

## [P11] Using problem-based learning to enhance the student experience in sports and exercise biomechanics

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Problem-based learning (PBL) has long been used within teaching in Higher Education in a range of subjects as a means to encourage student interaction and independent learning (Savin-Baden, 2003). A PBL approach has several advantages compared to other teaching methods. This is possibly due to the ability to build on previous knowledge, the immediate application of knowledge to construct solutions to specific problems and to the team based learning environment that facilitates student learning and independent thinking (Camp, 1996). However, there has been limited investigation of the impact of PBL on students' learning experience within sports biomechanics and while there is an expectation that PBL can make a difference in students' learning, the reality of these differences has not yet been investigated. The aim of this paper is to outline the development, and student experience of, PBL in a second year undergraduate, biomechanics module within a Sports Science degree.

The impact of PBL on students' learning experience was examined using a single module approach. The module was designed using the McMaster model whereby the students engaged with one problem at a time and met two/three times with the tutor to discuss the problem (Savin-Baden, 2003). The module format was modelled on a successful PBL module in Sports Studies (Duncan and Al-Nakeeb, 2006) and was designed to highlight a series of problems with a particular focus on competencies and issues related to biomechanical testing in sports. Problem scenarios were the central component of the module and other modes of delivery including laboratory practicals and workshops were designed to feed into the problem scenarios at an appropriate time. Two forms of assessment were utilised within the module: a written report and an examination.

Focus group interviews were conducted at the end of the module. The results from these along with end module questionnaires revealed a number of themes within the student experience of PBL. It was quite clear that the students who had taken this module had not experienced the type of delivery involved with PBL. Although many found this a change to begin with, the delivery of the module was perceived to be more enjoyable and effective. The students noted that PBL delivery allowed them more autonomy to explore problems the way they wanted to and develop skills that might be useful later in their course or in employment. For example, student B noted:

'Its taught me how to set out my own project and things like structure and how to research and it's a different idea, you are out on your own and you have to do it rather than being in a class and just listening'

A number of students reported that they felt 'more engaged', more 'inquisitive', that the approach allowed 'more freedom to play to our strengths and think about issues'. It was

clear from a number of student comments that simply presenting a problem and asking them to resolve it can provide a stimulus for greater critical thinking and independent thought that does not normally occur with traditional didactic delivery. Student G commented:

'If you have lectures first you kinda don't know what going on sometimes, you can switch off but having the problems first you sometimes don't know what going on too but then you have to work it out yourself so you have to think more about it and you can't switch off'

Overall, the student experience of this PBL module is positive and no student made negative comments about the module delivery or content. However, the results from the focus group interviews did provide some insight into barriers to learning within the module. The module was delivered over 2 terms (approximately 20 teaching weeks) with a 12 week break in between to accommodate the institution's generic work placement module. This appeared to be a particular barrier within the module and was raised by a number of students. For example: Student H stated:

'I feel I learnt a lot of stuff before placement, went on placement, forgot some stuff and then have had to come and pick it up again this term'

These points may be important considerations for future practice within problem-based learning. This particular module was the first module the students had undertaken that used problem-based learning. It may be that on first presentation of PBL, particularly where the initial onus is on the student to investigate an issue, the tutor may need to structure the module into a more compact and cohesive timescale.

In this specific instance, the use of a problem-based learning approach appears to offer advantages in terms of student enjoyment, engagement and development of criticality compared to traditional, lecture led, delivery in Sports Science. However, care may need to be taken in terms of timing of delivery and access to specific resources, particularly with groups who have no experience of problem-based learning.

## References

- Camp, G. (1996) Problem-based learning: A paradigm shift or a passing fad? *Medical Education*, 1: 2-6.
- Duncan, M. and Al-Nakeeb, Y. (2006) Using problem based learning in sports related courses: An overview of module development and student responses in an undergraduate Sports Studies module. *Journal of Hospitality, Leisure, Sport and, Tourism Education*. 5: 50-59.
- Savin-Baden, M. (2003) *Facilitating problem-based learning*. Buckingham: SRHE/Open University Press.