SYLWER: O ganlyniad i newidiadau yng ngofynion portffolio’r TUAAU, nid oes gan bob cyrch dysgu a lwythir i CADAIR yr un nodweddion. Mae’n bwysig bod y cyrchoedd dysgu hyn yn cael eu defnyddio fel adnoddau yn unig, ac nid fel canllawiau i’r hyn sydd ei angen i fodloni gofynion y TUAAU. Os oes gennych ymholiadau, cysylltwch â thestaff@aber.ac.uk.

PLEASE NOTE: Due to changes in the requirements of the PGCTHE portfolio, not all teaching cycles uploaded to CADAIR share the same properties. It is important that these teaching cycles are only used as a resource and not a guide to what is needed to fulfil the requirements of the PGCTHE. If you have any queries, please contact thestaff@aber.ac.uk.

TYSTYSGRIF UWCHRADDEDIG ADDYSGU MEWN ADDYSG UWCH

POSTGRADUATE CERTIFICATE IN TEACHING IN HIGHER EDUCATION

Cylch Dygu 1 | Teaching Cycle 1

Promoting Independent Learning

Mae’r Cylch Dygu hwn o’r portffolio TUAAU wedi’i gyflwyno i CADAIR gyda chaniatâd yr awdur uchod. Adnodd i’w ddefnyddio gan ymgeiswyr y TUAAU yn y dyfodol a staff eraill ydyw, fel rhan o’u datblygu proffesiynol ym Mhrifysgol Aberystwyth. Erys yn ei ddo i’r awdur a Prifysgol Aberystwyth. Os hoffech dyffynnu’r gwaith hwn neu gyfeirio ato, cysylltwch â’r awdur. Ceir y manylion cyswllt ym http://www.aber.ac.uk/cy/directory/.

This Teaching Cycle of the PGCTHE portfolio has been submitted to CADAIR with the permission of the author detailed above. It is to be used as a resource for future PGCTHE candidates and other staff as part of their professional development at Aberystwyth University. It remains the property of the author and Aberystwyth University. If you wish to cite this work then please contact the author. Contact details can be found at http://www.aber.ac.uk/en/directory/.
Teaching Cycle 1

Promoting Independent Learning

Overview of Module

The first teaching cycle evaluated the effectiveness of a teaching intervention to promote independent learning on a first year Sport Science module. The module that this intervention addressed is a basic muscular functional anatomy module in semester one (SS12110), the module is a 10-credit, core component of the students first year and was comprised of 131 students. The lecture format involves a 50-minute lecture per a week and this was supported by an hour laboratory based practical session every other week; each lab group had a maximum of 20 students. The assessment is a 1000 word laboratory report and a 1 ½ hour examination.

Rationale and Aims

Having just taken over this module, I identified a few issues which have developed over the past few years. A couple of the main issues on this module are linked to the increased student numbers. The module was developed a few years ago, with originally less than 20 students; the student intake has now increased the group size to well over 100 students. This has meant that the lecture has become more a handing over of information, rather than a seminar style discussion around key topics and that the laboratory sessions have to run with more students in each session. For this year group the number of laboratory sessions had to be halved due to lab space availability and staff demands; therefore student practical contact time was reduced to 5 hours instead of the previous 10 hours.

The other issue I have found linked to the increased student intake is the variability in their prior education. Some students have a very sound basis for this module and in fact have good autonomy in many of the topic areas. On the other hand many students have come onto the degree programme with no background in any science related subjects and/or any basic anatomy knowledge or understanding.

The problem that comes with the reduced contact time (and possibly a reduced quality of contact time) in combination with the increased variation in the students’ background, was that designing lectures to stimulate all the students is very difficult and limiting, without spending too much of the module contact time consolidating and developing a basic platform on which the module and course
objectives can then be address. This issue has also led to staff teaching on other modules and even myself as a new member of staff to the department to find students lacking in some areas of basic knowledge, in subsequent years.

The changes that have had to occur on the module over the past few years have had a negative impact on the teaching strategies in both this module and other modules across the course, with overall module marks for the current module being poor. It is debatable whether all the original learning outcomes for the module are actually being met by all the students.

It seemed to me, although not having taught this module previously that many of these problems could have been addressed by trying to engage the students in more independent learning tasks to supplement the module. Much of the groundwork could if carefully directed and structured, be conducted by the students themselves with tasks being completed outside of the classroom; thus leaving the lecture/contact time free to develop the lectures to meet the current learning objectives.

The aims of the current teaching cycle were to:

- Develop the capacity of the student to recognise, appraise and amend any gaps in their prior knowledge and understanding
- Promote students to undertake responsibility for and desire to commence their own independent learning
- Increase the students knowledge base, and to get all students to the same level of autonomy, irrespective of their prior education
- Improve performance on the module

Review of Literature

When designing the teaching cycle, I reviewed the literature and theory which was relevant to the intervention. The most important theory I needed to consider when devising the worksheet tasks was that of constructive alignment (Biggs, 1999). It was essential to design the worksheets to align with the learning outcomes of the module and to include in the assessment, questions relating to the work covered on the tasks. To ensure those students who are outcome orientated engaged on the independent learning tasks, the notion that the worksheets were aligned with the learning outcomes and assessment of the module also had to be clearly demonstrated to the students.
There is also a body of research supporting activity-based learning methods that aid experimental learning and that by researching information a higher retention level and learning autonomy can be achieved (Kolb, 1984; Shuell, 1986; Dewhurst et al., 2000 and Beach, 2003). By designing the worksheets in a progressive manner with research tasks to complete, should aid a greater mastery of the material. This structured format should aid the students’ ability to solve novel problems, which should in return significantly enhance meaningful learning and improve autonomy in the material (Cortright, 2005).

Dewhurst et al. (2000) investigated independent student learning aided by computers, and the authors concluded that students were able to organise their own learning effectively and their mastery of understanding was equivalent in an area of the module content wholly supported by class based learning. Several other authors have also supported the notion regarding fostering independent learning and empowering students to self-regulate motivation to study through the means of problem-solving questions (Harvey and Chickie-Wolfe, 2007). Various methods have been shown to foster this independent learning and to promote student success, such as the use of Blackboard (Samuels, 2007) and worksheet questions about the process or strategy used to solve a problem (Heibert et al., 1997).

Finally, is the importance of peer instruction in enhancing meaningful learning (Cortright, 2005; Rao et al., 2002; Rao and DiCarlo, 2000) and reducing negative feelings of a task (Bransford et al., 2000). This concept reiterates the importance of trying to establish study groups to either work through the worksheet tasks together and/or to peer assess each other, one study has demonstrated that peer instruction enhanced performance on problem-based questions from 59% to 80%.

The Teaching Intervention

As the students are in their first year at University, I felt that the reading and tasks that were set needed to be structured, with definite learning outcomes. In future years, this structure can become more open to allow students to achieve a deep learning disposition, as the student’s progress through their degree. However, at this stage they need to be taught how to take responsibility for their own learning experience and also some key skills, such as locating journals, sourcing information and to develop higher cognitive domains of learning.

For the structuring of these tasks, I designed eight worksheets (see Appendix 1 for an example), which were made available through blackboard on a weekly basis. Each worksheet focused on one particular independent topic, the earlier worksheets consisted of the more basic anatomical
terminology, and structure of the skeleton. The earlier worksheets, may provide a revision for students who have undertaken anatomy as part of their further education and for those students new to the concepts, they provided a step by step progress and introduction to the topic area. As the semester progressed, the worksheets become a method to pull together the separate topics we investigate in the lectures. These worksheets were more functional anatomy and collated the muscle physiology, muscle anatomy, bone anatomy and joint movements together within specific joints of the body e.g. hip, shoulder, knee and elbow, thus allowing students to examine how these systems essentially interact together.

Each worksheet progressed from simpler questions that are easy to locate the answers for, through to more complex tasks. The idea of the simpler tasks was to encourage those weaker students, demonstrate to the students the continuum of knowledge in that topic area, and to provide enough basic knowledge for the students to try and attempt the more complex tasks later in the worksheets. The more complex tasks would take a little more of the students' time, but should also provide motivation for the students who came onto the course with a greater autonomy in this discipline.

Feedback on these worksheets was essential to support the student learning experience and to ensure they were getting the correct answers, feedback was provided by several means. Firstly, the use of study groups was introduced to them, to try and get them to complete the worksheets with a group of friends or on their own and then having time set aside to sit down together and go through their responses. Secondly, the use of example answers, these were kept by me, but students could bring their worksheets to me and borrow the answer sheet to check over their answers. The notion of having to visit me to pick up the answers was to try and prevent the students just getting the answer sheet and not attempting to complete the worksheet on their own prior to receiving the answers. Finally, one of the timetabled lecture session was replaced with a whole day of optional tutorial sessions. The tutorials was set aside a week after the last worksheet had been set and students were invited to sign-up (in groups or independently) for a tutorial to go through any area of any of the worksheets that they wanted to cover, discuss or check an answer for.

In addition to the above, the relevance of completing the worksheets was reinforced throughout the module, with reference to the relevant sections made within lectures. It was also reiterated that the content of the worksheets could also be assessed in the examination at the end of the module. Time was also set aside at the end of each lecture, to provide an opportunity for students to ask any questions.
The teaching intervention was evaluated by several means; the generic departmental module evaluation forms (with no prompting for specific feedback regarding the worksheets) (Appendix 2), conducted at the end of the semester but prior to the exam; a questionnaire specific to the worksheets placed on blackboard for student to fill in online (Appendix 3) and the overall module grades, exam question attempted and mark breakdown were compared to previous years (with specific attention to the questions pertinent to the content of the worksheets). In addition to the above, this teaching cycle was presented at the University's Learning and Teaching Action Research Conference (Appendix 4), where peer feedback and support was also received on the intervention.

Implementation of the Teaching Intervention

Throughout the module I monitored how many of the students were opening the worksheet documents on blackboard. During one particular week I found that only 4-5 students had actually accessed the worksheets. On further investigation, this week coincided with their first assignment hand-in date on another module. So during the next lecture, I asked “if I gave them an extra week to conduct the tasks, would they endeavour to complete the worksheets?”; most of them agreed that this would be useful, this along with reiterating the importance of these worksheets in terms of their final assessment, seemed (by the number of students accessing the file) to re-encourage the students to engage on the tasks.

Apart from the continual encouragement to engage on the worksheet tasks, there was little more I could do during the interim to assess the effectiveness of this teaching intervention. Student feedback during the semester was positive and other staff members also commented on the students asking whether there were any similar task/worksheets to complete on other modules.

Evaluation

Generic Module Evaluations

Figure 1, summarises the results from the quantitative analysis of the student evaluation forms, 87 students completed these, which was significantly more than those who completed the worksheet evaluation questionnaire online. The students rank on a scale of 1-5, how they feel for each descriptive; below the figure are the definitions given to the students on the forms (Appendix 2).
The module evaluations for this year group was an improvement on the past years evaluations, ranks between 3.8 and 4.2 out of 5 were achieved for all the statements, except for the statement 'I achieved the aims of the module', in which a rating of only 3.4/5 was achieved. As a department we find that generically across all the modules that the particular statement of 'achieved', often tends to receive low ratings if the students have been asked to complete the evaluation forms prior to sitting their assessment and or prior to receiving their results. The students like to have feedback based on their own personal achievement rather than based on whether they have been sufficiently taught the aim and learning objectives of the module to achieve in their assessment. For this teaching cycle, the module evaluation forms had been completed prior to the students receiving feedback on their laboratory reports and prior to sitting the examination.

In the qualitative analysis of the module evaluation forms, 7 students made specific comments to continue the worksheets and another 7 students asked for more information on where to find information to answer the worksheets. In terms of module evaluation comments, this is a fairly substantial number of responses specific to the worksheets. On further investigation, the seven
students who requested more information on where to find the relevant sources were equine/animal studies students, of whom were also sitting the module in addition to our Sport Science students, this needs to be considered in future years. In addition eleven students also commented on the good structure of the presentations/lectures.

Worksheet Feedback Questionnaire

After the exam period an online questionnaire was posted on blackboard for 2 weeks, only 36 out of 131 (27.5%) students actually completed the survey. From the results of the questionnaire (assuming that this was a representative student sample) the following key responses were reported (Figure 2).

![Pie chart showing completion rates of the worksheets]

The majority of students either completed all or some of the worksheets (90%), however, there was still 7% who had not completed the tasks nor intended too. Those students who had not completed the worksheets gave the following as reasons why they had not completed them; no point, too hard, got bored and I always meant too, but never got around to them. Not one student who did not complete the worksheets gave the response of I knew the content anyway.
Sixty-nine percent of the respondents felt that having completed the worksheets will help them in the exam and that 76% found the worksheets to be a useful revision tool. Regarding knowledge gained from completing the worksheet tasks; 80% believed that they helped improve their knowledge and understanding of human anatomy, and that also 80% could see that the knowledge they had gained from the worksheets would help them in other modules on the course.

When asked about their learning experience, 72% appreciated that the worksheets made them undertake self-directed learning and research the topic areas independently. However, 86% found the process of completing the worksheets hard and only 59% felt they had achieved something once they had managed to finish a worksheet.

The students chosen method of receiving feedback varied, only 3% answered that they got their work checked by the module tutor. However, considerably more students used the tutorial slots to check their worksheets (n=23), demonstrating that those who were answering the survey may not be representative of the year group. However, still only 18 percent of students choose to get feedback on their work from a tutor and still less than half worked with their peers to either complete the tasks or to discuss their answers.

**Module Grades**

![Bar chart showing module grades for Exam, Lab report, and Overall for 2007-2008 and 2008-2009.]

*Figure 3 Module mark comparisons between pre and post teaching intervention*
The overall module grades following the teaching intervention increased marginally by an average of 2%. Grades increased from the examination component of the assessment, but decreased in the laboratory report (Figure 3). When the attempted exam questions were analysed, the question that specifically related to the worksheets, had very few attempts and had the lowest average mark of only 26 ± 15 %, although this was often the last question attempted and by looking at the scripts many students ran out of time whilst answering this question. The marks for this specific question followed a similar trend in the previous years. On a positive side, the exams questions relating to the content of the lectures did increases significantly based on the previous two years, following the teaching intervention the questions had a 51-52% average compared to ~44% for the previous years.

Conclusion

The improvement on marks relating to lecture content, combined with the weaker worksheet specific marks raises the question of whether removing the basic anatomy content to the worksheets helped to free up valuable lecture time and thus improved delivery and structure of the content relevant to the learning outcomes, but whether this was to the detriment of content covered in the worksheets. The fact remains that many of the students did not demonstrate an understanding of the content covered by the independent learning tasks, despite the positive feedback from the students regarding the usefulness of the worksheets for preparing them for the examination, they do not seem to have reached the level of autonomy that I would have desired to be demonstrated. On the other hand, the freeing up of lecture time did improve autonomy of learning relevant to the specific learning outcomes of the module.

The reduction in the average laboratory report mark was not a surprise, but I was glad that this did not seem to reduced the students overall module grade compared to previous years; it did however, counteract the improved student performance on the exam. With the reduction in student laboratory contact time, we had to reduce the content taught, to do this we had to remove one out of two student seminars on how to write and construct a laboratory report, as a consequence of these we saw more technical structural errors/omissions on the reports which reduced the marks, rather than a decrease in understanding of the topic.

The method of student feedback used in the current teaching cycle, led the student to take responsibility for checking their own work; either in study groups, borrowing a model answer worksheet from myself or from utilising tutorial time. The student marks on the exam paper
relevant to the worksheets suggest that either the students did not engage in learning sufficiently, or they were making mistakes on the worksheets that were not being picked up or recognised. This is an issue which will definitely need to be addressed before the module is run next year, if the use of worksheets is to continue.

The other consideration to think about is the style of exam questions; currently the format of the exam is a choice of essay questions, as detailed in the module guidelines. The basic anatomy is difficult to explain and write up in an essay style format, which probably leads to many students either avoiding this question and/or performing badly on it, due to the structure rather than their lack of knowledge. A more suitable format to assess their knowledge and understanding on this specific topic area would be short question answer and labelling of diagrams. The format of the assessment needs to be revisited and the most suitable assessment style that reflects the learning outcomes needs to be adopted, for students to show improvements on this module.

In summary:

- The worksheets help to free up valuable lecture time, but may not prove to be the most efficient method of improving student independent learning
- There is a need to provide more motivation/structure to ensure more students engage in the activities
- Develop a more constructive feedback strategy to students
- Redesign the module assessments to reflect the learning outcomes and discipline style
- Increase student contact time

Future Professional Development of Teaching Practice

This module needs to be rewritten so that the learning outcomes can be successfully aligned with the module content, and so that the assessment can be readdress to reflect the format and content on the module and to ensure that it assesses the specified learning outcomes for the module.

Further to this, if the module can be increased from being 10 to 20 credits, this would allow for the basics to be covered earlier in the module to help align the students understanding, before the theory is developed upon, irrespective of their prior education. This would also allow us to reinstate and increase the number of practical sessions the students attend.
I plan to still include worksheets but to supplement lectures and all students will be provided with feedback on these. Possibly by using WIMBA Create/quizdom, students can work through the tasks and then receive feedback instantly on their answers via adaptive release; I will also consider using online voting systems to work through the tasks with the class as a whole.