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Back to the future: An online OSCE Management Information System for nursing OSCEs

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SUMMARY

Background: The Objective Structured Clinical Examination (OSCE) is an established tool in the repertoire of clinical assessment methods in nurse education. The use of OSCEs facilitates the assessment of psychomotor skills as well as knowledge and attitudes. Identified benefits of OSCE assessment include development of students' confidence in their clinical skills and preparation for clinical practice. However, a number of challenges exist with the traditional paper methodology, including documentation errors and inadequate student feedback.
Objectives: To explore electronic OSCE delivery and evaluate the benefits of using an electronic OSCE management system. To explore assessors' perceptions of and attitudes to the computer based package.
Design: This study was conducted using electronic software in the management of a four station OSCE assessment with a cohort of first year undergraduate nursing students delivered over two consecutive years (n = 203) in one higher education institution in Ireland. A quantitative descriptive survey methodology was used to obtain the views of the assessors on the process and outcome of using the software.
Methods: OSCE documentation was converted to electronic format. Assessors were trained in the use of the OSCE management software package and laptops were procured to facilitate electronic management of the OSCE assessment. Following the OSCE assessment, assessors were invited to evaluate the experience.
Results: Electronic software facilitated the storage and analysis of overall group and individual results thereby offering considerable time savings. Submission of electronic forms was allowed only when fully completed thus removing the potential for missing data. The feedback facility allowed the student to receive timely evaluation on their performance and to benchmark their performance against the class.
Conclusions: Assessors' satisfaction with the software was high. Analysis of assessment results can highlight issues around internal consistency being moderate and examiners variability. Regression analysis increases fairness of result calculations.

Introduction

The Objective Structured Clinical Skills Examination (OSCE) is a well-established method of assessing skills and clinical competence among health practitioners including nurses (Oranye et al, 2012). The OSCE originated in the UK as an objective means to assess medical students' skills (Harden et al., 1975). The examination involves students progressing through a series of stations where they are assessed by an examiner with pre-determined marking criteria (Pugh et al., 2014).

Several authors have highlighted the importance of using OSCEs as an assessment method in nursing education (McWilliam and Botwinski, 2010; Baid, 2011; Oranye et al., 2012; Barry et al., 2012). The OSCE facilitates the assessment of students' competency with clinical skills in a controlled simulated environment instead of in the practice setting (Baid, 2011). According to McWilliam and Botwinski (2010), students recognize the value of the OSCE experience to their education.

A number of benefits have been attributed to the use of OSCEs including, the development of students confidence (Alinier, 2003), the preparation of students for clinical practice and the achievement of deeper more meaningful learning (Barry, et al., 2012). Importantly, the use of OSCEs facilitates the assessment of psychomotor skills as well as knowledge and attitudes (Baid, 2011). OSCEs have the potential to provide students with feedback on their clinical performance and facilitate the identification of strengths and weaknesses (McWilliam and Botwinski, 2010). The OSCE has been reviewed positively as an

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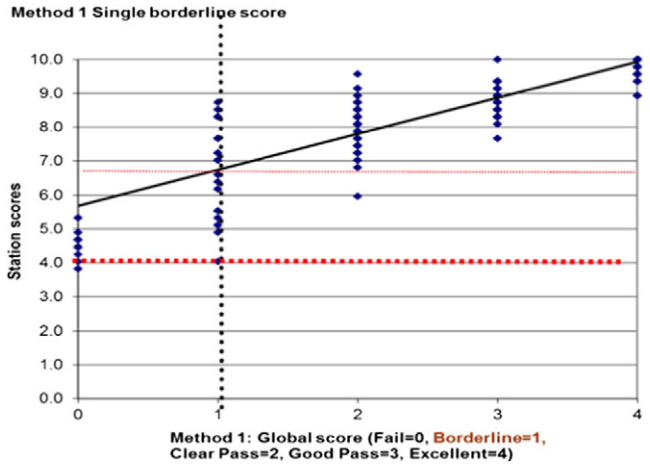

Fig. 1. Single borderline score regression analysis highlighting the difference between the static cut score (horizontal dotted line at 4.0 on the Y axis) and the dynamic cut score (solid line at 6.8 on the Y axis) (adjusted from John Patterson, honorary senior lecturer at the Centre for Medical Education of the Barts and London School of Medicine and Dentistry and Assessment Consultant).

assessment method for clinical competence and for responding to student diversity in education (Smith et al., 2012). However, there are a number of notable disadvantages associated with OSCEs. In particular, some students find them stressful and they are resource intensive in terms of staff, equipment and clinical skills laboratories (Baid, 2011). However, Alinier (2003) suggests that the educational benefits surpass the issues associated with resources (Alinier, 2003).

Traditionally OSCEs have been carried out using paper based methodology. However, a number of issues have been highlighted with this method including illegible handwriting, missing details (students' names and student numbers) and lost assessment sheets (Treadwell, 2006). Furthermore, it is known that manual calculation of results and entering them into a database are time-consuming and are subject to human errors and feedback is rarely provided to students on their performance after paper based assessments (Treadwell, 2006). Despite these issues there is a scarcity of literature regarding the use of computer or OSCE software and the assessment of OSCEs. Segall et al (2005) compared the usability of paper and pencil method and Personal Digital Assistant (PDA) based quizzes and found the PDA based quiz was more efficient and superior to the traditional based method (Segall et al., 2005). Similarly, Treadwell (2006) compared the conduction of a paper based OSCEs with an electronic method. The findings indicated that the electronic method was just as effective and more efficient (less time consuming) than the traditional paper based method. In addition, the electronic system was highly rated by the assessors, who found it less invasive and reported that they had more time to observe the students and permitted greater observation of the students when using the paper assessment. Schmitz et al. (2011) highlight a number of advantages to use an electronic handheld device to assess OSCEs including, speed of data gathering, simplicity of data evaluation and fast automatic feedback (Schmitz et al., 2011). Segall et al. (2005) support computer based assessment suggesting that grading is more accurate, feedback is immediate, security is enhanced and less time is spent by instructors on grading and data entry (Segall, et al., 2005). In the College of Medicine, Nursing and Health Sciences of the National University of Ireland in Galway (NUI Galway), an online assessment tool was developed and implemented from 2009 onwards. The OSCE Management Information System (OMIS) contains a station and item bank, an OSCE planning and student management tool plus a fully fledged results analysis tool (Kropmans, et al., 2012). We acknowledge, however, that other elements of OSCE planning, including use of simulators, props, actors/actresses and real patients, are not currently managed by OMIS. OMIS was originally developed with the primary objective of improving the quality assurance of our OSCE grading. The aim of this study was to explore the acceptability of an online OSCE Management Information System for the NUIG School of Nursing OSCEs, by means of a comparative cohort study.

Methods

We compared Objective Structured Clinical Examinations (OSCEs), delivered over two consecutive years of the first year nursing skills module using an online OSCE Management Information System (OMIS) (Cunningham et al., 2008). Each OSCE comprised of 4 individual stations. Both student cohorts (i.e. those from the 2012–2013 and 2013–2014 academic years) completed a hand washing, blood pressure measurement, manual handling and a documentation station, each of which was of 5 minute duration. Implementation of the OMIS software involved preparing both the system and the assessors. Assessment documentation was reviewed, reformulated, agreed by the module coordinators and uploaded to the OMIS system. Module coordinators and examiners were trained to use the electronic system and technical support was available at the time of the OSCE assessments. Student and assessor details were imported into the system and schedules finalized. In the first year of using OMIS in the School of Nursing & Midwifery, a User Acceptance Test (survey) was completed to explore the extent to which examiners accepted this online OSCE management solution. The questionnaire was developed following a comprehensive literature review around electronic OSCE management, expert review (Olsen, 2010) and consensus of the educationalists involved in OSCE planning. The 25 item questionnaire was divided into three sections evaluating 1. the OSCE Software user evaluation (3 Items); 2. usage of the electronic OSCE package (10 Items); and 3. the OSCE assessment process itself (12 Items). Last but not least examiners provided an overall impression of their experience with OMIS. The possible range of scores for the 3 sections ranged from 0 to 105, and the overall impression could be scored from 0 to 100%.

The total number of first year students that completed the OSCE was 203. The 2012–2013 cohort comprised 101 students, whereas the 2013–2014 cohort comprised 102 students. The station checklists for both OSCEs were identical. The novel online OSCE Management Information System, which was developed "in-house" at the National University of Ireland Galway, was used to administer both examinations (Cunningham et al., 2008; Kropmans et al., 2012). OMIS retrieves, stores and analyses assessment data electronically. Student feedback can be sent to students electronically using the Student Feedback Email System. We used item checklists to assess student competency with each task. The number of items per assessment form varied from 5, for the Documentation station, to 15, for the Blood Pressure station, with a maximum score of 30 marks for all three clinical stations and 10

Raw Data | **Summary** | Detailed | BL Groups | Graphs | Export | All

	Nr. of Results	Stations Passed	Stations Failed	Mean Result	Mean Result (%)	SD	SD (%)	Min	Max	Range	Mid Range	Station Items Cronbach Alpha (α)
Evaluation Questionnaire	18	18	0	89.9 / 105	85.6%	9.8	9.3%	75.0	101.0	26.0	88.0	0.139
Exam Totals & Mean %	18	18	0		85.6%							0.139
Students Passed | Failed		18 (100%)	0 (0.0%)									

Fig. 2. The outcome of the User Acceptance Questionnaire (n = 18) with an overall mean (min, max) score of 89.9 (75, 101) out of a total score of 105. The OSCE Management Information System was used to complete the User Acceptance Questionnaire (2012–2013).