

Using Problem-Based Learning to teach retailing and consumption geographies

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Abstract

Problem-based learning (PBL) is a method of teaching and learning, which is being increasingly used in curricula covering a great diversity of subjects worldwide. The literature on PBL is vast and continues to increase considering that it raises an important set of issues ranging from the appraisal of its purposes, benefits and risks, to the accurate description of the technique and the presentation of “sound practices”. By involving a student-centred approach, oriented to foster self-directed learning, small-group learning and decision-making strategies, PBL is particularly appropriate for effectively handling the Bologna Process. This paper provides an overview of a PBL experience that was undertaken in the course *Retailing and Consumption Geographies*, an optional subject in the Geography undergraduate degree programme at Lisbon University. The learning experience involved 50 students who expressed very different reactions. Some responded well to the challenge, making a peaceful transition from “teach me” to “help me to learn”, and they appreciated the benefits of the method. However, others found the approach confusing and were not able to adapt to the challenges, partly because it was their first PBL experience. When asked to evaluate their learning experience, a significant number of students tended to stress the technique rather than problem-solving, critical thinking, teamwork or communication, skills particularly relevant to their professional future.

Keywords: Problem-based learning, retailing and consumption geography, Bologna Process, teamwork, student-centred learning.

Introduction

Geography in higher education, as in many other subjects, is currently facing an important challenge in Portugal: putting the Bologna Process and the Lisbon Strategy into practice. Crucially shaped by the technical rationale paradigm, politicians and academics have always tried to solve the discipline’s problem of its inadequacy to answer the demands of society and the labour market by overhauling study programmes and syllabuses (Cachinho, 2008). However, the results of these measures have been far from positive. It is true that the subject has changed and in many aspects, syllabus contents are more attractive to students today, but pedagogical practices and teaching strategies insist on remaining fairly similar to what they were before. In fact, modules of different subjects continue to be content centred; the framework of generic and specific competences developed and assessed by the *Tuning Project* (2003) and the *HERODOT Network* (Donert, 2007) has been devalued and continues to be unused by almost all teachers, while students are a long way from being placed at the heart of the educational and training process.

In this paper I argue that in order to face the new challenges we do not need new curricula and syllabuses with more fashionable content. Renewing these attributes can help to make study programmes more credible both in terms of the curriculum and in the eyes of students, but teachers’ practices remain untouched, and as Sebarroja (2001) stated, no educational reform can be successful without a change in teachers’ thoughts, routines and attitudes. In contrast to

what has been done so far, we believe that in order to tackle new challenges successfully, it is crucial to make a real investment in changing teaching methodologies and strategies capable of altering the traditional role played by teachers and students in the educational process.

To illustrate our perspective on this subject, this paper will present a problem-based learning (PBL) experience in the module *Retailing and Consumption Geographies*, an elective course in the Geography undergraduate programme at Lisbon University. PBL represents a shift from the traditional approach which focuses on the teaching method, to a perspective that focuses on the students' learning processes, thus entailing consequences for education as a whole (Dahlgren *et al.*, 1998). Intrinsically linked with the constructivist approaches and discovery learning theories, PBL radically changes the roles played by both teachers and students. Above all, teachers are invited to become excellent observers, talented creators and managers of learning experiences. Freed from performing, they can spend their time observing the students' performances and using this observation for their own research. On the other hand, in being placed at the heart of the educational process, students are encouraged to take the main role in the learning process. They are invited not only to acquire specific subject knowledge, but also develop many transferable skills, such as critical thinking, problem solving, time management, independent learning, and the art of communication (both verbal and written), teamwork and self-motivation. In fact, all the activities in PBL are designed with the students in mind and are based on the assumption that if well planned, they will have a lasting influence on their thoughts and attitudes.

The paper is organised in three short sections. The first introduces the concept of the PBL approach. This is followed by a brief presentation of the PBL experience applied to the module on *Retailing and Consumption Geographies*. Finally, the third section provides a first assessment of the learning experience in terms of outcomes, encouraging student self-evaluation, and the tutor's view.

What is Problem Based Learning?

Even if PBL can take almost as many forms as the places in which it is applied (Macdonald, 2001:1), there is relative agreement about a set of elements that identify this approach involving teaching and learning (Sproken-Smith, 2005). First of all, PBL is a student-centred educational method that uses problem-solving strategies as an anchor for learning (Bligh, 1995; Wood, 2003; Beringer, 2007). Through the use of "triggers" behind problem scenarios, students are placed in the active role of problem-solvers and start off their learning process by defining the goals they need to achieve through a blend of self-directed study and teamwork (Doing, 1993).

As Wood (2003) pointed out, PBL is not about problem-solving *per se*, but rather, it uses real-life problems with the aim of enhancing knowledge, understanding and skills. Actually, the problems have a dual role in the process: they organize the curriculum in terms of contents, replacing the traditional subjects or topics, and provide the context for learning (Bligh, 1995). Given the key role they play, problems should offer students a rich variety of learning experiences and provide them with transferable skills including: problem solving, self-inquiry, self-confidence, self-discipline, learning how to learn, critical thinking and team work (Roberts and Ousey, 2003). This is why, regardless of the set of variants they may involve, problems tend to be complex and open-ended (Jr Levia and Quiring, 2008). If well conceived and presented through suggestive "triggers" or scenarios, they immediately catch the students' attention and stimulate group discussion and collaboration. After some time spent brainstorming and exchanging views, students working in small groups identify what they

know about the problems and, more crucially, they become aware of what knowledge gaps they need to cover, and what information they have to collect in order to answer questions and solve problems (Dahlgren *et al.*, 1998). Thus, at the end of each tutorial session, each group defines an action plan with clear aims to achieve and sets down tasks for each member to carry out until the next group meeting. Between tutorial sessions, students work independently on tasks bringing back their findings. The group reflects on the new knowledge and decides on further action in order to find a satisfactory answer to the problem. Since making mistakes is a part of real life, the PBL approach allows students take risks and pursue inappropriate avenues. Making mistakes and realizing their errors often reinforces the correct information (Alexson and Kemnitz, 2001). Nevertheless, for effective learning to take place, it is essential that students have the chance to reflect and adapt their work in order to build upon their successes and learn from their mistakes (King, 2001).

While working in small groups assisted by a tutor is a typical attribute of PBL, the use of group work in itself in a course does not make a PBL approach (Spronken-Smith, 2005). The main goal of PBL is to involve students in meaningful learning experiences, taking advantage of the high potential of teamwork and also the role that the teacher plays as a facilitator. Through group work, students have the opportunity not only of investigating real-world problems and building new knowledge accordingly, but also of acquiring a set of intellectual and transferable skills “that can be deployed in a wide variety of social settings” (Bridges, 1993: 50) which have been devalued by the traditional model of teaching. In a PBL approach, the independent student’s work continues to be essential to the learning process, but it is no longer a private activity. After studying by themselves, they need return to the group to discuss and share their findings. In doing so, students have the opportunity to learn how to interpret the group processes and how to convey and receive useful feedback (Dahlgren *et al.*, 1998). Thus, PBL methodology is not about group work for its own sake, but rather it uses tutorial work in small groups to make public, the processes of learning and problem-solving, leading students to higher-order thinking (Beringer, 2007) and comprehension (Rhem, 1998).

The PBL experience of retailing and consumption geographies

The decision to follow a PBL approach in the course was based on a set of pedagogical factors. Firstly, it is relevant to stress the importance of providing undergraduates with learning experiences based on different teaching styles and strategies. Among the innovations introduced by the Bologna Process, widely recognised by the Portuguese government (Decreto-Lei n.º 42/2005), is the call to adopt teaching methods so as to focus on the student him/herself and to plan the curriculum in order to develop knowledge, understanding and transferable skills. In this context, due to its intrinsically constructivist nature, the PBL approach is in a unique position to respond to these goals effectively. Secondly, emphasizing the holistic view of problems, PBL is particularly suited to interdisciplinary subjects, such as geography or the environmental sciences (Spronken-Smith, 2005; Pawson *et al.*, 2006; Chappell, 2006).

In recent years, several geographers have advocated the suitability of this technique for teaching different topics in geography. Its value has been assessed in fieldwork classes namely by Bradbeer and Livingstone (1996), Chappell (2001) and Perkins *et al.* (2001), in environmental education by Dahlgren *et al.* (1998), in Environment Sciences by Alexson and Kemnitz (2001) and Jr Levia and Quiring (2008); in the world regional geography by Fournier (2002), in the urban planning curriculum by Kotval (2003), in research methods by Spronken-Smith (2005), in earth systems interactions by Beringer (2007) and in GIS by Bednarz (2000). Last but not least, among the reasons for embracing the PBL approach is the opportunity to

put theory into practice as well as to make *Retailing and Consumption Geographies* an example of “good teaching practices”. Investing in renewed teaching methods and learning strategies is justified due to the fact that undergraduate programmes in Geography at Lisbon University are still tightly shaped by a technical rationale. Basically, university teachers have always believed that education and training lie in learning scientific content. It is assumed that a solid scientific education in the subject is enough to become a good professional, and in order to be a good teacher it is enough to know a lot, bearing in mind the fact that transmitting information would occur without any problems.

Considering the above rationale and other factors related with contents, available time and the students’ profile, we will now give a brief outline of the syllabus that was drawn up.

Retailing and Consumption Geographies is an elective course in the Geography undergraduate programme. The course runs for one semester and earns the student 5 ECTS. It has a workload equivalent to about 140 hours of student effort: consisting of 42 hours tutoring and 98 hours private study. Broadly speaking, the course is an introduction to retailing and consumption in an urban space. Through a PBL methodology and case studies, students are invited to develop their knowledge and understanding about the growth of retail-city linkages and the role played by consumption in the contemporary city’s production and experience. Besides content, it is expected that learning experiences contribute actively to the development of a wide range of instrumental, interpersonal and systemic competences, both generic and subject-related, such as: i) applying and understanding geographical concepts, ii) asking geographical questions, iii) collecting, organising and summarising information from different sources, iv) using appropriate geographical representation methods and techniques, v) developing logical arguments vi) thinking critically; vii) problem-solving; viii) successfully undertaking research; ix) communicating effectively and fluently by written, spoken and visual means; x) working in group; xi) learning to listen and respect others; and xii) taking independent responsibility for one’s own learning. The aims of the course are given in Table 1.

Table 1 – Aims of the course *Retailing and Consumption Geographies*

- Make a summary of the main geographical concepts and perspectives about retailing and consumption in an urban setting.
- Discuss the role of retailing and consumption in the way contemporary urban society is organised and works.
- Describe the main changes in the urban retail landscape and their underlying processes.
- Evaluate the potentialities of retailing and consumption in the regeneration of urban centres in order to improve their competitiveness.
- Develop critical thinking by solving problems connected with consumption and retailing.
- Develop skills in the field of research and in teamwork by means of devising and drawing up small-scale projects based on retailing and consumption.
- Enhance spoken and written communicative capacities by means of using different resources, in particular, ICT.
- Encourage responsibility and autonomy in the learning process through a combination of private study and teamwork.

In order to achieve these aims, four problem-solving situations were given to the students, one for each block of topics in the programme. The first problem was aimed at discussing some key concepts (retailing, consumption and city); the second dealt with changes in the retail landscapes of cities; the third question raised the role of consumption in revitalising urban spaces, and the fourth problem, which was optional, took the form of a case study. In the case

study, the students were able to choose one of the following three subjects: i) exploring the meaning of urban shopping centres in the consumers' shopping experiences; ii) analysing the retail dynamics at work in Avenida da Liberdade, and iii) discussing the role of the open-air market, *Feira do Relógio*, in Lisbon's retail scene. More than the topic itself, the fourth problem was demarcated from the previous three because it entailed field work as a source of information and it was a pretext seeking to develop competences connected with first-hand data collecting, processing statistical, graphic and cartographical data and giving feedback on the results. Each problem was backed up by a "trigger" / a different scenario that gradually unfolded throughout three weeks of effective work. Owing to the fact that the topics on retailing and consumption in an urban setting were new to the students, each situation was given a framework in the form of the teacher's lecture. The lectures served a twofold purpose in that they introduced the topic and motivated students to follow through with their own problem solving. Because the students were unfamiliar with the PBL method, two extra 3-hour lessons were included. Their goal was to introduce students to the method, separate the class into working groups and lay down the ground rules, define assessment, make known the intended learning outcomes and celebrate group contracts.

The PBL tutorial approach can be conducted in several ways depending on whether the model adopted is "pure" or "hybrid" (Wood, 2003). In order to implement our learning experience, we adopted the "seven Jump" Maastricht process, composed of seven steps: 1) identify and clarify terms and concepts presented in the scenario; 2) define the problem(s) to be discussed; 3) brainstorming session to discuss the problem(s), suggesting possible explanations on the basis of prior knowledge; 4) discuss and organise ideas and arrange explanations into uncertain solutions; 5) generate learning objectives and outcomes; 6) private study by each member of the group in order to gather information related with learning objectives; 7) report back to the group to share results of private study and discuss the newly acquired information.

To facilitate the enhancement of the student learning experience, special attention was paid to five requisites, which according to Duch (2001), are essential for successful PBL. Thus, 1) all scenarios should be planned to reflect real-life situations, relevant to professional practice in the discipline; 2) in order to solve problems, students should be asked to investigate and base their answers in factual, scientific information; 3) scenarios should be designed in terms of content and complexity bearing in mind the potentialities of group work and the value of talking things over within the group; 4) the problems should be sufficiently open, so that discussion is not curtailed too early in the process; and 5) the set of problems presented to the students should be designed in such a way that they deal with content and call upon prior knowledge gained in other courses, thereby encouraging them to interconnect modules and integrate their knowledge. In the next section, we provide a first assessment of the learning experience conducted with 50 students, using for this purpose a questionnaire completed by the students at the end of the course and designed to determine student satisfaction.

Assessment of the PBL experience: the students' point of view

In order to ascertain the success of the PBL experience, students undertook to reply to an anonymous survey at the end of the course in 2008, one week before receiving their final marks. The questionnaire, informally administered in class, included a mix of closed- and open-ended questions. In the first group, students described their feelings and thoughts about the PBL experience by rating them on a fixed scale ranging from 1 to 6 (1 = totally agree and 6 = strongly disagree). The questions dealt with the relevance of topics and subject-contents, the quality of scenarios and problems, the suitability of teaching and learning methods, the value of resources used to back up teaching and learning, the tutor profile, and student self-

evaluation in terms of knowledge, understanding and skills acquired from the course. In the second group, students were called upon to express their opinions about the organisation and structure of the course; the strengths and weaknesses of the PBL experience; their performance and commitment to learning, in particular in the working group, and what they would change in the course to improve it. Finally, students were actively encouraged to produce written comments about any aspect they considered relevant but which was omitted in the questionnaire. They were invited to express their global level of satisfaction with the course on a scale from 1 to 5 (1 = poor and 5 = excellent). The following assessment is based on the results of the survey and the students' written comments.

According to the students' opinion the course was only moderately successful. As for the degree of overall satisfaction, about half the students expressed a relatively neutral opinion (3.1 in a scale ranging from 1 to 6). Only 28% said they were very satisfied, underlining the innovating character of the course in terms of its teaching/learning methods and the interest generated by the topics in view of a geographer's training. At the opposite end of the scale, about 12% of the students said they were very disappointed with the course, alleging that methodology was given undue attention in detriment to content, group work was compulsory, the teacher kept too low a profile in the classroom and topics which they had thought were relevant, were very superficially dealt with. The contrasting opinions of two students are quite revealing regarding this point:

Student A: *"The subject ended up by influencing my academic career owing to innovative methods and the sense of responsibility I acquired during the semester in which I attended the course".*

Student B: *"The content was very interesting but poorly exploited, which is a pity. The method is excessive, abusive and tiring! This subject is called Retailing and Consumption Geographies and not Geography Methodology".*

Several factors made their appearance in the students' overall appreciation, which a detailed analysis of the parameters in the survey will allow us to understand better. Generally speaking, the topics, the course contents and the questions that were raised earned the students' favourable opinion (2.5). 72% of the students thought that they were highly relevant to their education and stressed the course's innovative character and originality, as well as its usefulness and applicability to real life. More than 50% of the students said the same thing in terms of the competences developed by the course subject. Paradoxically, a substantial number criticised the superficiality with which the contents had been handled.

Satisfaction plunged when it came to class-time and the teaching/learning method (2.9). Although 60% of the students recognised that: (1) the lessons encouraged discovery, critical reflection and discussion; (2) credit was given to active participation; (3) the teaching/learning method encouraged students to acquire competences by working in groups and by speaking/communicating and thinking critically, the truth is that the majority did not agree that the lessons were aimed at: (1) helping the student to develop through meaningful learning; (2) favouring the build-up of knowledge, or (3) encouraging the student to be autonomous. A considerable number of students tended to make a negative assessment of the course when it came to the teaching/learning method and thought that the teacher should have transmitted more; they also thought that there was too little time reserved for problem solving and that they hardly had any time to clear up their doubts.

The least positive assessment of the course was situated in the section dealing with pedagogical resources (3.0). Here, students stressed the fact that the classrooms was not suitable for group work, that there were too few computers connected to the internet and

because the class was too large, there were too many teams which made it difficult for the facilitator to follow them up adequately. Some students also pointed out that the course reading matter had a few weak spots. They complained that there was a dearth of material in Portuguese and too many English-language texts, and that some problem-solving situations did not have sufficient coverage. However, most of the students admitted that group work and fieldwork was important for developing competences and a working knowledge of the subject.

The students gave decidedly positive opinions about their teacher's scientific and pedagogical qualities (2.1). More than 80% stressed his scientific competences, his innovative outlook when dealing with topics and his assiduousness. The students favouring more content-based lessons and lecturer-centred approaches however, would have preferred more lecturing. Some students even suggested adopting a hybrid method. Nevertheless, the fact that students were able to recognise these qualities in their teacher does not invalidate the fact that 28% thought that he not always put the students at their ease, and that his explanations were not always clear to them.

Students' self-evaluation of their own progress was fairly positive (2.9), although it seemed to be somewhat contradictory. In fact, 50% or more admitted that the subject had allowed them to (1) acquire useful knowledge, (2) develop autonomy and reflect upon their learning, (3) become more interested in topics to do with retailing and consumption, (4) learn new working techniques, (5) develop competences that they were able to use in other course subjects, and (6) have a greater participation in the work. However, only 24% said that the working methodology was well adjusted to their own style of learning and 20% said that apart from having appreciated the methodological approach, they also liked the way it could be applied to other subjects. Regarding these outcomes, the students seemed to be transmitting two signals: they recognised the discipline's high educational possibilities and its usefulness owing to the knowledge and competences they had acquired, but the changes they had to make in switching over to another kind of working method demanded an investment that many did not care to make.

Concluding Remarks

In this article, reflection was aimed at the PBL experience that was had in 2008 in the Geography module *Retailing and Consumption Geographies*, taught at Lisbon University. Apart from describing the learning experience in broad lines, an assessment of it was made by analysing the students' opinions obtained by means of a survey. The Bologna Process and Lisbon Strategy challenge higher education institutions to devise study programmes so as to facilitate the development of knowledge, understanding and skills, and to adopt active teaching methods focusing on the student. Since PBL is "an active learning method that leads to greater understanding and achievement of competences, rather than retention of knowledge for its own sake" (Pawson *et al.*, 2006: 114), this was the method we found to address these challenges. However, students' feedback varied significantly. Some students passed through stages of shock and resistance, this is typical of those newly exposed to PBL, who become members of effective working groups and can ably answer the challenge. They made a peaceful transition from "teach me" to "help me to learn", and thought that the PBL was a positive experience that they would like to apply to other courses. At the other extreme, a small group of students totally rejected the methodology and failed to see any interest in it or educational merit. While some students in this category dropped out of the subject, others remained even if they did not like it, asking the teacher why he did not change his teaching method. Because they were angry, they took advantage of the questionnaire to air their

grievances. One student went as far as stating: “I don’t understand this obsession with methodology and next year you should go back to the traditional method. Add contents to the programme and go into them. This is the only way to really learn!” Finally, most students found the approach confusing and had many difficulties in overcoming challenges raised by the method. This happened not only because it was their first PBL experience, but it was also due to other factors, such as the large number of students in the class, the scarcity of resources in the classroom, little time available for research - a lack keenly felt by workers-students and some weaknesses on the part of the facilitator. When asked to evaluate their learning experience, this group tended to stress the technique rather than problem-solving, critical thinking, teamwork or communication, skills particularly relevant to their professional future. We are convinced that in the way they go through other learning experiences, this group of students will come to appreciate the real benefits of PBL.

References

- Alexson, R.; Kemnitz (2001), The World Bank Scenario – A Problem-Based Learning Activity in Human Geography and Environmental Science, *Planet*, Special Issue 2, 25-26.
- Bednarz, S. (2000), Connecting GIS and Problem Based Learning, in R. H. Audet and V. Ludwig (eds.) *Gis in schools*, Redlands, ESRI Press, 89-101
- Beringer, J. (2007), Application of Problem Based learning through Research Investigation, *Journal of Geography in Higher Education*, 31 (3), 445-457.
- Bligh, J. (1995), Problem based, small group learning, *British Medical Journal*, 311, 342-343.
- Bradbeer, J. and Livingstone, I. (1996), Problem-based learning and fieldwork: A better method of preparation?, *Journal of Geography in Higher Education*, 20 (1), 11-18.
- Bridges, D. (1993), Transferable skills – philosophical perspectives, *Studies in Higher Education*, 18 (1), 43-52.
- Cachinho, H. (2008), Geography education in Portugal: discourses and practice, in Donert, K. and Wall, G. (eds.) *Future Prospects in Geography*, Liverpool Hope University Press, Liverpool, 19-26.
- Chappell, A. (2001), Challenging the Teaching Convention in Geography Using Problem-Based Learning: the Role of Reflective Practice in Supporting Change, *Planet*, Special Issue 2, 18-22.
- Chappell, A. (2006), Using the ‘Grieving’ Process and Learning Journals to Evaluate Students’ Responses to Problem-Based Learning in an Undergraduate Geography Curriculum, *Journal of Geography in Higher Education*, 30 (1), 15-31.
- Dahlgren, M., Castensson, R. and Dahlgren L. (1998), PBL from the teachers’ perspective: Conceptions of the tutor’s role within problem based learning, *Higher Education*, 36, 437-447.
- Doing, K. (1993), Adopting and adapting problem-based learning for laboratory science, *Laboratory Medicine*, 24 (7), 411-416.
- Donert, K. (2007), *Tuning Geography: a report of findings and outcomes*, <http://www.HERODOT.net/state/TUNING-Geography-v1.pdf>, accessed 23/03/2009.
- Donert, K. and Wall, G. (eds.) (2008), *Future Prospects in Geography*, Liverpool Hope University Press, Liverpool.
- Duch, B. (2001), Writing problems for deeper understanding, in B. Duch, E. Groh , D. Allen (eds.) *The Power of Problem-Based Learning*, Sterling, Stylus Publishing.
- Fournier, E. (2002), World regional geography and problem-based learning: using collaborative learning groups in an introductory-level world geography course, *Journal of General Education*, 51, 293-305.
- Jr. Levia, D. and Quiring, S. (2008), Assessment of Student Learning in a Hybrid PBL Capstone Seminar, *Journal of Geography in Higher Education*, 32 (2), 217-231.

- King, H. (2001), Editorial: Case Studies in Problem-based Learning from Geography Earth and Environmental Sciences, *Planet*, Special Issue 2, 3-4.
- Kotval, Z. (2003), Teaching Experiential Learning in the Urban Planning Curriculum, *Journal of Geography in Higher Education*, 27 (3), 297-308.
- Macdonald, R. (2001), Problem-based learning: implications for educational developers, *Educational Developments*, 2 (2), 1-5.
- Pawson, E., Fournier, E., Haigh, M., Muniz, O., Trafford, J. and Vajoczki, S. (2006), Problem-based Learning in Geography: Towards a Critical Assessment of its Purposes, Benefits and Risks, *Journal of Geography in Higher Education*, 30 (1), 103-116.
- Perkins, C., Evens, M., Gavin, H., Johns, J. and Moore, J. (2001), Fieldwork and Problem-Based Learning, *Planet*, special edition Two, 27-28.
- Spronken-Smith, R. (2005), Implementing a Problem-Based Learning Approach for Teaching Research Methods in Geography, *Journal of Geography in Higher Education*, 29 (2), 203-221.
- Rhem, J. (1998). Problem-based learning: an introduction, *National Teaching and Learning Forum*, 8 (1), 71-88.
- Roberts, D. and Ousey, K. (2004), Problem based learning: developing the triggers. Experiences from a first wave site, *Nurse Education in Practice*, 4, 154-158.
- Sebarroja, J. (2001), *A Aventura de Inovar. A mudança na escola*, Porto Editora, Porto.
- Tuning Project (2003): *Tuning Education Structures in Europe*, Final Report, Pilot Project Phase 1.
- Wood, D. (2003) ABC of learning and teaching in medicine: Problem based learning, *British Medical Journal*, 326, 328-330.