Les Tumilty

Yr Adran Saesneg ac Ysgrifennu Creadigol | Department of Sport and Exercise Science

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TYSTYSGRIF UWCHRADDEDIG ADDYSGU MEWN ADDYSG UWCH

POSTGRADUATE CERTIFICATE IN TEACHING IN HIGHER EDUCATION

Cylch Dygu 1 | Teaching Cycle 1

Formative Assessment Introduction in Musculoskeletal System Module

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Teaching cycle 1

Summary of intervention design

A formative assessment was introduced into the Musculoskeletal System module in the 2009 – 2010 academic session, during weeks 7 to 9 of the term. The assessment covered the content of the first three lab practical sessions of the term. It was felt that this was a suitable ‘chunk’ of information to assess as well as an appropriate time mid-term in order that any change or review could be made to teaching and learning in response to student feedback.

The three practical sessions covered in the formative assessment covered the basic principles of recognition of bones and muscles. This directly related to a module learning outcome where students must demonstrate the ability to “Describe the gross anatomy of the skeletal and muscular systems”. The formative assessment was designed using the inbuilt test canvas on the Blackboard Virtual Learning Environment (VLE), which allowed the inclusion of some interactive elements to the assessment (see appendix 3 for examples). This was then uploaded to the module content page on Blackboard to allow students to access the assessment online. This form of assessment has previously been regarded by students as useful to learning in previous research (Henly, 2003). Some of the formative assessment provided immediate feedback, and the remainder could be compared to model answers contained in a marking scheme, which was distributed only to those who attempted the assessment. The decision to use a web-based assessment method was primarily to enable students to gain immediate feedback on some of their performance, but also due to time constraints on lecturers. Students were also informed that the assessment questions and marking criteria were structured similarly to the end of term exam questions, and that the assessment would be available online for 2 weeks. They were also told that although it was
not compulsory to do so, completing the assessment would provide feedback on learning, and practice in exam type questions.

Analysis of formative assessment

Analysis of the effectiveness of the formative assessment was carried out via a formative assessment feedback form (appendix 4), and a focus group. The questionnaire allowed students to respond with both quantitative and qualitative feedback. A focus group can be defined in its simplest form as an informal discussion among individuals who are selected to talk about particular topics. This type of data collection facilitates openness and disclosure (Wilkinson, 1998). In particular it offers a greater insight into participants’ own meanings and understanding of the topic of discussion, and are especially useful as an adjunct to more conventional or quantitative data collection (Wilkinson, 1998). It also gives a greater insight into individuals’ feelings and views than individual interview by including jokes, arguments, anecdotes that people use on an everyday basis (Kitzinger, 1995). It was also felt that a mixture of evaluation methods would provide a triangulation of results in an attempt “to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint” (Cohen and Mannion, 1986). Finally, the end of module feedback forms (appendix 5) were distributed at the end of the semester during one of the final lectures of the term. These allowed further quantitative and qualitative measures of student impressions of the module in general, and whether learning outcomes were achieved.

The focus group involved two distinct stages of development: the structuring of an interview guide; and the recruitment of participants. The semi-structured interview guide was
developed in order to provide appropriate aims and research questions and to provide a
direction for the group discussion. Broadly speaking, questions should move from general to
specific topics and less than 12 questions should be included (Kitzinger, 1995). These factors
were considered in the design, and four major questions were selected, along with relevant
sub questions (figure 2). In line with recommendation given by Kitzinger (1995), five
individuals volunteered take part in the focus group discussion. Care was taken to choose a
representative sample from the year group, involving both males and female representation.
Prior to carrying out the focus group, the semi-structured interview guide was pretested by
with experienced qualitative researchers. This enabled any problems or issues related to the
wording or order of the questions, or the chairing of the meeting to be highlighted. The
group session was carried out in a comfortable and relaxed environment with participants
sitting in a circle to encourage dialogue. They were informed that the session would be
recorded throughout and gave their full consent to do so. They were also informed that any
comments would be treated in the strictest confidence and that they should be as open and
honest as possible with their comments.

The focus group was designed with several aims in mind:

1. To assess alignment of teaching with learning outcomes and exam requirements
2. To gain views on formative assessment and feedback
3. To gain views on module structure and content
1. To what extent do you think there is enough opportunity to learn as much as possible within the module?
   - How do you find the level they are pitched at?
   - Is there enough scope in the module content for you to challenge and develop your knowledge of the subject area?
2. What do you think about the use of formative assessments?
   - Do you think you get enough feedback in general to maximise your learning?
   - How do you use this feedback?
   - What would be the ideal timing for them in relation to the term?
   - Online?
3. What is your favourite/least favourite aspect of the module? Why?
4. Do you have any suggestions to improve the module in any way?

Figure 2. Semi-structured interview guide with focus group discussion questions.

Analysis of teaching cycle 1

The formative assessment feedback form was distributed to students during a timetabled lecture slot, and 46 students completed the questionnaire. Tracking statistics obtained from Blackboard showed that 17 students from the 92 students enrolled on the module, had attempted at least part of the formative assessment. This differed from the number of students stating via questionnaire that they had accessed the assessment, however it was decided to include all of these 22 completed forms for the purpose of evaluation.

Analysis of module feedback forms

Quantitative and qualitative feedback was gained from the 86 students enrolled on the module, at the end of the 2009 - 2010 academic year, via module feedback forms distributed
at the end of term. The forms contained seven questions requiring a subjective rating on a scale of 1 to 5, where 1 represented “I completely disagree”, and 5 represented “I completely agree”. A separate section allowed students to provide qualitative feedback in relation to the module, under the headings “Stop” “Start” and “Continue”.

The median scores for all seven questions was 4 (figure 3), representing a subjective rating of “I agree”. From the student’s responses we can see that they feel the content, teaching and assessments are clear and well organised. They also agree that the module content is interesting and challenging. We can also see from their responses that they feel the content of lectures and practicals is appropriate. Perhaps as a consequence of this, the students’ ratings suggest that they thought that they achieved the aims of the module.

The largest range of scores recorded was for students’ impression of whether they had achieved the module aims (question 5, figure 3) and whether they considered the module assessment to be fair (question 7, figure 3). Therefore these seemed obvious areas for improvement. The module assessment method had been changed for the upcoming academic year 2009 – 2010 (see above), therefore it was agreed that formative feedback was a suitable area to focus on for improvement, as it was felt that this could impact on students impressions of achievement of module outcomes.
Figure 3. Median (filled diamonds) and upper and lower extreme range values (vertical capped lines) for scores on 7 questions from module feedback form, at the end of 2009 – 2010 session. See appendix 5 for explanation of questions.

The students’ qualitative comments obtained from the feedback forms are summarised in figure 4. For the purpose of analysis, two common themes stood out from the comments; “assessments and feedback”, and “understanding of course content”, and these accounted for thirteen of the twenty one comments given. In the “Stop” category, four comments related to understanding of course content (comments 1 – 4). In the “start” category, three comments related to understanding of course content (comments 6, 9, and 10), and four comments related to assessments and feedback (comments 6 – 8, 11). In the “continue“ category, four comments related to understanding of course content (comments 13, 15, 20, 21), and one comment related to assessments and feedback (comment 18).
<table>
<thead>
<tr>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Just photos on slides, need info as well to get down key points</td>
</tr>
<tr>
<td>2. Putting too much in lectures, we never cover it all</td>
</tr>
<tr>
<td>3. Using so many pictures and more explanation on slides!</td>
</tr>
<tr>
<td>4. Stop the lecture slides with only pictures do not understand them and hard to make notes on</td>
</tr>
<tr>
<td>5. Having lectures at the tallest room in Aberystwyth</td>
</tr>
<tr>
<td>Start</td>
</tr>
<tr>
<td>6. Lab worksheets, putting lecture notes up earlier</td>
</tr>
<tr>
<td>7. Lab sheets that go towards final grade</td>
</tr>
<tr>
<td>8. Doing some coursework rather than 100% exam</td>
</tr>
<tr>
<td>9. Putting slides up earlier on Blackboard</td>
</tr>
<tr>
<td>10. Giving extra notes, maybe some appropriate readings</td>
</tr>
<tr>
<td>11. Would prefer a coursework element similar to last year's module</td>
</tr>
<tr>
<td>12. With the seminars, maybe make them a little more hands-on</td>
</tr>
<tr>
<td>Continue</td>
</tr>
<tr>
<td>13. Diagrams and cartoons to explain key concepts</td>
</tr>
<tr>
<td>14. It's great! One of the better modules</td>
</tr>
<tr>
<td>15. Interesting slides</td>
</tr>
<tr>
<td>16. Talking about trainers</td>
</tr>
<tr>
<td>17. Interacting with audience</td>
</tr>
<tr>
<td>18. Self-test on Blackboard</td>
</tr>
<tr>
<td>19. Having Les instead of Jo</td>
</tr>
<tr>
<td>20. Layout of lectures are really easy to understand</td>
</tr>
<tr>
<td>21. Making the lectures interesting</td>
</tr>
</tbody>
</table>

Figure 4. Students’ qualitative comments from the module feedback form.
Figure 5. Median (filled circles) and upper and lower extreme range values (vertical capped lines) of scores for 12 questions from the formative assessment feedback form. See appendix 4 for explanation of questions.

Quantitative analysis of formative assessment feedback forms

Median scores for ten of the twelve questions was 4, representing a subjective rating of “I agree” (figure 5). The median score for questions seven and eight was 3, representing a rating of “I neither agree nor disagree”. Questions seven and eight were: “I enjoyed the formative assessment”; and “I think the formative assessment should be compulsory”, respectively. The largest range of scores was for questions three and twelve, which were: “I
found the marking scheme easy to understand”; and “the timing of the formative assessment was appropriate”, respectively.

**Qualitative analysis of feedback form**

Feedback from those who didn’t complete the online formal assessment showed that lack of time was the major reason for students not attempting the online assessment, and one student commented that there was “lots of work to catch up on”. A different student said that “it was taken off Blackboard”, presumably before they could complete the assessment. One student stated that they forgot about the assessment and a separate student stated that they “didn’t have the internet at the time and then forgot”. One comment stated that it was more useful to simply look at the questions as opposed to carrying out the assessment, and a final comment from one student stated that the reason for not completing the assessment was that they didn’t enjoy musculoskeletal systems. One student supplied a further comment regarding the manner in which the assessment was implemented, and said: “I think it should be compulsory otherwise I just won’t do it”. Some students verbally expressed that the online format was difficult to use. This was unexpected, as the question wording and the assessment “flow” of the questions had been checked before making the assessment available online.

**Focus group analysis**

From the recording of the focus group, several themes were apparent: feedback during the term was insufficient; students did not like 100% exam assessment; and mixed views about the content and structure of lectures and practicals.
1. Feedback during the term was insufficient

Students felt that more formative assessment was needed, and that they did not receive enough feedback in general.

“We don’t really do a lot to get feedback from.”

A separate student stated that:

“There isn’t really anything is there?”

They felt that worksheets which had been distributed earlier in the module had been useful for gauging learning and understanding. However, they felt that the distribution was not structured in such a way that would give optimal feedback.

“We didn’t really hand in any work to show our understanding.”

“All we did was went through them in the lecture, rather than hand them in to see if we could get feedback.”
One student felt so strongly about this that he felt that “...the way the worksheets were handled” was his least favourite aspect of the module. This student felt that a more structured approach to the formative assessments with proper feedback, or even summative marking would be more appropriate.

That said, some of the group used there wrong answers on the worksheets to guide their revision, and as an indicator of where their weaknesses were.

“I just wrote the right answers down, and if I hadn’t got it right then I knew what to revise for.”

Some approached the lecturer for further feedback and felt that this was satisfactory and useful for learning and understanding. Another student suggested that making a resume sheet with key points available on Blackboard after each lecture along with lecture slides, would help understanding and retention of lectures content.

“...have each topic, have like a summary, ‘cos then you know what your strengths are.”

The online formative assessment which was described above was viewed as worthwhile and helpful exam revision. The students noted that this was particularly relevant given that there were no past exam papers available to aid with exam preparation.
"...I found that one really, really helpful for the January exam."

The feedback gathered after the formative assessment stated that students felt that the timing of the formative assessment was inappropriate, as it was too close to exams. Therefore, students were asked what they thought was the ideal time for these. One student suggested that worksheets should be made available after every lecture, and should be marked by a lecturer then handed back with appropriate feedback.

"Do them in stages, so part of what you’ve learned you do an assessment, get feedback, see how much you know, see how much you don’t know. Then do another one."

The formative assessment was initially available online for a period of two weeks in order to encourage students to access it. However, one student was concerned that formative assessments were only made available online for a limited time period throughout all the modules, not just on the Musculoskeletal Systems module.

"I think the timing of it, it’s sometimes hard to do it before it expires."

2. Positive and negative responses for method of module assessment
Anxiety/fear of failure

There seemed to be a common theme that students did not like the way in which the module was assessed. Some students suggested that some form of coursework assessment would be more favourable than 100% exam assessment.

“. . .the worksheets and seminars, try and assess them. So, like every seminar you have a worksheet that you have to hand in like, a couple of weeks later, instead of having, like, a 100% exam.”

“. . .I really like the fact that we have lab worksheets in the first term so it’s not all hanging on what you get in the exam.”

There was a certain amount of stress associated with assessment by exam, as one student described:

“I worry too much if it’s all exam, and you get a bad question.”

However, this view was not universal, and one student stated that due to coursework demands from other modules, the exam assessment format was welcome on the Musculoskeletal Systems module:
“I like the assessment format. I think it’s good that we just have exams because we got a lot of coursework from other modules as well and it’s all sort of piled up towards the end of the semester. So it’s nice to not have one to focus on for Musculoskeletal, just to know that you’ve got another exam.”

3. The content and structure of lectures

Satisfied with content and materials

The students felt that the module content was at an appropriate level, and one student in particular who had studied ‘A’ level biology at school felt that the content progressed well from school studies and “deepened understanding”. However, some students felt that there was too much to learn from each lecture. In response to this, students felt that this could be overcome to a certain extent, by good study skills.

There were several comments made about the structure of the slides during lectures. Some of the group felt that there was not enough text, and that this hindered revision after the lecture as it was difficult to remember the lecture content.

“Sometimes I think, for myself, it would be useful to put some bullet points, ‘cos then when you come to revise……when you go back you can link the text with the picture, and remember.”
That said, separate comments suggest that some students did find the pictures useful for understanding.

“It’s good to have visuals, it helps it stick in your mind.”

Some felt that by adding text on slides in addition to pictures would offer “a summary of what you said” during lectures and would help when it was time to revise. Several of the students felt that the practicals were their favourite part of the module, and aided understanding of lecture materials:

“I did like the practicals. Like, even at the start when we were playing with the skeletons. I thought they were really good, I had fun with them.”

“That was a good idea with making the muscles out of the tissue paper. You could see the shape of them, it sort of stuck in your head a bit more.”

“The second semesters I thought were good. The seminars were a bit more hands-on, practical, and applicable to what we were doing in lectures.”
One student thought that the practicals could be structured better as they felt that there was not enough opportunity to interact.

"...when we had one it was just like you didn’t really know how to work the machine, and it was just like, we could’ve learned more from it rather than just sitting around."

A comment was made that the recommended reading materials, particularly journal articles, were contradictory to what was taught in the lectures.

"Sometimes you don’t know what information to trust. Sometimes you don’t know what to take on board."

In response to this, it was agreed that perhaps the recommended journals were pitched to an advanced level, and that in future review articles may give a better introductory viewpoint.

**Personal reflections and implications**

The primary aims of the formative assessment were to provide students with feedback on their progress in relation to learning outcomes and upcoming module exams, and to provide feedback on teaching effectiveness. It was encouraging to note that the quantitative analysis showed that the students found the assessment and feedback useful preparation for exams. The formative assessment seemed to be pitched at the right level, and although some
comments were made about the timing of the assessment, the feedback scores from those who did complete it seemed to think that the timing was appropriate. It is difficult to see how this could be changed in future as a balance must be achieved between ensuring that the assessment is provided fairly close to exam time, and the start of term when the workload on students may be less. The use of a web-based format was on reflection, the correct decision. This meant that the time demands on teaching staff were minimised, while still providing the students with some immediate feedback on learning. Perhaps in future a separate session could be organised to ensure that all students are familiar with using the online format, before setting the assessment. The feedback on the effectiveness of lab sessions in preparation for the assessment scored highly, and this was encouraging. As the questions were in the same format as the upcoming module exam, it seems that by definition, students view the teaching within labs as appropriate to achieve success in exams. It was decided to assign the assessment in a non-compulsory fashion in the hope that students would see the inherent intrinsic value. This seemed to work with some students, although some did state that it should be compulsory in future in order to motivate them to access it. The low participation rates were a little disappointing as all students had prompted with an initial two weeks in order to complete the assessment. Also, they had been informed that this would provide practice for the new format of the upcoming exam. Boud and Holmes (1981) stated that often students may not treat seriously any assessment which is not formally assessed and which doesn’t have an extrinsic award, and this may partly explain the low participation rate during this formative assessment. That said, by making the assessment non-compulsory, it was hoped that students would be encouraged to take part in self-assessment and reflection in relation to their learning and preparedness for exams. On reflection, the decision to make the assessment non-compulsory was probably correct. It was decided early on in the planning stages of the teaching cycle that the assessment should be self-assessed. This was in order to
maximise available lecturer time (based on the expediency argument; Boud, 1989), and to encourage students’ interpretation of their work in relation to expected criteria, even if they didn’t fully agree with these criteria (the reality argument; Boud, 1989). Therefore this feedback method builds skills for everyday life as well as studies, and has been described as a more holistic way of learning (Boud, 1989). To improve the reliability of student marking, at explicit criteria for satisfactory and unsatisfactory performance were established (Boud, 1989). This was addressed by the provision of a marking scheme to those who completed the formative assessment. In this way, it was intended to avoid students’ under- or over-estimating their marks, in relation to their academic ability (Boud and Falchikov, 1989).

The focus group was successful in the sense that greater insight was gained than was received from the module feedback forms alone. Several extremely useful comments were made regarding the structure, content and delivery of lectures. One of the most encouraging impressions to come from the focus group was that students felt that the module content was sufficiently challenging and was relevant in relation to the exam questions. The content seems to fit in well with, and build upon, student’s current knowledge of biology and physiology. In that sense it seems to be aligned with the learning outcomes. There were some concerns that there was too much content to learn. This was one of the primary reasons for introducing the formative assessments for teaching cycle 1, and hopefully with the introduction of more formative assessments, this will be addressed. The delivery of some of the practicals was hampered this academic year in part due to equipment shortages. New equipment is being purchased for the next academic year, so this should mean more student involvement during practicals. A main theme to arise from the focus group was that students felt that they did not receive enough feedback on progress throughout the term. The
introduction of the formative assessment was welcomed by the students, mirroring most of the feedback outlined in the formative assessment feedback forms for teaching cycle 1. They felt that this type of feedback should be available after every lecture and practical, preferably with lecturer feedback. There are obvious time constraints in relation to this, however, the introduction of further online formative assessments or even learning objects in future, may address this to a certain extent. The feasibility of introducing learning objects is currently being explored for a later teaching cycle. There were mixed views on the assessment method of 100% exam currently, which was introduced in the 2009 – 2010 year. Some felt that a move towards coursework assessment would be less stressful and fairer, whereas others welcomed the fact that having an exam assessment meant more time to focus on coursework on other modules. The shift towards 100% exam was necessitated due to the changes in the module structure, as described above. One of the major reasons for this was the ever increasing numbers of students enrolling on the degree course. It was felt that exam assessment was fairer and more objective due to the manner in which large numbers of coursework were distributed between staff from marking.

One of the major considerations during the restructuring of the module was a greater alignment with learning outcomes, and the student responses suggest that this has been successful. It was surprising to see that students’ quantitative responses agreed that the assessment for the module was fair given some of the qualitative statements made regarding this. Within the module, students are encouraged to think critically, and to practically apply knowledge gained in lectures, and the scores from students suggest that this has also been successful. From the student’s responses we can see that they feel the content, teaching and assessments are clear and well organised. They also agree that the content is interesting, and
challenging. We can also see from their responses that they feel the content of lectures and practicals is appropriate. Perhaps as a consequence of this, the students stated that they agreed that they achieved the aims of the module. The qualitative comments from the module feedback form seemed to mirror many of the comments made during the focus group. It appears that a triangulation of methods has confirmed, and given a greater insight into student views (Cohen and Mannion, 1986).

In summary, students generally seemed satisfied with the lecture content and delivery on the Musculoskeletal Systems module. It seems that students also recognise the importance and value of formative feedback to learning. The introduction of further formative assessments was welcomed by the students also, and this will be explored further in a future teaching cycle.