depending on whether their answer to the question was correct or incorrect, respectively |          |
| Practice classes (15 h)  | Laboratory sessions (15 h) | 6 laboratories (2 h) | Module-specific practice for each subject. Activities to develop nursing clinical skills were included in these team-based practices (e.g., blood pressure measurement in nursing care for patients at risk of cardiovascular disease and diabetes mellitus module or inhalers management for chronic respiratory disorders module). |
|                          | 1 laboratory (3 h) |              |          |
from 19 to 50 years old (20.81 ± 3.59). Overall, 85.9% of participants (n = 128) identified as female, while 14.1% as male (n = 21). The qualitative analysis revealed four major themes that are summarised in Table 2.

3.2. Theme 1: Teaching transition in the COVID-19 pandemic scenario

This first theme captures the experience of learning in a sharply changed context in times of the COVID-19 pandemic, which demanded the use of innovative teaching approaches.

3.2.1. Sub-theme 1.1: challenges in educational institutions in response to a public health emergency

While the majority of participants acknowledged the inherent difficulties in teaching and learning via a blended-learning approach, what they perceived most was a lack of planning and teaching strategies to mitigate the problems of attention, concentration, or distraction caused by spending long hours in front of a computer:

“Most classes consisted of three hours of sitting and listening to someone talk while doing nothing. It was tedious and repetitive, but if you participate and do different things like in this one, it becomes more enjoyable”

3.2.2. Sub-theme 1.2: gamification experiences among nursing students

The inclusion of game elements was a useful and captivating aspect, as well as a new and rewarding experience in their daily learning:

“Gamification has been hugely helpful. It helps you learn new content, keeps you alert, and is a lot of fun. It has been that ray of hope that we have had this year to keep a little bit of interest in studying that had faded so much”

3.3. Theme 2: Game elements to retain student attention and learning

This second theme illustrates how some of the major features of the gamification process made it worthwhile for participants to participate in the experience.

3.3.1. Sub-theme 2.1: freedom of choice as an extra point

The possibility to choose their own team, as well as the software, tools, format and structure to be used for the activities, was essential for developing their imagination and allowing them to adapt these activities to their needs in order to study later:

“I liked that we could do the work in whatever format and structure we wanted. This encouraged us to beat our brains out, debate with the team... It was better this way because we did a much better job together”

3.3.2. Sub-theme 2.2: attentional focus as cornerstone in gamification

One common aspect mentioned by participants was that the incorporation of game elements in blended-learning classes engaged them in the subjects and encouraged them to follow along and attend the classes. They stated that the dynamism provided by these elements had a significant impact on their dedication, commitment, and adherence to the subject attendance:

“The key factor was that when I was connected, I knew I would have work to do and that it would be more dynamic. I was more concentrated and focused in the class. In other subjects that only read slides it is easier to get distracted”

3.3.3. Sub-theme 2.3: usefulness in the students’ evaluation process

Besides that, some participants agreed that all of the activities, including the game sessions, were helpful in keeping the subjects up to date and productive in order to prepare for their end-of-semester final examinations:

“It is a different way of learning, but I believe you learn more effectively because you have to do a report, a presentation and record it, etc., so you already get to know it and it motivates you to go to class if you want to win”

3.4. Theme 3: gameful designs for competency-based team training

This theme sheds some light on participants’ perceptions of their
Table 2
Themes, sub-themes and representative quotes.

| Main theme                                                                 | Sub-themes                                                                 | Representative quotes                                                                                                                                                                           |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Teaching transition in the COVID-19 pandemic scenario                     | Challenges in educational institutions in response to a public health emergency | ’I believe the subjects have not been adapted as well as they could have. Classes of two or three hours, with only a five-minute break in between. You cannot spend three hours staring at a screen’ (G2-P5) |
|                                                                             |                                                                           | ’Overall, the subject of blended learning was given the situation of COVID-19. Many classes, however, were distant, lacked dynamism, learning was lessened, and there was a lack of total concentration. Everyone has had a difficult time, but it has been all work, work, work... There was no time!’ (G5-P9) |
|                                                                             |                                                                           | ’I suspect that some of us, if not all of us, thought it was a shocking idea. However, it has helped us to work as a team, to learn more tools, to do the work, and if one of us did not know how to do it, we helped each other’ (G13-P4) |
|                                                                             |                                                                           | ’Having the freedom to choose teams, in my opinion, allowed me to optimise group dynamics. At last, until you work with people several times, you don’t know what is best for each of them’ (G3-P10) |
|                                                                             |                                                                           | ’I feel that having the option to select our team or the tools we can use is hugely helpful. You already have people with whom you are on the same wavelength and with whom you can approach the situation as you see fit’ (G12-P6) |
|                                                                             |                                                                           | ’Gamification really helps you to stay focused in class. Nothing happens if you get lost at some point because you will eventually figure out what you are doing in the game, at work, or wherever you are. It’s interesting because you don’t feel overwhelmed’ (G1-P6) |
|                                                                             |                                                                           | ’It allowed me to be more engaged in class. The time flew by because you were interacting with your classmates and you didn’t lose concentration at any point, but you also didn’t need to be hyper-focused’ (G15-P1) |
|                                                                             |                                                                           | ’It forces you to stay up to date on the subject, which helps you prepare for the exam. As you work on summaries, you are also preparing for the exam, and it is not only what you see that is important, but also what your group sees as important’ (G11-P2) |
|                                                                             |                                                                           | ’We learn how to collaborate in groups. As what we are studying is so multidisciplinary, you learn to manage the situation and say, ’I think this, I think this will be better’. It promotes teamwork in the same way that debating does’ (G8-P11) |
|                                                                             |                                                                           | ’In a profession like nursing, I believe gamification has greatly helped us in working as a team. It showed the value of teamwork and how to create a positive work environment where everyone helps each other’ (G3-P4) |
|                                                                             |                                                                           | ’Having a common goal improves group dynamics dramatically. You become more committed to your team almost unintentionally as you become more involved. I noticed it a lot from the first to the last gamification session we did!’ (G7-P9) |
|                                                                             |                                                                           | ’This dynamic approach has helped me in recognising something that was already happening... When you sit through a two-hour class without interacting, it becomes very difficult to maintain concentration and much more online!’ (G4-P7) |
|                                                                             |                                                                           | ’Making it more interactive, I suppose, is much better because it forces you to connect to the class and attend because, in many other online classes you say, ’I can read slides myself, and I don’t waste two hours’’ (G11-P5) |
|                                                                             |                                                                           | ’The technological barrier, at least for me, because I find it extremely difficult. Adapting to certain tools and learning how to use them... That was the barrier for me, but it was doable and useful to learn’ (G10-P12) |
|                                                                             |                                                                           | ’We all tried to get a good WiFi signal, but it was difficult to do so while sharing an apartment for at least 6 h a day and having 8 computers connected at the same time’ (G14-P2) |
|                                                                             |                                                                           | ’In a profession like nursing, I believe gamification has greatly helped us in working as a team. It showed the value of teamwork and how to create a positive work environment where everyone helps each other’ (G3-P4) |
|                                                                             |                                                                           | ’Having a common goal improves group dynamics dramatically. You become more committed to your team almost unintentionally as you become more involved. I noticed it a lot from the first to the last gamification session we did!’ (G7-P9) |
|                                                                             |                                                                           | ’This dynamic approach has helped me in recognising something that was already happening... When you sit through a two-hour class without interacting, it becomes very difficult to maintain concentration and much more online!’ (G4-P7) |
|                                                                             |                                                                           | ’Making it more interactive, I suppose, is much better because it forces you to connect to the class and attend because, in many other online classes you say, ’I can read slides myself, and I don’t waste two hours’’ (G11-P5) |
|                                                                             |                                                                           | ’The technological barrier, at least for me, because I find it extremely difficult. Adapting to certain tools and learning how to use them... That was the barrier for me, but it was doable and useful to learn’ (G10-P12) |
|                                                                             |                                                                           | ’We all tried to get a good WiFi signal, but it was difficult to do so while sharing an apartment for at least 6 h a day and having 8 computers connected at the same time’ (G14-P2) |

Table 2 (continued)

| Main theme                                                                 | Sub-themes                                                                 | Representative quotes                                                                                                                                                                           |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gamification experiences among nursing students                             | Freedom of choice as an extra point                                         | ’Forming a group and working in it in gamification has been very constructive for me. It helped me to understand the importance of debating with constructive criticism. It has been vital because nurses are part of a team’ (G2-P8) |
|                                                                             |                                                                           | ’Forming a group and working in it in gamification has been very constructive for me. It helped me to understand the importance of debating with constructive criticism. It has been vital because nurses are part of a team’ (G2-P8) |
|                                                                             |                                                                           | ’Managing the situation and say, ’I think this, I think this will be better’. It promotes teamwork in the same way that debating does’ (G8-P11) |
|                                                                             |                                                                           | ’In a profession like nursing, I believe gamification has greatly helped us in working as a team. It showed the value of teamwork and how to create a positive work environment where everyone helps each other’ (G3-P4) |
|                                                                             |                                                                           | ’Having a common goal improves group dynamics dramatically. You become more committed to your team almost unintentionally as you become more involved. I noticed it a lot from the first to the last gamification session we did!’ (G7-P9) |
|                                                                             |                                                                           | ’This dynamic approach has helped me in recognising something that was already happening... When you sit through a two-hour class without interacting, it becomes very difficult to maintain concentration and much more online!’ (G4-P7) |
|                                                                             |                                                                           | ’Making it more interactive, I suppose, is much better because it forces you to connect to the class and attend because, in many other online classes you say, ’I can read slides myself, and I don’t waste two hours’’ (G11-P5) |
|                                                                             |                                                                           | ’The technological barrier, at least for me, because I find it extremely difficult. Adapting to certain tools and learning how to use them... That was the barrier for me, but it was doable and useful to learn’ (G10-P12) |
|                                                                             |                                                                           | ’We all tried to get a good WiFi signal, but it was difficult to do so while sharing an apartment for at least 6 h a day and having 8 computers connected at the same time’ (G14-P2) |

3.4.1. Sub-theme 3.1: improving transversal nursing competencies from cooperative mechanics

Working in class every day with the same team helped the students to get to know each other better, be more effective, and identify their strengths and weaknesses in order to optimise their academic performance. This teaching approach was helpful in enhancing some nursing competencies such as team organization, communication, and team management:

’Forming a group and working in it in gamification has been very constructive for me. It helped me to understand the importance of debating with constructive criticism. It has been vital because nurses are part of a team’ (G2-P8)
3.4.2. Sub-theme 3.2: commitment as a form of cooperation nested within competition

Some participants emphasised that being part of a team, being needed for both activities, and winning in the game gave them a sense of individual responsibility to the team, making them feel an inherent commitment not to let the rest of the team down:

“In this subject, you are motivated to stay focused, you want to get points and answer correctly. I was more likely to concentrate because this was a team effort; if I made a mistake, the entire team would suffer the consequences”

(G8-P6)

3.5. Theme 4: blended learning vs face-to-face learning including gamification

In this final theme, the participants claimed that not only could this planning of game elements in teaching be adapted to face-to-face learning approaches, but it could also improve them on occasions. However, they agreed that teaching strategies such as direct instruction, project-based learning, or peer assisted learning were more important than the format itself, whether classes be online-only or face-to-face. As they mentioned, both approaches provide unique opportunities to implement game elements, but there are some other hurdles to consider.

3.5.1. Sub-theme 4.1: the needed change in teaching strategies

Despite the fact that online teaching strategies are inclined to be a temporary shift for many educational institutions, some participants recognised that there was already a need to shift toward more dynamic and participatory classes rather than passive classes, which has become more relevant in online approaches:

“Many lecturers have been doing only online theory classes and asking for a report with no feedback. So, what is the point of that line format, and interaction within the group itself can be difficult at times”

(G15-P10)

3.5.2. Sub-theme 4.2: hurdles to overcome

These perceptions were not limited to teaching strategies, but also to other obstacles observed when incorporating game elements into their classes. Participants identified different barriers to incorporating this innovative approach into both online and face-to-face classes:

“I believe it worked because we were using blended learning. In a face-to-face class, it would be much noisier, more disorganised, and the pace of work would be a hassle”

(G16-P6)

“Some aspects of this approach could be improved in face-to-face classes. We often miss live feedback from other groups in the online format, and interaction within the group itself can be difficult at times”

(G10-P4)

These difficulties extend to other hurdles that these participants faced while using this novel approach:

“My biggest problem was my internet connection. I couldn’t be in my bedroom because I didn’t get a good Wi-Fi signal. Eventually, I had to go to the living room”

(G9-P3)

4. Discussion

The aim of this study was to explore students’ experiences and perceptions about the use of game elements in both subjects using a blended-learning approach. After analysing our findings, almost all participants reported an increase in interest, enthusiasm, and adherence to the subjects as a result of the incorporation of game elements in blended-learning lessons, despite difficulties such as long hours in front of the computer screen, exhaustion, lack of attention, and demotivation caused by the transition to this new teaching delivery method. These findings further support previous in-person studies, in which these positive effects appeared to be driven by dynamism and significant learning through the gamification process (Brull and Finlayson, 2016; McEnroe-Petitte and Farris, 2020). This gamification process, similar to gamification in face-to-face classes, enabled nursing students to control their own progress, have autonomous learning, and promote intrinsic motivation to learn, engage and maintain interest in the class, and actively participate in their learning process (Castro et al., 2019; Castro and Gonçalves, 2018).

This experience was proven to be useful in reducing the stress and fatigue associated with spending long hours in front of a computer in a passive manner, which may have an impact on these students’ psychological well-being and academic performance (Bailenson, 2021). In this vein, keeping students active, working as a team, and having social support was not only important for stress reduction, but also for promoting teamwork skills, cooperative engagement, developing communicative skills, and encouraging critical thinking (Magnavita and Chiorri, 2018; Shorey et al., 2018). Students perceived pre-class subject preparation, similar to a flipped classroom, to provide better understanding, self-learning, efficiency in teamwork during online class activities, and the ability to reflect and learn at their own pace (Ramasubramaniam et al., 2017), particularly in team-based blended learning (Kang and Kim, 2021). Furthermore, learning while competing, as in this innovative teaching strategy, was surprisingly one of the most valued game elements among participants for improving content acquisition in order to be prepared for end-of-semester final exams by being engaged and participating in game sessions (Castro et al., 2019; Woolwine et al., 2019).

In comparison to other teaching approaches and consistent with other studies, the freedom of choice in their own learning process and online team-based learning fostered other key clinical competencies required in nursing practice, such as creativity, innovation for decision-making or problem solving, or criticism (Tehranineshat and Rakhshian, 2018). One possible explanation for these findings may be a lack of value in teaching non-scientific aspects of care, especially given that content-driven teaching is still the most common style in many nursing faculties (Costa et al., 2020; Rieger et al., 2020). Although some people may think that these competencies are innate, research suggests that everyone can be creative or innovative to some extent, with some being more so than others (Yuen and Balakrishnan, 2019). As a result, these innovative strategies may encourage these competencies by fostering new ideas, critical thinking, creatively alternative solutions, and teamwork-related skills (Plioryan et al., 2019). In this sense, our findings are consistent with those observed in previous studies, which found that these active strategies support knowledge mobilisation or the development of cooperation-based synergies, and prepare nursing students for the complex roles and responsibilities required in a multifaceted care environment (Cabral and Baptista, 2019; Dearnley et al., 2018). Personal qualities such as resilience, self-confidence in teamwork communication, resources management, and team role-based responsibility are just a few of the potential benefits that innovative approaches like the one proposed have been shown to foster (Ramires-Sakamoto et al., 2020).

However, the transition to online and blended learning in the midst of the COVID-19 pandemic has raised some issues to consider (Lockee, 2020; Sahu, 2020). Although online teaching is not a new delivery
method in higher education, the rapid shift to digital learning has had a visible impact on professional responsibilities, with physical and logistical implications for both educators and students (Ferdig et al., 2020). Some authors speculate that lecturers are in an unprecedented situation in which they have no choice but to change their teaching strategies (Adi-Badiozaman, et al., 2021; Cutri et al., 2020). This sudden pivot to online teaching urged universities to quickly design and develop supportive training programmes for in-service lecturers to use online learning platforms, which may have overlooked those who are not tech-savvy or have no previous experience in these contexts (Sañu, 2020).

That being said, the general use of active rather than passive teaching strategies was by far the most valued feature of this innovative design among the participants. As they interestingly pointed out, how educators interact with students in online teaching was more important than the format itself (McEnroe-Petitte and Farris, 2020), with active teaching strategies being an effective approach to foster student engagement (Castro and Gonzalves, 2018). Despite the initial efforts required to prepare these innovative teaching strategies and other obstacles that students and lecturers may experience in blended learning (Dost et al., 2020), these findings support previous in-person gamification research on its benefits in nursing to develop transversal clinical competencies (Gómez-Urquiza et al., 2019; Roman et al., 2020), as well as to introduce a new understanding of its potential outcomes such as captivating and motivating students to participate in online and blended learning.

Finally, a number of limitations need to be considered when interpreting the results of this study. To the best of our knowledge, no study has focused on the use of game elements in full-nursing subjects using a blended-learning approach yet, which has limited our discussion. Further studies will have to delve deeper into the experiences and perceptions of nursing educators in order to gain a better understanding of the use of game elements in blended learning, as well as possible alternatives to hurdles identified when using this innovative teaching approach. Rather than concluding this topic, the findings of this study warrant further discussion, such as the acquisition of non-scientific aspects of care or team-based learning in other academic years of the nursing degree and other healthcare disciplines via online or blended learning.

5. Conclusions

This study yields, for the first time, some interesting findings about the use of game elements in blended learning. The experiences and perceptions of second- and third-year nursing students provided worthwhile evidence to support the use of this innovative teaching strategy in order to ease online fatigue and stress as well as foster students’ engagement in online classes. The use of online active learning strategies, freedom of choice, and team-based learning proved to be effective in teaching other key clinical- or teamwork-related skills such as creativity, innovation, team-based communication and responsibility, among others. Likewise, while there are some institutional, technical, and teaching-related drawbacks to consider for future implementation, this innovative strategy was very useful for improving content acquisition in order to be prepared for end-of-semester final examinations.

Supplementary data to this article can be found at https://doi.org/10.1101/j.nedt.2021.105109.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

No conflict of interest has been declared by the authors.
Kang, H.Y., Kim, H.R., 2021. Impact of blended learning on learning outcomes in the public healthcare education course: a review of flipped classroom with team-based learning. BMC Med. Educ. 21 https://doi.org/10.1186/s12909-021-09208-y.

Lincoln, Y.S., Guba, E.G., 2006. Naturalistic Inquiry. SAGE Publications, Newbury Park.

Lockee, B.B., 2020. Shifting digital, shifting context: (re)considering teacher professional development for online and blended learning in the COVID-19 era. Educ. Technol. Res. Dev. 1–4 https://doi.org/10.1007/s11423-020-09836-8.

Mackavey, C., Cron, S., 2019. Innovative strategies: increased engagement and synthesis in online advanced practice nursing education. Nurse Educ. Today 76, 85–88. https://doi.org/10.1016/j.nedt.2019.01.010.

Magnavita, N., Chiorri, C., 2018. Academic stress and active learning of nursing students: a cross-sectional study. Nurse Educ. Today 68, 128–133. https://doi.org/10.1016/j.nedt.2018.06.003.

McCutcheon, K., Lohan, M., Traynor, M., Martin, D., 2015. A systematic review evaluating the impact of online or blended learning vs. face-to-face learning of clinical skills in undergraduate nurse education. J. Adv. Nurs. 71, 255–270. https://doi.org/10.1111/jan.12509.

McEnroe-Petitte, D., Farris, C., 2020. Using gaming as an active teaching strategy in nursing education. Teach. Learn. Nurs. 15, 61–65. https://doi.org/10.1016/j.teln.2019.09.002.

Morin, K.H., 2020. Nursing education after COVID-19: same or different? J. Clin. Nurs. 29, 3117–3119. https://doi.org/10.1111/jocn.15222.

Riegler, K.L., Chernomas, W.M., McMillan, D.E., Morin, F.L., 2020. Navigating creativity within arts-based pedagogy: implications of a constructivist grounded theory study. Nurse Educ. Today 91, 104465. https://doi.org/10.1016/j.nedt.2020.104465.

Roman, P., Rodríguez-Arrastia, M., Molina-Torres, G., Márquez-Hernández, V.V., Gutiérrez-Puertas, L., Ropo-Padilla, C., 2020. The escape room as evaluation method: a qualitative study of nursing students’ experiences. Med. Teach. 42, 403–410. https://doi.org/10.1080/0142159X.2019.1687865.

Sahu, P., 2020. Closure of universities due to coronavirus disease 2019 (COVID-19): impact on education and mental health of students and academic staff. Cureus 12, e7541. https://doi.org/10.7759/cureus.7541.

Shanny, S., Siew, A.L., Ang, E., 2018. Experiences of nursing undergraduates on a redesigned blended communication module: a descriptive qualitative study. Nurse Educ. Today 61, 77–82. https://doi.org/10.1016/j.nedt.2017.11.012.

Staker, H., Horn, M.B., 2012. Classifying K-12 Blended Learning. Innosight Institute.

Tehranineshat, B., Rakhshan, M., 2018. The relationship between knowledge management and creativity in bachelor degree compared to master degree nursing students. Invest. Educ. Enferm. 36 https://doi.org/10.17533/udee.iee.v36a3e05.

Wang-Sze-Cheng, V., Davenport, T., Johnson, D., Vella, K., Hickie, I.B., 2019. Gamification in apps and technologies for improving mental health and well-being: systematic review. JMIR Ment. Health 6, e13717. https://doi.org/10.2196/13717.

Woolwine, S., Romp, C.R., Jackson, B., 2019. Game on: evaluating the impact of gamification in nursing orientation on motivation and knowledge retention. J. Nurses Prof. Dev. 35, 255–260. https://doi.org/10.1097/NND.0000000000000570.

World Health Organization, 2020a. WHO Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020 [WWW Document]. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.

World Health Organization, 2020b. UNESCO & IESALC COVID-19 and Higher Education: Today and Tomorrow. Impact Analysis, Policy Responses and Recommendations. Yuen, H.-W., Balakrishnan, A., 2019. Next stop - teaching creativity and innovation in medical education. Med. Teach. 41, 116–117. https://doi.org/10.1080/0142159X.2018.1500682.