

## Teaching and assessment of an innovative and integrated pharmacy undergraduate module

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### Abstract

This study reports the development of an innovative undergraduate integrated pharmacy module, using novel teaching methods and using as an assessment tool the objective structured clinical examination (OSCE). This study aims to evaluate the performance of the students in this module, towards the end of their degree programme, and to discuss student feedback. Student feedback was very positive. This study supports the use of integrative cross-disciplinary teaching as a valuable tool in pharmacy undergraduate education.

**Keywords:** *Integrated teaching, OSCE, integrated pharmacy, novel teaching methods*

### Introduction and context

This study seeks to assess knowledge and skills consolidation of the very first cohort of final year Pharmacy students at the Royal College of Surgeons in Ireland (RCSI) following a clinically-driven senior undergraduate programme featuring innovative teaching methods. The programme was modularised in 2005 to comply with the European Credit Transfer Scheme (ECTS). The challenge of enhancing integration between pharmacy subjects while reorganising into discrete modules was recognised. An integrated pharmacy module was developed for the final semester of the programme to extract and apply the knowledge skills and attitudes acquired throughout the course. The outcome measures of the module were defined as follows:

- To emphasise how the integration of pharmacy knowledge and skills is necessary for pharmacists regardless of their sector of employment.
- To extract and apply pharmacy knowledge from previous modules.
- To consolidate professional skills alongside scientific learning.
- To recognise professional and ethical responsibilities.
- To improve oral communication skills.

All members of staff across all subject areas delivered the course through a series of interactive tutorials, using case studies featuring aspects of every discipline. The design of the module encouraged students to extract and apply knowledge from previous modules. Guest lecturers in industrial and clinical practice delivered presentations on the integration of scientific and clinical knowledge in their working environment.

The OSCE was chosen as an assessment tool as the stations could be chosen to reflect the spectrum of the course. At undergraduate level, studies have revealed that OSCEs are considered to be beneficial in preparing students for the preregistration year and also very applicable to practice (Rutter & Brown, 2002). To date there has been no experience of using this type of teaching, or in utilising OSCE examinations at senior undergraduate level in Pharmacy education in the Republic of Ireland.

### Learning design description

The module was delivered as follows: lectures, 4 h; practicals, 12 h (OSCE preparation and video communication sessions); integrated tutorials, 18 h and specified learning activities, 28 h. Integrated tutorials were case-based exercises ranging from

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clinical scenarios to quality assurance and project management. These were uploaded onto the college's virtual learning environment prior to discussion sessions. The virtual platform contained a feature enabling the tracking of student progress.

In the OSCE assessment, students were required to visit ten stations, each for a period of five minutes, during which time various tasks were set, each assessed using a checklist or defined marking scheme. Five of the stations were interactive, using actors and assessed concomitantly by members of lecturing staff. The remaining five stations were non-interactive paper exercises assessing different competencies using a mix of clinical and applied scientific questions. The tasks set are outlined in Table I.

A survey of the final year cohort was undertaken using a range of questions using a Likert scale to assess attitudes to this novel module.

## Evaluation

The results of student performance in the OSCE may be seen in Figure 1. Students performed consistently well in all five stations involving direct patient interaction. Within these stations, mean scores ranged from 54 to 72%. In contrast, students performed more poorly in situations requiring dosage adjustment (mean score 37%) and especially in pharmaceutical calculations (mean score 17%). These differences were statistically significant as shown by analysis of variance (ANOVA).

The invited feedback had a response rate of 54%, and 61.5% of students agreed or strongly agreed that they would rate the integrated module highly as part of their semester's work. It is of note that 100% of respondents were either neutral or agreed/strongly agreed that the OSCE component supported their understanding of the subject, and 71% agreed or strongly agreed that the integrated tutorials supported their understanding of the subject. Individual comments included the following:

Integrated pharmacy was a very well structured course looking back on it now. Overall a good subject.

Table I. OSCE station (I; interactive, NI; non-interactive).

Patient counselling—Nicotine replacement therapy (I)
Conflict management—Dealing with an angry, litigious patient (I)
Patient counselling—Anticoagulation (I)
Responding to symptoms—Irritable bowel syndrome (I)
Patient counselling—Meningitis (I)
Pharmaceutical calculations—Preparation of extemporaneous eye drop preparation (NI)
Industrial pharmacy—Preformulation techniques (NI)
Dose conversion—Anti-epileptic therapy (NI)
Pharmaceutical and clinical chemistry—Drug stability and metabolism (NI)
Toxicology—Pharmacology and treatment of an anti-cholinergic overdose (NI)

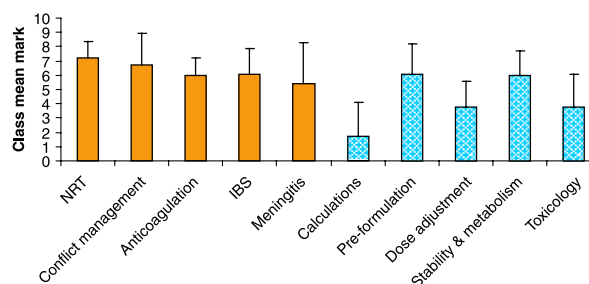


Figure 1. Student performance at OSCE stations (mean score,  $\pm$  standard deviation).

I enjoyed the vertical and horizontal integration implemented this year

The OSCE component was both interesting and helpful in developing communication skills and thinking outside the box in relation to problem solving

## Discussion

Feedback from students on the worth and success of the integrated module and the use of OSCEs as a teaching tool was positive. Student feedback also indicated that more practice sessions would be beneficial, as would the introduction of OSCEs earlier in the course. Building on the success of the integrated format, an additional module in the first year of the course has been redesigned as an integrated professional skills module. The new module will introduce the multi-faceted nature of pharmacy, from first principles of drug design through to patient care. Selected model drugs will be synthesised, formulated and dispensed. To introduce the use of OSCEs earlier in the course, this form of assessment will be used in the new module.

A benefit of OSCE examinations is that they assess practice skills and not just data recall (Ragucci, Fermo, & Mazur, 2005). Validity of the OSCE for pharmacy practice has been demonstrated in a study using both entry-to-practice candidates and already practising pharmacists (Quero Munoz, O'Byrne, Pugsley, & Austin, 2005). OSCEs can identify areas of deficiency within student cohorts (Langford, Landray, Martin, Kendall, & Ferner, 2004). It has been repeatedly demonstrated that one of the major areas of incompetence in degree-level and preregistration level pharmacy students is a lack of adequate numerical skills (Corbo, Patel, Abdel Tawab, & Davies, 2005; McPherson, Davies, & McRobbie, 1999). The present study demonstrates that within the senior cohort, performance in interactive situations involving patient counselling and responding to symptoms was generally satisfactory, the students showing confidence and good communication skills.

Deficiencies existed in numerical skills; this has been recognised (Nathan, 2000) and reported in similar studies, as aforementioned (McPherson et al., 1999). Within our course, these results have stimulated institution of “refresher” numerical assessments over the entire course of the degree programme.

Under the terms of the Bologna agreement all undergraduate pharmacy programmes will have to comply with the ECTS format by 2009. Innovative methods of integrated teaching and assessment are imperative for the future success of the ECTS modular structure.

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