Using Objective Structured Practical Examinations (OSPE's) to consolidate practical skills and assess graduate attributes in life sciences

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Background to Project

- Need for a final year, rigorous practical experience.
- Assess a wide variety of students from different backgrounds.
- Integration of visiting students.
- How do we assess skills that are perhaps not the usual focus of our teaching and learning activities?
- Curriculum Reform and Graduate Attributes.
- Staff Succession Planning.
- Preparation for Honours projects.
### Background to OSPE Design

#### Aberdeen Graduate Attributes

<table>
<thead>
<tr>
<th>Academic excellence</th>
<th>Critical thinking and effective communication</th>
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<tbody>
<tr>
<td>• In-depth and extensive knowledge, understanding and skills at internationally-</td>
<td>• A capacity for independent, conceptual and creative thinking;</td>
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<td>recognised levels in their chosen discipline(s);</td>
<td>• A capacity for problem identification, the collection of evidence, synthesis</td>
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<tr>
<td>• A breadth of knowledge, understanding and skills beyond their chosen discipline(s);</td>
<td>and dispassionate analysis;</td>
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<tr>
<td>• An ability to participate in the creation of new knowledge and understanding</td>
<td>• A capacity for attentive exchange, informed argument and reasoning;</td>
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<td>through research and inquiry;</td>
<td>• An ability to communicate effectively for different purposes and in different</td>
</tr>
<tr>
<td>• A contextual understanding of past and present knowledge and ideas;</td>
<td>contexts;</td>
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<tr>
<td>• An intellectual curiosity and a willingness to question accepted wisdom and to</td>
<td>• An ability to work independently and as part of a team;</td>
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<tr>
<td>open to new ideas</td>
<td>• A diverse set of transferable and generic skills</td>
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<tr>
<th>Learning and personal development</th>
<th>Active citizenship</th>
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<tbody>
<tr>
<td>• An openness to, and an interest in, life-long learning through directed and self-directed</td>
<td>• An awareness and appreciation of ethical and moral issues;</td>
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<tr>
<td>study;</td>
<td>• An awareness and appreciation of social and cultural diversity;</td>
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<tr>
<td>• An awareness of personal strengths and weaknesses,</td>
<td>• An understanding of social and civic responsibilities, and of the rights of</td>
</tr>
<tr>
<td>• A capacity for self reflection, self discovery and personal development</td>
<td>individuals and groups;</td>
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<td></td>
<td>• An appreciation of the concepts of enterprise and leadership in all aspects of</td>
</tr>
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<td></td>
<td>life;</td>
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<td></td>
<td>• A readiness for citizenship in an inclusive society</td>
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Background

- Objective Structured Practical Examination (OSPE) assessments - assess theoretical, practical and problem-solving skills at multiple stations.
- Marking criteria structured and published in advance.
- Students receive the same test and interaction with different examiners.
- Used in clinical courses a lot.
- Six stations, each assessing a mixture of different skills.
- Would this method be suitable to assess Honours sciences students in practical and communications skills?
- Is it an efficient method to assess a large Honours class and provide timely and USEFUL feedback?
What happens during the Biomedical Science OSPE?
Overview of the OSPE

Outline Protocol

- 100 students over 2 assessment days
- Assessment tasks introduced during an all-day practical class

- VLE resources/extra tuition provided
- Students move round each station for assessment

- Objective and consistent
- Stations reusable and adaptable
How does the OSPE work?

Select your stations/timing to suit your students

1. ECG Measurement
2. Serial dilutions
3. Respiratory testing & Cardiovascular Calculations
4. Solution Making
5. Urinanalysis
6. Phlebotomy
Outcomes & Feedback

• Students reported they found the process “a bit stressful” as they had to prove they knew how to perform specific tasks/skills.

• However, found it worthwhile preparation for upcoming practical work and employment opportunities.

• Staff felt it was a useful way of assessing wide array of graduate attributes at Honours level WITHOUT large amounts of paperwork.

• However, requires planning, clear aims and flexibility in initial stages.

• Students reported thinking more about skills expected in future employment, and also considering their strengths and weaknesses.

• Assessment of communications skills improved – sometimes forgotten in traditional science-based curricula.

• Students felt they could display their full range of knowledge, skills and abilities.

• Strong support team is required to initially set up such assessment activities.
<table>
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<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Can assess a range of graduate attributes not easily accomplished via traditional assessment methods</td>
<td>Lot of effort to initially set up</td>
</tr>
<tr>
<td>Students often try much harder to succeed as they cannot hide behind written work or group work</td>
<td>Planning and organisation are key to success</td>
</tr>
<tr>
<td>Easily adaptable for different skills, disciplines and locations</td>
<td>Some nervous students need reassurance if previously reliant on written work</td>
</tr>
<tr>
<td>Fast and easy way to assess practical skills in large groups of students</td>
<td>Need backup plans</td>
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Future Developments

How can we make this work better?

• Remove more paper and automate as much as possible.
• Increase the number of staff and subject that can take part in the OSPE.
• Remove any subjectivity in assessment.
• Could we deliver feedback and grades to the VLE almost immediately?
• Outreach, remote and rural considerations?
Use of iPads

Development of an app that can be adjusted by the assessors

The App

- Subjective scoring replaced with clearly defined marking criteria.
- Questions structured – improved consistency between examiners.
- Marking scheme (positive and negative marks) not visible to examiners
- Comments added manually in final section
- Different styles of assessment and feedback utilised
- Marks and comments quickly downloaded to spreadsheets after examination

Phlebotomy station - assess communication skills when undertaking a complex task. Paper-based system time consuming to collate and feedback to students

OSPE – assess theoretical, practical and problem-solving skills at multiple stations

Marking criteria structured and published in advance

Students receive the same test and interaction with different examiners

Could iPad technology be used to optimise quality and speed of feedback to students and minimise variation between examiners?
Screenshot from OSPE App

Ask the candidate the following:

- Introduces themselves and explains purpose.
- Checks candidate's ID.
- Considers their safety at the bench.
- Confident at the bench.
- Able to explain technique.

Station setup:
- Technique
- Collect materials
- Assembly
- Applications

Comments:

Global score:
- Unsatisfactory
- Satisfactory
- Highly Satisfactory
- Excellent

Appropriate blood type on the bench:
- O negative
- AB negative
- Rh negative

Other common topics:
- Biochemistry
- Immunology
- Cytotoxicology
- Clinical Chemistry
- Hematology
- Coagulation

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