



## Towards the implementation of OSCE in undergraduate nursing curriculum: A qualitative study



Montserrat Solà<sup>a,b,\*</sup>, Anna M. Pulpón<sup>a</sup>, Victòria Morin<sup>a</sup>, Raül Sancho<sup>a,b</sup>, Xavier Clèries<sup>c</sup>, Núria Fabrellas<sup>a,b</sup>

<sup>a</sup> School of Nursing, University of Barcelona, Spain

<sup>b</sup> IDIBELL Institute of Biomedical Research, Spain

<sup>c</sup> Parc Sanitari Pere Virgili, Barcelona, Spain

### ARTICLE INFO

#### Article history:

Received 11 March 2016

Received in revised form 28 October 2016

Accepted 24 November 2016

#### Keywords:

OSCE  
Assessment  
Nursing curriculum  
Competencies  
Training

### ABSTRACT

**Background:** Despite the fact that Objective Structured Clinical Examination is considered to be an efficient assessment method, their implementation in the undergraduate nursing curriculum encounters difficulties. However, the initiative of the European Higher Education Area to promote competency-based assessment may represent an opportunity to introduce this instrument in undergraduate nursing curriculum.

**Objective:** To explore the perception of nursing faculty members regarding the implementation of the OSCE as an assessment tool in Catalan Nursing Schools.

**Design/Participants/Setting:** In this qualitative study, fifteen teachers participated in semi-structured interviews in eight Catalan Nursing Schools.

**Methods:** Semi-structured interviews were conducted. A thematic content analysis was used to identify major themes in the interview data and collaborative analysis was undertaken to ensure rigorous results.

**Results:** The relevant aspects that are emphasized by teachers included the consideration of the dual purpose of the OSCE via its formative and evaluative facets by enhancing the feedback received by students about their performance on the OSCE. The OSCE should be administered towards the end of the degree program and should complement other methods of assessment. Despite its high cost, the OSCE was deemed to be efficient as it enables student competencies to be assessed with objective criteria, which is a difficult task with other instruments. OSCE implementation is feasible with the institutional support of and collaborative work between schools.

**Conclusions:** The implementation of the OSCE in the Catalan undergraduate nursing degree programs is feasible if the project receives the support of all involved parties and if creative strategies are determined to reduce economic costs and optimize resources. With adequate *feedback*, the OSCE is an assessment tool that can provide high-impact training to students.

© 2016 Elsevier Ltd. All rights reserved.

### 1. Introduction

Student assessment is a critical aspect in the design of undergraduate curriculum. If the main functions of assessment are considered to be formative and evaluative, the selection of one function or the combination of two functions involves the selection of an evaluative instrument, an approach to implementation, and the required resources (Friedman, 2009).

Assessment of clinical skills is an essential component of undergraduate and graduate nursing education because it provides information about potential knowledge deficits, and attitudes that interfere with successful performance of patient care skills. From its creation to the present, the Objective Structured Clinical

Examinations (OSCE) has been regarded as an effective assessment tool. A significant number of experiences that assess students' clinical skills in the context of university education in health sciences, primarily in nursing and medicine degree programs, has been described in the literature (Harden et al., 2016; Walsh et al., 2009).

Different authors have compared the value of the OSCE in relation to other assessment methods. Some strengths of the OSCE include its high level of validity and reliability (Bartfay et al., 2004; Mitchell et al., 2009; Rushforth, 2007; Schuwirth and van der Vleuten, 2003; Trejo-Mejía et al., 2016), its objectivity in relation to other practice assessments (Bagnasco et al., 2016; Rushforth, 2007; Schuwirth and van der Vleuten, 2003; Selim et al., 2012; Watson et al., 2002) and the motivation of students who have to assess clinical conditions that are similar to reality and may challenge their competencies (Bartfay et al., 2004; Rushforth, 2007). The issues that hinder the implementation of the OSCE include the anxiety that it generates in students (Muldoon et al., 2014; Nulty et al.,

\* Corresponding author at: School of Nursing, University of Barcelona, Spain.

E-mail addresses: [montsesolap@ub.edu](mailto:montsesolap@ub.edu) (M. Solà), [apulpon@ub.edu](mailto:apulpon@ub.edu) (A.M. Pulpón), [nfabrellas@ub.edu](mailto:nfabrellas@ub.edu) (N. Fabrellas).

2011), its high cost and the complex logistics in its organization (Rushforth, 2007). Despite the fact that many publications explicitly detail the effective use of the OSCE, the pragmatic issues related to the OSCE are not controversial, i.e., how the OSCE can be implemented in the academic curriculum (Henderson et al., 2013).

During the 2001–2011 academic years, an OSCE summative assessment test was administered in Catalan Nursing Schools to 1892 undergraduate students. Nursing students' competencies were assessed at the end of their college studies through 14 simulated clinical situations typical of nursing practices, which students had to solve across 18 assessment stations. Most stations comprised a clinical encounter with a simulated patient or a dummy. Some situations had a second station at which the student was asked to write a care plan proposal for the simulated patient who had been interviewed at the previous station. The maximum time allotted for each station was 10 min. The total test duration was 4 h, including rest, and the test was conducted at the outpatient clinics of teaching hospitals. The OSCE had the same design and contents for each institution. Each cohort had 18 students, for this reason we organized a double OSCE per day. So every day, we evaluated 36 students and repeated the test on consecutive days until the total number of students to be evaluated was completed. During this period, the administration of the test was partially funded by the government (Solà et al., 2011). According to Palese et al. (2012) the high price of the OSCE is its development and administration phase (case workshops, scenarios creation, standardized patients, logistics, catering, etc.). The project was interrupted due to the economic crisis that was experienced in the country and the reform of undergraduate nursing studies. This reform extended the curriculum from three years to four years and created, with the 2012–2013 cohort, its first graduating class. This study responds to the need to conduct a qualitative study to explore and heighten the understanding of Nursing School faculty's perceptions on the future of the OSCE and its implementation in the new competency-based assessment context in undergraduate nursing studies within the framework of the European Higher Education Area (EHEA).

## 2. Objective

To explore Nursing School faculty's perceptions about the future of the OSCE and the guidelines for its implementation in undergraduate nursing studies.

## 3. Methodology

Considering that the purpose of this study is to explore faculty's perceptions of the future of the OSCE and the characteristics of its possible implementation, (purpose of the test, placement in the curriculum, feasibility...), a qualitative research study from a phenomenological perspective was designed to collect and analyse the data. The study population consisted of faculty members of the nursing programme who satisfied the following criteria: were associated with the organization of OSCE and a Nursing School. The sample was intentional and informants were selected from both teachers in managerial positions (dean and head of studies) and non-managerial teachers of the public universities and subsidized and private universities. Teachers were contacted by email and invited to participate in semi-structured interviews (Blasco and Otero, 2008). These interviews were conducted in their own university centres and had an average duration of 55 min. During the 2012–13 academic year, 15 interviews were conducted until data saturation was attained. The teachers who were interviewed belonged to eight Nursing Schools: the Nursing School of the University of Barcelona, the School of Nursing of the Autonomous University of Barcelona, the Nursing School of Lleida, the Nursing School of Girona, the Nursing School of St. Joan de Déu de Barcelona,

the Gimbernat Nursing School, the Health Sciences School of Manresa and the Health Sciences School of Blanquerna. The interviews were recorded in a digital recorder after obtaining the consent of interviewees. Next, its contents were transcribed, and the transcripts were returned to the participants for approval or revision. All comments from the interviewees were incorporated into the transcripts.

Data collection and analysis alternated during the process, and the analysis of the first data guided the collection of additional data. A thematic content analysis was performed (Vazquez, 1996). First, successive readings of the transcribed interviews were conducted to extract the initial meaning from the data and establish the operational criteria according to the research objectives. Subsequently, the units of significance were identified and data were inductively categorized and grouped in thematic units. To ensure the rigour of the results, each of the outlined phases was separately performed by several members of the research team. The analysis was subsequently confirmed by group consensus. The analysis was performed with recursive loops throughout the entire process. Consequently, once each of the phases was completed, the previous phase was revised. To facilitate data organization and categorization, the qualitative analysis program Atlas.ti version 5.0 software packages (Atlas.ti Scientific Software Development GmbH, Berlin, Germany) as employed.

### 3.1. Quality Criteria

To ensure the rigour of the data, the researchers followed the credibility (informants' feedback, triangulation of researchers, data illustration via exemplification), transferability (explication of the selected representation and description of the selected subjects), dependence (description of information-gathering techniques) and confirmability (mechanical collection of information and textual transcription of interviews) criteria that were proposed by Guba (Pla, 1999).

### 3.2. Ethical Considerations

Participation in the study was voluntary, and written informed consent was obtained from the participants and the administrators of the various institutions. Anonymity and confidentiality were guaranteed. Personal and institutional information were removed during data transcription, and each interview was coded to protect the participants' identities. The project was approved by the Commission on Bioethics at the University of Barcelona.

## 4. Results

The following four thematic clusters emerged from the data as key points to guide a proposal for implementing OSCE in undergraduate nursing degrees: *purpose of the OSCE, its placement in the curriculum, its efficiency and its implementation strategies.*

### 4.1. Purpose of the OSCE

Most interviewees stressed the need to complement the OSCE evaluative facet with its formative potential; in this manner, the student body benefits from a powerful formative experience that can be integrated in the evaluation. A formative-evaluative integration that includes an OSCE in the current undergraduate nursing curriculum was deemed ideal.

*"I think it would be essential for the OSCE to strengthen its formative aspects. During their care practices, students do not usually encounter vital situations they have to face alone. This experience, even if simulated, is of paramount importance to their training. Both aspects would complement*

*each other perfectly by simultaneously training and evaluating the student.” (Participant 14)*

Teachers advocated formative assessment because if tests only had an evaluative purpose, they would merely represent a grade and a result. They determined that an OSCE that exclusively focused on evaluation would not be reasonable.

*“The student is learning continuously. Therefore, I am of the opinion that any evaluative action must address training as well, if it’s just a prize or a punishment... Assessment for assessments sake does not make any sense; it must be complemented with training.” (Participant 8)*

Despite the consensus on the role of assessment in student formation, some interviewees noted that assessment should be represented by a grade in the curriculum to ensure the involvement of all students.

*“The first thing the student asks the teacher is whether it counts towards their grade. You always have to say ‘yes’, even if it represents 10% of the final grade... The activities that have no meaning in the curriculum, which do not have weight in the evaluation are useful for a reduced group of students who are very responsible, but we do not always have the same student profile. Therefore, the test must have a score. It must have some weight.” (Participant 5)*

In the interviews, the enhancement of student experience was proposed by providing *feedback* about how they performed while solving the cases presented by the OSCE. In general, the teachers felt that it was necessary to improve this *feedback* to reveal to students the strengths and weaknesses that had been detected in their performance to contribute to their learning.

*“The test lacks feedback. Ideally feedback would include students’ strengths and weaknesses. For praising what has been done well, and explaining mistakes, I find OSCE extremely interesting for their training.” (Participant 15)*

Teachers highlighted the importance of *feedback* to infuse the OSCE with qualitative features rather than quantitative features. Positive language should be employed to stimulate self-reflection and work with the student regarding aspects that can be improved.

*“I think that the results on how they have performed in the test should be given with a positive attitude, referring to improvement areas and making suggestions, encouraging students’ analysis on how they felt and what has happened. One would aim to assess students qualitatively, not quantitatively, that is to say, guiding student on aspects that should be improved, asking them about aspects that would, in their opinion, improve their performance in the clinical situations in which the OSCE has detected difficulties.” (Participant 5)*

This *feedback* was provided on the basis of the specific performance of students in the different scenarios that were portrayed by the OSCE at the global level and at the competence level.

*“... for example, in case of the woman admitted for surgery, you can tell the student: you focused only in providing information about the procedure but you didn’t account for the emotional aspect, the woman was not worried because of the technical aspects of the intervention but because of her personal and family situation during admission. Each student’s weaknesses can be analysed according to specific cases, for example if a student focuses more on biological*

*aspects instead of emotional ones or the patient’s response.” (Participant 1)*

#### 4.2. Placement in the Curriculum

The majority of teachers suggested inclusion of the test towards the end of the degree. In this manner, they can demonstrate how the acquired skills were integrated in their training.

*“For me the OSCE is really valuable if included toward the end of the studies, as an integrating instance for all the areas of competence.” (Participant 6)*

Some teachers suggested that the OSCE is a suitable instrument for training students in clinical skills prior to performing practices in health care centres.

*“... the test is an extremely controlled experience, it allows students to find a mid-point before going to a hospital, to prepare themselves for facing reality.” (Participant 7)/“Yes, it represents training prior to the internships in hospitals or health centres.” (Participant 10)*

The majority of teachers referred to the OSCE as a complement to clinical practice assessment and a tool to facilitate student preparation for their future professional activities.

*“The OSCE is complementary to the simulated situations and practice assessment. I see it as a final test, yes, but complementary to the practice assessment.” (Participant 8)*

*“... As the OSCE would be organized as part of the final practices, it would help precisely in the transition from university academic training to the professional world, during the last year.” (Participant 5)*

The teaching staff suggested that the OSCE was not presented as a single test but was complementary to other assessment strategies, such as the end of course work or internship assessment.

*“The OSCE, yes; in isolation, no, I don’t like using a single methodology, not for learning neither for assessing...” (Participant 7)/“The OSCE and the end of course work complement each other. The OSCE assesses students’ ability to make decisions in certain situations and, in the end of course work, the student has to create a creative proposal and defend it.” (Participant 12)*

#### 4.3. Test Efficiency

Despite the high cost of the OSCE, teachers considered it to be an efficient test, given that its methodology ensures that students will be assessed via standardized objective criteria. Some teachers noted that the test achieved greater efficiency if presented as a long-term project and highlighted the important investment that is required for its implementation.

*“I think it is efficient. It is different than what is assessed through other tests... Therefore, it deserves the resources it requires.” (Participant 3)/“I think that implementing it makes sense, it would be worth it. It is difficult for students to be properly assessed in their professional practices because there are many evaluators. With the OSCE all the students go through the same situations with the same assessment criteria.” (Participant 1)/“A substantial initial investment is required, but once initiated, it is not as expensive. In the long run, it is efficient.” (Participant 7)*

Respondents praised the OSCE, as certain aspects that could not be assessed with other instruments can be included by this assessment tool and indicated its suitability for assessing clinical competencies.

*“The OSCE should be devoted to enhance procedural work, attitudinal or communication skills or the ability to make decisions when faced with certain situations. Yes, improving the OSCE, but for me it is the ideal test to assess students’ clinical skills.”* (Participant 9)

#### 4.4. Implementation Strategies

Most teachers described OSCE implementation as feasible if the university supported the proposal and the university policies were favourable.

*“It depends on the direction and the politics at the time... I consider its implementation feasible, if it is backed by a good project, I think that it could work.”* (Participant 5)

Teachers in managerial positions stressed the economic aspect as the most prominent factor that would make hinder possible implementation of the OSCE. Given the economic restrictions, seeking creative formulas to increase OSCE feasibility in undergraduate nursing studies is proposed.

*“Yes, it is feasible, the only problem relates to the economy. One would have to think of strategies and be more creative in gathering resources. In the nursing degree, finding a way to implement OSCE makes much sense; it is necessary to capitalize on all the work done in these last few years.”* (Participant 13)

One of the proposed strategies involved sharing knowledge, resources and efforts among the Nursing Schools to reduce costs.

*“One of the most interesting points of the project was that it had teachers from different backgrounds sharing the knowledge and evaluation criteria.”* (Participant 6)/*“...working together across schools, creating synergies to leverage resources and reduce costs would be advisable.”* (Participant 9)

## 5. Discussion

The results of this study indicate that the OSCE should have a dual purpose—formative and evaluative—in undergraduate nursing curriculum. Other studies also highlight the role of the OSCE as a formative assessment of students’ clinical skills (Anderson and Stickley, 2002; McWilliam and Botwinski, 2012; Rentschler et al., 2007). Consequently, participants in this study claimed that implementation of the OSCE with an exclusively evaluative purpose in undergraduate studies would not be reasonable, as this use would not take advantage of its formative potential; however, in order to insure student involvement, the OSCE should be scored and recorded as a curriculum grade. Byrne and Smyth (2008) state that the influence exerted by assessment on learning is such that students frequently organize their training in relation to the evaluative methods and do not refer to the teachings of the professor. Although academic success is defined by grades and students try to optimize their results, van der Vleuten et al. (2010) argue that students are also intrinsically motivated to learn and their efforts are not always directed towards assessment.

Improving the *feedback* given to students after the OSCE is another basic factor identified by teaching staff. Similarly, McWilliam and Botwinski (2010) argue that the OSCE, which has an evaluative purpose, should place greater importance on the *formative feedback* received by students regarding their performance. The participants of this study suggested giving positive *feedback* that is descriptive and more qualitative in nature, rather than quantitative feedback that is based on specific situations, to stimulate the reflection of a student body on the aspects regarding performance that can be improved. Van der Vleuten and Dannefer (2012) insist on the need to provide students with meaningful information during the assessment process. If the information in the assessment is significant, learning will significantly improve. Other

authors, such as Cazzell and Rodriguez (2011) and Rush et al. (2014), insist on the relevance of providing descriptive feedback as soon as possible after the completion of the test.

Regarding the OSCE in the curriculum, the results of this study reveal that the OSCE should be administered towards the end of a bachelor’s degree program in nursing. For some professors, the objective of the test is to prepare students prior to care practices. Studies by Brosnan et al. (2006), Rentschler et al. (2007) and McWilliam and Botwinski (2012) also indicate that the OSCE is an appropriate instrument for preparing students for clinical immersion. However, the majority of the teachers proposed that the OSCE complemented clinical practice assessment to ensure that the student is ready for professional practice. Akin to this proposal, Holland et al. (2010), introduce the term *“fitness for practice”* to define whether students are sufficiently competent to work at the end of their undergraduate training. Note that a high percentage of teachers indicated that the final evaluation for the degree should exceed the importance of a single test. Friedman (2000) suggests the design of integrated assessment models that embrace a sum of perspectives rather than models that assess student skills from a partial view. In accordance with this study, McGaughey (2004) suggests assessing clinical competencies by complementing observations in clinical practice with the OSCE. Furlong et al. (2005) claim that the use of various evaluative methods enhances the transfer of knowledge into clinical practice. Mitchell et al., (2009, p.403) concluded that *“it is necessary to use various evaluation methods to capture the nature of nursing practice.”* The multi-method assessment approach is useful for ensuring competency assessment and to assess the success of students in integrating the complex repertoire of knowledge, skills and attitudes that are required for competency in health care practice (Martensson and Lofmark, 2013).

Despite the high cost of administering an OSCE, the teachers that were interviewed in this study believe that it is an efficient test that is worthy of investment, as the expected benefits outweigh the cost. The faculty consider the test to be necessary, as it assesses aspects of competence that cannot be assessed using other instruments. In this context and to optimize resources, they agree with Walsh et al. (2009) and state that the OSCE should assess the areas of clinical competence that are not assessable with other assessment strategies, including theoretical exams or strategies that cannot be objectively evaluated in clinical practice, as certain environmental factors cannot be controlled. Khattab and Rawlings (2001) and Rushforth (2007) also argue that the main barriers to OSCE implementation are its high cost and the complex logistics that are involved in its organization. Teachers propose being creative and seeking synergies to enhance test effectiveness. They suggest working together by sharing resources among the Nursing Schools. In a study conducted by Palese et al. (2012), the economic cost of the OSCE and some compensatory measures are analysed, including searching for volunteer patients in associations to serve as simulated patients or establishing partnerships with health care centres. As indicated by Meskel et al. (2015) the use of an electronic management system would facilitate the implementation of the OSCE.

Most faculty informants note that the implementation of the OSCE in nursing studies is feasible if an acceptable project is available and the university policy of the moment is favourable. Recent changes in the curriculum of the Degree in Nursing after its incorporation into the EHEA provide a suitable opportunity for implementation of a methodology for competency-based assessment. The study of Henderson et al. (2013) reinforces the idea that the stages of change that include revisions for curriculum represent a suitable opportunity for the implementation of the OSCE.

## 6. Limitations

A limitation of this study is the difficulty of extrapolating the results to other populations. The results of this study may be relevant to

Nursing Schools that undergo a similar situation and attempt to implement the OSCE in their undergraduate studies.

## 7. Conclusions

The implementation of the OSCE in bachelor's degree programs in nursing in the context of the Catalan Nursing Schools is considered to be feasible if the project has the support of all involved parties and imaginative strategies to reduce economic costs and optimize resources are sought. Collaborative work between schools and is considered to be a key factor for its success.

The test should have a summative and formative-purpose—enhancing the *feedback* received by students about their performance—and should carry weight in regard to students' academic records to ensure their involvement. The OSCE would be conducted towards the end of a bachelor's degree program but prior to the last clinical training, because it is still possible to identify the evolution of their learning based on the results obtained in the OSCE, and thus ensures that students are prepared to enter the professional world. The OSCE would be part of a multi-method evaluation strategy that complements student assessment of the skills that are difficult to evaluate with other types of tests. According to Nulty et al. (2011), a reasonable practice guide for the implementation of the OSCE should be developed to enhance the value of the OSCE in student learning.

## Funding

This study was partially funded by the Commission for the Investigation of the School of Nursing of the University of Barcelona (PREUI 12/01).

## Acknowledgements

The authors thank all teachers who participated in the study; their valuable contributions made this research possible.

## References

- Anderson, M., Stickley, T., 2002. Finding reality: the use of objective structured clinical examination (OSCE) in the assessment of mental health nursing students interpersonal skills. *Nurse Educ. Pract.* 2 (3):160–168. <http://dx.doi.org/10.1054/nepr.2002.0067>.
- Bagnasco, A., Tolott, A., Pagnucci, N., Torre, G., Timmins, F., Aleo, G., Sasso, L., 2016. How to maintain equity and objectivity in assessing the communication skills in a large group of student nurses during a long examination session, using the Objective Structured Clinical Examination (OSCE). *Nurse Educ. Today* 38:54–60. <http://dx.doi.org/10.1016/j.nedt.2015.11.034>.
- Bartfay, W.J., Rombough, R., Howse, E., Leblanc, R., 2004. Evaluation the OSCE approach in nursing education. *Cancer Nurs.* 100 (3), 18–23.
- Blasco, T., Otero, L., 2008. Técnicas conversacionales para la recogida de datos en investigación cualitativa: La entrevista (I). *Nure Investig.* 33:1–5 ([http://www.nureinvestigacion.es/ficheros\\_administrador/f\\_metodologica/formet\\_332622008133517.pdf](http://www.nureinvestigacion.es/ficheros_administrador/f_metodologica/formet_332622008133517.pdf)).
- Brosnan, M., Evans, W., Brosnan, E., Brown, G., 2006. Implementing objective structured clinical skills evaluation (OSCE) in nurse registration programs in a centre in Ireland: a utilization focused evaluation. *Nurse Educ. Today* 26 (2):115–122. <http://dx.doi.org/10.1016/j.nedt.2005.08.003>.
- Byrne, E., Smyth, S., 2008. Lecturers' experiences and perspectives of using an objective structured clinical examination. *Nurse Educ. Pract.* 8 (4):283–289. <http://dx.doi.org/10.1016/j.nepr.2007.10.001>.
- Cazzell, M., Rodriguez, A., 2011. Qualitative analysis of student beliefs and attitudes after an objective structured clinical evaluation: implications for affective domain learning in undergraduate nursing education. *J. Nurs. Educ.* 50 (12):711–714. <http://dx.doi.org/10.3928/01484834-20111017-04>.
- Friedman, M., 2000. The role of assessment in expanding professional horizons. *Med. Teach.* 22 (5):472–477. <http://dx.doi.org/10.1080/01421590050110731>.
- Friedman, M., 2009. Principles of assessment. In: Dent, J.A., Harden, R.M. (Eds.), *A Practical Guide for Medical Teachers*. Churchill Livingstone, Elsevier, Edinburgh, pp. 303–310.
- Furlong, E., Fox, P., Lavin, M., Collins, R., 2005. Oncology nursing students' views of a modified OSCE. *Eur. J. Oncol. Nurs.* 9 (4):351–359. <http://dx.doi.org/10.1016/j.ejon.2005.03.001>.
- Harden, R.M., Lilley, P., Patricio, M., 2016. *The Definitive Guide to the OSCE. The Objective Structured Clinical Examination as a Performance Assessment*. first ed. Elsevier, Edinburgh.
- Henderson, A., Nulty, D.D., Mitchell, M.L., Jeffrey, C.A., Kelly, M., Groves, M., Glover, P., Knight, S., 2013. An implementation framework for using OSCEs in nursing curricula. *Nurse Educ. Today* 33:1459–1461. <http://dx.doi.org/10.1016/j.nedt.2013.04.008>.
- Holland, K., Roxburgh, M., Johnson, M., Topping, K., Watson, R., Lauder, W., Porter, M., 2010. Fitness for practice in nursing and midwifery education in Scotland, United Kingdom. *J. Clin. Nurs.* 19 (3–4):461–469. <http://dx.doi.org/10.1111/j.1365-2702.2009.03056>.
- Khatab, A.D., Rawlings, B., 2001. Assessing nurse practitioner students using a modified objective structured clinical examination (OSCE). *Nurse Educ. Today* 21 (7), 541–550.
- Martensson, G., Lofmark, A., 2013. Implementation and student evaluation of clinical final examination in nursing education. *Nurse Educ. Today* 33 (12):1563–1568. <http://dx.doi.org/10.1016/j.nedt.2013.01.003>.
- McGaughey, J., 2004. Standardizing the assessment of clinical competence: an overview of intensive care course design. *Nurs. Crit. Care* 9 (5):238–246. <http://dx.doi.org/10.1111/j.1362-1017.2004.00082.x>.
- McWilliam, P.L., Botwinski, C.A., 2010. Developing a successful nursing objective structured clinical examination. *J. Nurs. Educ.* 49 (1):36–41. <http://dx.doi.org/10.3928/01484834-20090915-01>.
- McWilliam, P.L., Botwinski, C.A., 2012. Identifying strengths and weaknesses in the utilization of objective structured clinical examination (OSCE) in a nursing program. *Nurs. Educ. Perspect.* 33 (1):35–39. <http://dx.doi.org/10.5480/1536-5026-33.1.35>.
- Meskel, P., Burke, E., Kropmans, T.J.B., Byrne, E., Setyonugroho, W., Kennedy, K.M., 2015. An online OSCE management information system for nursing OSCEs. *Nurse Educ. Today* 35:1091–1096. <http://dx.doi.org/10.1016/j.nedt.2015.06.010>.
- Mitchell, M.L., Henderson, A., Groves, M., Dalton, M., Nulty, D., 2009. The objective structured clinical examination (OSCE): optimising its value in the undergraduate nursing curriculum. *Nurse Educ. Today* 29 (4):398–404. <http://dx.doi.org/10.1016/j.nedt.2008.10.007>.
- Muldoon, K., Biesty, L., Smith, V., 2014. I found the OSCE very stressful': student midwives' attitudes towards an objective structured clinical examination (OSCE). *Nurse Educ. Today* 34:468–473. <http://dx.doi.org/10.1016/j.nedt.2013.04.022>.
- Nulty, D.D., Mitchell, M.L., Jeffrey, C.A., Henderson, A., Groves, M., 2011. Best practice guidelines for use of OSCEs. *Nurse Educ. Today* 31:145–151. <http://dx.doi.org/10.1016/j.nedt.2010.05.006>.
- Palese, A., Bulfone, G., Venturato, E., Urli, N., Bulfone, T., Zanini, A., Dante, A., 2012. The cost of the objective structured clinical examination on an Italian nursing bachelor's degree course. *Nurse Educ. Today* 32 (4):422–426. <http://dx.doi.org/10.1016/j.nedt.2011.03.003>.
- Pla, M., 1999. El rigor en investigación cualitativa. *Aten. Primaria* 24 (5), 295–300.
- Rentschler, D.D., Eaton, J., Cappiello, J., McNally, S.F., McWilliam, P., 2007. Evaluation of undergraduate students using objective structured clinical evaluation. *J. Nurs. Educ.* 46 (3), 135–139.
- Rush, S., Ooms, A., Marks-Maran, D., Firth, T., 2014. Students' perceptions of practice assessment in the skills laboratory: an evaluation study of OSCAs with immediate feedback. *Nurse Educ. Pract.* 14:627–634. <http://dx.doi.org/10.1016/j.nepr.2015.01.001>.
- Rushforth, H., 2007. Objective structured clinical examination (OSCE): review of literature and implications for nursing education. *Nurse Educ. Today* 27 (5):481–490. <http://dx.doi.org/10.1016/j.nedt.2006.08.009>.
- Schuwirth, L.W.T., van der Vleuten, C.P.M., 2003. The use of clinical simulations in assessment. *Med. Educ.* 37:65–71. <http://dx.doi.org/10.1046/j.1365-2923.37.s1.8.x>.
- Selim, A.A., Ramadan, F.H., El-Gueneidy, M.M., Gafer, M.M., 2012. Using objective structured clinical examination (OSCE) in undergraduate psychiatric nursing education: is it reliable and valid? *Nurse Educ. Today* 32 (3):283–288. <http://dx.doi.org/10.1016/j.nedt.2011.04.006>.
- Solà, M., Martínez, D., Molins, A., Pulpón, A.M., 2011. Pruebas de evaluación clínica objetiva y estructurada (ECO) para estudiantes de enfermería. *Rev. Rol. Enferm.* 34 (7–8), 32–39.
- Trejo-Mejía, J.A., Sánchez-Mendiola, M., Méndez-Ramírez, I., Martínez-González, A., 2016. Reliability analysis of the objective structured clinical examination using generalizability theory. *Med. Educ. Online* 21:31650. <http://dx.doi.org/10.3402/meo.v21.31650>.
- van der Vleuten, C.P.M., Dannefer, E.F., 2012. Towards a systems approach to assessment. *Med. Teach.* 34 (3):185–186. <http://dx.doi.org/10.3109/0142159X.2012.652240>.
- van der Vleuten, C.P.M., Schuwirth, L.W.T., Scheele, F., Driessen, E.W., Hodges, B., 2010. The assessment of professional competence: building blocks for theory development. *Best Pract. Res. Clin. Obstet. Gynaecol.* 24 (6):703–719. <http://dx.doi.org/10.1016/j.bpobgyn.2010.04.001>.
- Vazquez, F., 1996. *El análisis de contenido temático. Objetivos y medios en investigación social*. Universitat Autònoma de Barcelona.
- Walsh, M., Bailey, P.H., Koren, I., 2009. Objective structured clinical evaluation of clinical competence: an integrative review. *J. Adv. Nurs.* 65 (8):1584–1595. <http://dx.doi.org/10.1111/j.1365-2648.2009.05054.x>.
- Watson, R., Stimpson, A., Topping, A., Porock, D., 2002. Clinical competence assessment in nursing: a systematic review of the literature. *J. Adv. Nurs.* 39 (5):421–431. <http://dx.doi.org/10.1046/j.1365-2648.2002.02307.x>.