

## Research article

# A serious game for online-based objective structured clinical examination in nursing: A qualitative study

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## ABSTRACT

**Background:** The current pandemic has led to unprecedented scenarios worldwide. In this context, educational institutions had to move abruptly from in-person to online classes, having to be flexible and innovative, one of the main concerns being the semester-end examinations in practical modules.

**Objective:** This study aimed to explore nursing students' perceptions of the use of a serious game-like model in their final online objective structured clinical examination (OSCE).

**Design:** An exploratory phenomenological study was conducted during the COVID-19 pandemic, in particular during June 2020.

**Settings:** This study took place at the University of Almeria with nursing students enrolled in a clinical placement module.

**Participants:** Eighty-nine fourth-year nursing students took part in this study.

**Methods:** Following the educational principles of the OSCE, a virtual OSCE was designed, using the Genially platform, an online platform for creating interactive content, to set up an assessment as a story-telling game-like model. A total of 5 focus groups (FGs) were conducted afterwards via the GoogleMeet platform. In addition, 30 semi-structured interviews were performed via the same platform. The data was analysed using a content analysis approach and supported by the ATLAS.ti 8.4 software.

**Results:** Our finding revealed 2 main themes and 4 sub-themes. The two main themes were (i) generating emotions and feelings in times of virtuality; including emotions and feelings experienced by students during their online assessment process, and (ii) online assessment: a potential alternative to educational barriers; describing the variability of traditional modality, its implications for learning and the acquisition of competences.

**Conclusions:** Serious game-like models, such as the story-telling game proposed, as part of their online OSCE assessment appear to be an appropriate alternative assessment method for face-to-face approaches. This paper adds new evidence on the use of innovative and state-of-art resources as part of nursing OSCE assessments in a new reality for most students and teachers. Serious game-like models in online OSCE may empower students and help them to remove perceived barriers in face-to-face assessments.

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## 1. Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spread, which began in December 2019, has produced an unprecedented global scenario (Choi et al., 2020). Not only did the pandemic pose a challenge to all healthcare systems worldwide, but also to other key sectors, such as economics and education (Ceylan et al., 2020). In this sense, educational institutions had to move abruptly from in-person to online classes, affecting more than 1.5 billion students in 191 countries (World Health Organization, 2020). As in other countries, all educational institutions were closed down and all clinical practices were suspended as a preventive measure for health students when Spain officially decreed lockdown on 15th March (Ministry of the Presidency, 2020).

In this manner, universities have had to be innovative, flexible and agile in a short period of time to decide how to continue their students' education. Although online training is not a novel method of delivery for many universities, it raised a number of concerns related to the semester-end final examinations (Jones et al., 2020). This transition has therefore been particularly challenging for some health-related degrees, such as medicine and nursing, which include some practical modules that have been traditionally assessed by the Objective Structured Clinical Examination (OSCE) approach (Prior et al., 2020). This approach measures clinical competence through different scenarios and, consequently, its challenge was to creatively restructure them in order to reduce the disruption of the curriculum (Kakadia et al., 2020).

In this context, nursing faculties were required to make changes to their assessment procedures while implementing strategies to ensure student engagement (Jackson et al., 2020), and many of them hence adopted online education as an alternative for their students. Online teaching and learning include a variety of designs, such as full online or blended designs (Means et al., 2014), but all concur with the use of technology to establish virtual learning environments in order to achieve meaningful active learning (McCutcheon et al., 2015). Notwithstanding the pandemic, certain gamification designs such as game-based learning or serious games might be helpful for both student engagement and online OSCE assessments as they allow for immediate feedback in real-close scenarios (Ghoman et al., 2020; Roman et al., 2020). Interactive story-telling games, for instance, have a meaningful learning potential as an essential part that can be added to maintain and increase students' motivation and content retention (Habes et al., 2020; Young et al., 2015). Stories with a choice-based format allow players to experience the plot from multiple perspectives, prompting critical thinking and exploring complex topics such as moral or ethical choices (Melcer et al., 2020).

Although there exists evidence of the use of online OSCE assessments with simulated clinical scenarios, its development remains similar to that of a traditional practical module (Higgins et al., 2019; Kakadia et al., 2020). These online OSCE assessments replicated most of the curricular elements needed to adapt some of them to an online environment, such as educational content or feedback methods. However, a paucity of research investigating experiences in online nursing assessments using innovative gamification designs such as serious games was noted, specially related to these practical modules. To our knowledge, this is the first study that provides an overview of the use of a serious game design in a final online nursing OSCE assessment. Thus, the aim of this study was to explore nursing students' experiences and perceptions of the use of a serious game-like model, such as a story-telling game, as part of their online-based OSCE assessment during the COVID-19 outbreak.

## 2. Methods

### 2.1. Design

An exploratory phenomenological study was conducted during the

COVID-19 pandemic, in particular during June 2020.

### 2.2. Theoretical framework

Our proposal was based on both Means and collaborators' conceptual framework for online education (Means et al., 2014) and (Floryan et al., 2019). Online education identifies nine dimensions such as role of online assessments, source of feedback or pacing among others. These dimensions allow students to have adaptive instructions and provide students with information on learning status and immediate feedback while exploring simulated scenarios in their own pace. At the same time, the gamification principles add certain elements to enhance student engagement, such as freedom of choice or visibility of their progress and the benefits of their efforts.

### 2.3. Virtual OSCE

Face-to-face assessments (including OSCE) were not allowed due to social distancing measures and government instructions. Following the educational principles of the OSCE (Khan, Gaunt, et al., 2013; Khan, Ramachandran, et al., 2013), an online OSCE was therefore designed, using the Genially platform to set up an assessment as a story-telling game-like model (see Fig. 1). This platform allows to create interactive digital content, such as creative academic presentations, infographics, training material and games (Jiménez et al., 2020). The virtual OSCE was set in an Intensive Care Unit (ICU) and consisted of a series of clinical decision-making focusing on clinical safety, cardiopulmonary resuscitation, stroke management, and emergency drug management. The created online content integrated multiple interactive gamification elements, including videos, photos, micro-interactions, and a feedback loop, into the storyline in order to confront students with the consequences of their choices. Students had to complete the virtual OSCE in a maximum time of 20 min, after which time students could no longer send their answers. All decisions were based on images and depending on whether the answer was correct or incorrect, the evolution of the patient would be one or the other. The greater the number of incorrect options, the worse the evolution of the patient, always linked to the clinical decision that the student would have taken (Meskell et al., 2015). For example, an error in the calculation of the dose of medication may lead to a situation of ventricular fibrillation in which the student must recognise the rhythm and act accordingly. Or, for example, an error identifying the clinical manifestations of a patient with a stroke may lead to the activation of an inappropriate code and a series of complications in the patient for which the student had to act.

### 2.4. Participants

The study population was recruited using a convenience sampling approach and included fourth-year nursing students at the University of Almeria. The inclusion criteria used were as follows: (i) to be enrolled in a clinical placement module, (ii) to have previously participated in a face-to-face OSCE, and (iii) to convey their agreement to participate and be recorded.

### 2.5. Data collection

Researchers developed and agreed on an interview protocol designed to promote participants to give detailed responses (Supplementary Table S1). A total of 5 focus groups (FGs) were conducted via the GoogleMeet platform, with 11–12 participants in each focus group. 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. In addition, 30 semi-structured interviews took place using the same platform for students who were unable to attend the focus group meeting. Data collection was concluded after analysing last interview to ensure no new concepts emerged, considering that the stage of data



Fig. 1. Serious game-like model designed for a virtual-based OSCE.

saturation had been reached. Both FGs and interviews were recorded and lasted between 30 and 60 min each. To ensure the anonymity of the participants in the transcription of the interviews, the letters “FG” (focus group), “P” (participants) and “I” (interview) were employed, along with the participant number. Prior to the analysis, the participants were given the option of reviewing the transcripts.

## 2.6. Data analysis

In a first stage, interviews and FGs were transcribed. Subsequently, ATLAS.ti 8.4 software for Windows was used for data analysis, conducting a content analysis and following the analysis phases proposed by Colaizzi (Morrow et al., 2015): (i) review and familiarise oneself with the data; (ii) identify significant statements; (iii) formulate a meaning of the statements within the context; (iv) group and organise the identified meanings into clusters of themes or categories; (v) a full and inclusive description of the feelings and ideas of participants about each theme and each participant; and (vi) elaborate a fundamental structure or theory.

## 2.7. Ethical considerations

Approval for the study was obtained from the Ethics Committee of University of Almeria (UALBIO2019/023), and all of the ethical aspects of the Declaration of Helsinki were taken into account. During the research process, the voluntary nature of students' participation in the study was guaranteed at all times, and informed consent was obtained. Additionally, the participants were informed that their experiences, perceptions and/or opinions would not influence their final qualification.

## 2.8. Rigour

To ensure the validity of the study, data triangulation (interviews and FGs) and investigator triangulation were used, who performed an independent content analysis (CR and MR). Additionally, the consolidated criteria of reporting qualitative research (COREQ) and Standards for Reporting Qualitative Research (SRQR) recommendations were followed (O'Brien et al., 2014; Tong et al., 2007). According to the Lincoln and Guba (2006) criteria, trustworthiness was verified through

credibility, transferability, dependability, and confirmability. In this sense, a third researcher was consulted to review codes and analysis, and resolve discrepancies for credibility. Transferability was enforced through set selection criteria and detailed demographic information. For dependability, the memo writings served as documentation of analysis over time, and sharing these memos with the co-researchers at each phase of analysis served to maintain confirmability.

### 3. Results

#### 3.1. Participant characteristics

Eighty-nine fourth-year nursing students participated in the study, representing a participation rate of 68.46% ( $n = 130$  nursing students). Overall, 80.90% of participants ( $n = 72$ ) identified themselves as female and 19.10% as male ( $n = 17$ ). The mean age of these participants was 23.51 years old ( $SD = 5.55$ ), with an age range from 20 to 55 years. Two main themes emerged from the data analysis, which characterise students' experiences and perceptions about the use of a story-telling game-like model in their online assessment to ascertain their competencies acquired during their fourth academic year (see Table 1 and Fig. 2).

#### 3.2. Theme 1. Generating emotions and feelings in times of virtuality

This first theme includes emotions and feelings experienced by students during their online assessment process. In this sense, two sub-themes emerged from this first theme, which provide both information of realism perceived, nervousness throughout the process and their perception of its implementation as an assessment approach for their competencies.

##### 3.2.1. Sub-theme 1.1. Bridge towards a real word

Despite the physical distance that separates the usual context of performance with students, virtual assessment allowed most students to delve into a situation close to real-life nursing practice, carrying all the emotions on the other side of the screen:

“What I liked most is the dynamism of the assessment itself, making you feel as if you were in an intensive care unit through a real story. Even sometimes, I felt responsible for some of the decisions I made” (FG3-P12)

“The realism was terrific as real images and videos were used. The situation completely realistic; I felt the stress of the situation, watching how the patient evolved at the base of what I decided” (I23)

Likewise, the time management during the development of the activity helped to convey the uncertainty of real scenarios that students will have to deal with as an additional factor to their future practice:

“Although the time limit increases the pressure a little bit, it tests our ability to react and decide in similar situations to those we may find in our professional practice” (FG4-6)

Having the necessary patient details and data at all times, as well as addressing the case in real time, made it easier and more effective for students to make decisions. These decisions were based on the patient, modifying their health status according to the preferred clinical decision. All of this gave rise to a sense of responsibility that filled students with an authentic experience:

“Certainly, having a patient's medical record and treatment gives you the opportunity to make decisions that are similar to a real context” (FG5-P8)

**Table 1**

Summary of themes, sub-themes and representative quotes.

| Themes   | Sub-themes                                  | Representative quotes  |
|--|---|--|
| Generating emotions and feelings in times of virtuality            | Bridge towards a real world                 | <p>“I think it's a good way to learn how we should act in real situations that we will soon experience in the hospital. It is a dynamic and realistic test in which key clinical decisions need to be taken quickly” (FG1-P12)</p> <p>“I find this type of assessment more educational and enriching than others, because it makes you put yourself in the situation and be aware of the knowledge you have. I have become aware of the real time and anxiety caused by emergency situations” (I6)</p> <p>“There were times when it seemed like a real situation, and I forgot it was an assessment. It gets you right into the case, and even if it's online, it seems more real than doing it in a lab” (FG5-P4)</p> <p>“The virtual OSCE allows you to perform without the pressure of feeling observed by an evaluation board or peers” (I23)</p> <p>“I thought more calmly about the answers. I felt less anxiety both before and during the test” (FG3-P2)</p> <p>“The virtual OSCE allows us to be less nervous, so that we can think more clearly and capture all the knowledge gained during the course and clinical practice. You do not feel as evaluated as in the face-to-face OSCE” (I1)</p> |
| Online assessment: a potential alternative to educational barriers | Waterproofing against insecurity and nerves | <p>“I found it quite thrilling because I've always decided what to do and how to do it through the story. I liked this assessment approach, because it reproduces the patient's follow-up with a detailed story and takes into account the procedures developed” (FG4-P9)</p> <p>“I liked the assessment because, in my opinion, it wasn't a simple multiple-choice test, where you set out the theory learned, but here you had to connect concepts and act accordingly” (I19)</p>  |
|  | Beyond the face-to-face monotony            | <p>“I found it fascinating and highly interactive because it's a more individualized and personalized test. You follow a storyline where you have to decide on the basis of your clinical knowledge” (FG4-3)</p>   |
|  | A safe space to build knowledge             | <p>“It would be interesting to use it as a learning option in the future, as it helps you deal with new and unknown situations” (I8)</p> <p>“I found it to be an original method of assessing, it also helps to consolidate concepts and makes you better</p>  |

(continued on next page)



Table 1 (continued)

| Themes | Sub-themes | Representative quotes  |
|--------|------------|--|
|        |            | remember the theory" (FG1-P10)   |
|        |            | "The virtual OSCE allows an objective assessment without the influence of the personal opinion of the examiner. It's fantastic!" (I15) |

"I found it surprisingly realistic because like everything, every action has an impact, and we must be responsible for what we do. This assessment shows that a decision can change everything" (I7)

### 3.2.2. Sub-theme 1.2. Waterproofing against insecurity and nerves

On the other hand, most participants agreed that nerves and insecurity that come with face-to-face assessment is a risk factor for interfering with the manifestation of competencies and communication skills, resulting in an underestimation of their academic level:

"In a face-to-face OSCE, you feel more observed and those nerves do not let you show all your knowledge and skills, because you are more concerned about whether or not you know how to act than about performing the exercise" (FG1-P1)

"I did not even greet the patient because of my nerves in the face-to-face OSCE, which I did in every room during my hospital practice and I have even had small conversations before starting the procedure in question" (I3)

Thus, the online assessment diluted this obstacle by providing students with an environment of tranquillity and security in which to demonstrate all the knowledge acquired during their academic year. The opportunity for students to be tested in a familiar and close context therefore provided the confidence and the feeling of control needed to face the situation without losing the thread:

"There is no nervousness factor in a live and supervised assessment, so the level of concentration remains more stable and I can focus more on the problem or assessment of the patient" (FG1-P9)

"The peace of mind of taking the exam from home allowed me to experience the feeling of being able to control the situation, reflecting on it before making a mistake during my performance" (I29)

Unlike the current face-to-face OSCE, the virtual online-based

assessment allows innovation when designing its questions and clinical cases, providing a trendy and attractive approach to capture the students' attention. In this way, the majority of students had the feeling of engaging in a fun and educational learning game, without the perception of being evaluated and thus masking the stress created by the conventional format:

"It was a very interesting and interactive way to evaluate our knowledge. I think it has been an assessment that does not look like an assessment, because it was fun to try to get it right and follow the clinical course" (FG2-P9)

"I found it fun as if we were in a game that takes you to one place or another, depending on what you decide. It was visually very attractive, too. I didn't feel like being evaluated. What is more, the story-telling was a real thought-provoking experience" (I22)

### 3.3. Theme 2. Online assessment: a potential alternative for educational barriers

The wide range of barriers to the development and execution of educational work over time have been accentuated by the current health situation. This has led to new technologies being the key to providing quality education with optimum guarantees of safety for teachers and students. In this theme, students' perceptions about the online method as an alternative for assessment are considered. Two sub-themes arose, describing the variability of traditional modality, its implications for learning and the acquisition of competences.

#### 3.3.1. Sub-theme 2.1: beyond the face-to-face monotony

Before taking their virtual assessment, most students assumed that the test would follow a similar distribution to the traditional face-to-face exam, where the classical question-answer binomial would fit into an electronic format:

"I thought it would be a traditional assessment in which the case is presented, and that's it. In fact, within those assessments, you have to work on some of the interventions without really assessing the knowledge you have on the subject." (FG1-P5)

"I assumed this would be a typical test, but online, where we'd have to interact with it somehow" (I12)

However, the online assessment pleasantly surprised the students, moving away from the usual routine used to date. Clinical cases and questions provided a personalized approach, where students felt self-sufficient enough to handle the situation:

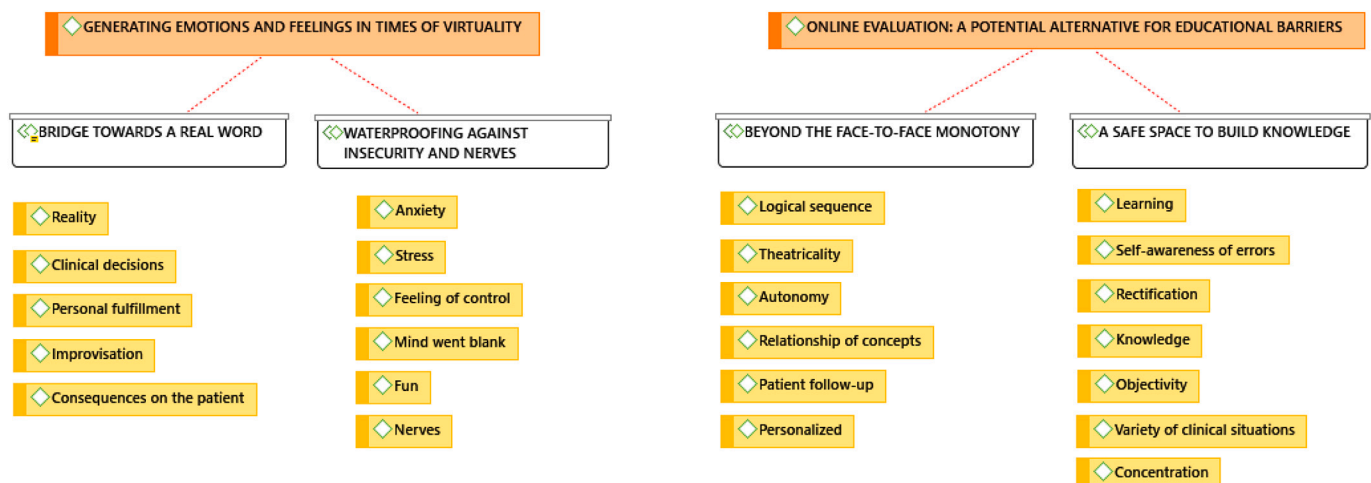


Fig. 2. Conceptual map elaborated from participants' experiences and perceptions of the use of a serious game in their online OSCE.

"It was quite detailed and personalized because, depending on the decision I made, it led me to one situation or another" (FG4-P5)

"What I loved most was that I felt like a real nurse, I was the one who made the decisions, not the one who made the decisions of others" (I9)

In addition, the performance of the virtual assessment itself was modified into a logical sequence of actions, based on the course of the decisions taken, allowing the clinical assessment of the patient to be carried out at the same time and to react accordingly. In this manner, students are not the ones who need to simulate the course of the situation or interpret the procedures followed:

"Each decision was chained to the next in a well-tailored story. It sent you to a consequence, being interactive and not a linear story" (FG2-P7)

"It was delightful that the virtual assessment reproduced the patient's follow-up and took into account the procedures developed" (FG5-P10)

"You have to memorize and mechanize all the steps in a face-to-face test so that none of them is missed. However, there is no theatricality in the virtual assessment, you are simply you and your decisions, you have to relate concepts and act in a coherent manner" (I27)

### 3.3.2. Sub-theme 2.2: a safe space to build knowledge

The online approach is not only an alternative to assessing student competencies but also a method of promoting learning and knowledge acquisition in a safe and convenient manner. The wide variety of clinical scenarios that can be given to the same student throughout stories, followed by a higher level of concentration achieved during the test, make virtual assessment a potentially useful resource:

"I think it's the best way to learn. I feel pleased with the kind of learning I am getting with this method [virtual OSCE]. Now I am far more interested in learning those things that I left empty in the virtual OSCE. I wish there would have been more learning of this kind" (FG1-P11)

"You are limited to performing a task that you have to do or answering a few questions [in a face-to-face exam], while you have more questions and you are more focused on them in here, so you have more opportunities to demonstrate your knowledge" (I18)

As students' progress throughout the test, they become self-aware of their own mistakes, being able to correct them if they need to do so, and thereby promoting a self-assessment and strengthening their learning process. The majority of participants highlighted the objectivity of this assessment as a major advantage, thus eliminating the impact of the subjectivity of the evaluators on their results and achieving a unified criterion:

"I think it's a good assessment resource, because it allows self-correction and you've become self-aware that you're failing, reflecting and learning at the same time" (FG3-P6)

"Normally our result depends a lot on the examiner who evaluates your performance in a face-to-face exam, as some teachers are too demanding when evaluating and others are not. The virtual assessment is fairer and more equitable for all" (I8)

This educational alternative is not exempt from limitations, such as doubts and queries that may arise during the development of the activity or lack of personal contact with the patient. However, most students felt that these barriers were potentially minimized, helping them to perform at their own pace:

"Although lack of contact makes it difficult to demonstrate your professional skills, this moves to second place, as they are evaluated in our clinical practice. After doing our clinical practice, it would be desirable to theoretically evaluate how to react in certain scenarios, and this can be done easily and comfortably through a virtual assessment" (FG2-P12)

"During my exam, I had several connectivity problems and queries, but the online platform allowed me to start again without any problems and the issues were resolved by a video call" (I12)

Furthermore, both the optimization of content and personal resources as well as a better management of the time spent, are additional advantages that students attribute to online assessment:

"I believe that the virtual exam, as I said, is an optimization of resources. It saves time for evaluators and students, and it can be a more objective method to evaluate our knowledge" (I14)

## 4. Discussion

The aim of this study was to explore nursing students' experiences and perceptions in the use of a serious game-like model, such as a story-telling game, as part of their online or virtual OSCE, designed as an alternative assessment method to the face-to-face approach. After analysing our findings, almost all participants reported that online assessment was a useful resource that allows them to demonstrate their acquired knowledge in a safe and realistic manner. These findings are in line with [Shehata et al. \(2020\)](#), [Boyle et al. \(2020\)](#) and [Day et al. \(2018\)](#), who introduced the online OSCE in nursing students to assess their clinical skills and competencies as a training for real clinical scenarios. Despite the content and personal limitations identified in our findings, no study has specifically examined the use of story-telling as part of a serious game-like design for online nursing OSCE assessments to date. Response to questions and clinical cases following a serious game-like model has been shown to be a key factor in the level of nervousness and safety perceived by students during their assessment process ([Johnsen et al., 2018](#)). In this vein, the use of methods such as the virtual OSCE reduces the feeling of being observed while the exam is being carried out, creating an environment of control over the situation. This suggests that the use of serious game-like models can be a strong approach of evaluating clinical skills with proper safety perks ([Roman et al., 2020](#)). According to our results, online modality helps students test their skills differently from traditional approaches, betting on innovation and working dynamics.

One of the differentiating factors that enables this new outlook to be incorporated is the use of new technologies, which gives examiners the opportunity to use specialized software to create relevant multimedia content for their students ([Phillips et al., 2020](#)). As reported by our participants, the virtual OSCE and the use of new technology make the nursing care process easier, where students are responsible for managing clinical decisions that would have an impact on the health status of the patient. Likewise, our findings mirror existing studies on similar scenarios, where critical and creative thinking is needed for problem solving in this kind of simulated virtual environments ([Gómez-Urquiza et al., 2019](#)).

Conversely, online assessment and new technologies in general are not free of problems. The optimal network connection or the possibility to resolve queries or doubts during the assessment appeared to be the main barriers in this methodology ([Kakadia et al., 2020](#)). Our results support the need to use different methods to minimize these barriers as much as possible, such as enabling video calls with examiners if necessary or allowing the possibility of restarting the assessment in the event of poor connectivity.

At a different level of results, our participants perceived that the assessment process is often conducted under the subjectivity of the

examiners. Despite having unified criteria based on scientific evidence, students' perception of their own performance may differ from that of the examiners (Inayah et al., 2017). In fact, variability in their results is one of the main reasons why students experience frustration and discouragement in preparing for future exams (Donohoe et al., 2020). In this manner, online OSCE and other serious game-like approaches appeared to be a possible alternative for students to feel fairly and objectively evaluated.

The use of serious games as part of online OSCE assessment is not only a resource for promoting student assessment but also a set of characteristics that make it a perfect environment for learning and developing new skills. Unlike the face-to-face OSCE, an online approach can easily transfer learners to different clinical settings, facilitating the acquisition of a wide range of knowledge. Furthermore, the freedom to choose the place to take the OSCE online seemed to relieve the perceived pressure that helped them to focus on content with greater success (Kakadia et al., 2020). Another important feature to be mentioned in this new assessment system is the time management by students, which is the cornerstone of their learning process (Ertuğ & Faydali, 2018). Certainly, this element helps to create a context that is closer to their future reality, as appropriate decisions and overall assessments need to be taken in a timely manner. Having said that, not all the participants agreed with this idea, as they argued that time is actually a factor that causes them anxiety, making it difficult to demonstrate their skills and knowledge (Tweed et al., 2013).

Nevertheless, this study has various limitations to be considered when interpreting our results. Interviews and FGs were conducted in fourth-year nursing students with the aim of reducing this limitation and ensuring the richness of the data collected. It would also have been interesting to include the experiences and perceptions of the educators who developed the virtual OSCE in order to gain a better understanding of these new assessment approaches. All things considered, this paper adds new evidence on the use of innovative and state-of-the-art resources as part of nursing OSCE assessments in a new reality for most students and teachers.

## 5. Conclusion

Serious game-like models, such as the story-telling game proposed, as part of their online OSCE assessment appear to be an appropriate alternative assessment method for face-to-face approaches. Serious game-like models in online OSCE could be seen as a realistic assessment environment that allows students to handle all patient details at their own pace and helps them to get rid of nervousness related to the feeling of being observed like in face-to-face assessments, revamping their clinical-decision making skills. Similarly, online OSCE using story-telling game-like models seems to strongly favour learning and reflection, aspects that the participants do not perceive as such in face-to-face approaches. In this sense, the participants consider this state-of-the-art approach to be more objective and equal, since the inter-evaluator variability does not influence their assessment.

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& editing, Visualization. **José Granero-Molina:** Methodology, Supervision, Investigation. **Cayetano Fernández-Sola:** Methodology, Supervision, Investigation. **José Manuel Hernández-Padilla:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Supervision, Project administration.

## Declaration of competing interest

No conflict of interest has been declared by the authors.

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