

## **18. CO-ORDINATING AND MANAGING PBL PROGRAMMES - CHALLENGES AND STRATEGIES**

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### **INTRODUCTION**

Among the wealth of material published on Problem-based Learning (PBL), very little focus is directed to the key areas of coordination and management of the curriculum. The traditional curriculum is organised around subjects and disciplines with teaching arranged often quite independently, within a simple structure based around the availability of students, staff and facilities. In such a structure the content is decided by each department. As one of the key advantages of Problem-based Learning is integration of subjects and disciplines, both horizontally and vertically throughout the programme, the management of the curriculum becomes vital to the delivery of this advantage to students.

Problem-based Learning is very suited to professional education programmes such as medicine and dentistry where contextualised learning represents a more accurate reflection of the real-life situation that is presented to health practitioners on a daily basis. Skills in self-directed learning are also crucial to health practitioners developing a culture of lifelong learning which is vital to maintaining competence throughout their practising careers.

The challenge in five-year professional educational programmes is to plan and coordinate the input into the undergraduate curriculum of the large numbers of disciplines which have involvements in teaching, research and possibly health services delivery, so as to ensure that the programme, at the very least, meets the statutory requirements for new graduates. It is of course highly desirable that new graduates emerge from professional training programmes with the required levels of skills and competences to practise safely and especially to have developed skills in self-directed learning.

Within traditional health sciences curricula, individual departments to a large extent determine the scope of their involvement in teaching, research and health service provision. This structure militates against integration of subjects or disciplines within the curriculum. It also frequently leads to a situation where external departments determine the content of the curriculum rather than the school. The challenge in implementing a Problem-based Learning curriculum is to provide structures that support integration, ensuring relevant content in the curriculum as well as facilitating self-directed learning.

This chapter will discuss the structures required to support and manage a Problem-based Learning curriculum once established rather than the challenges involved in changing from a traditional to a Problem-based Learning curriculum. Of course, development of the structures to support the curriculum is an integral part of that change process.

## **ORGANISATIONAL CONCERNS RELATED TO PBL**

### **Curriculum Content**

A number of key concerns emerge in the debate about Problem-based Learning. One is that some disciplinary areas perceive a loss of control of the content, which may lead to a reduction in the amount of teaching and thus have implications for resource allocation. For example, within programmes training health professionals in the basic sciences, the concern revolves around whether students are learning a sufficient amount of the basic sciences to underpin their learning in the biomedical and clinical sciences. The fragmentation of input throughout the problems may lead to questions as to whether students are learning the appropriate material. The underlying assumption is that if a lecture covers the materials believed to be necessary, then the lecturer can be sure that s/he has discharged their responsibilities to the students. Where there are also requirements laid down by statutory bodies for training health professionals, it is vital for a university to be in a position to demonstrate compliance with these requirements. Otherwise the graduating health professional may obtain a degree that might not be recognised for registration with the statutory authority.

### **Resources**

Another key concern is the availability of the resources (personnel, facilities and financial) to support a PBL curriculum. Mennin and Martinez-Burrola (1990) reported that the cost of Problem-based Learning differed only very slightly from traditional curricula. Nieuwenhuijzen Kruseman et al (1997) compared numbers of staff (involved with the PBL components) in the Faculty of Medicine of the University of Maastricht with other traditional medical schools in the Netherlands. They concluded that the Maastricht medical programme did need more academic staff when compared with medical education delivered by lecture-based programmes but that this extra requirement did not relate to small group learning sessions but rather to skills training, student guidance, programme development and staff development. The other Dutch faculties had not included such aspects of staff provision. When the calculations were adjusted to take into account these factors, the staff to class ratio was then only slightly higher in Maastricht. It is interesting to note that Nieuwenhuijzen Kruseman et al (1997) used an assumption that an average of five hours preparation time per lecture was required to produce and update lectures to an acceptable standard. This would appear to be a generous allowance that in practice may be eroded.

Another interesting finding in the Mennin and Martinez-Burrola (1990) study was that in Problem-based Learning medical education, 72% of staff time was spent in contact with students whereas in the traditional curricula only 39% of staff time was spent in contact with students. This finding suggests a change in emphasis (rather than total time allocation) which has implications for staff development; the role of the staff member may have changed quite dramatically from one as traditional teacher/instructor to facilitator in a Problem-based Learning curriculum.

Savin-Badin (2000) reports that the majority of students found the lack of library resources of concern in a Problem-based Learning approach. Fincham & Schuler (2001) commented on the increased demands on library resources and the need to involve librarians in the planning process for Problem-based Learning. Included in the area of library resources is the need for ready access to internet and e-learning resources to support student learning.

Higher education has in the last few years suffered from reduced budgetary allocations from governments and pressures to increase student intake. This trend has consequential effects on the availability of physical resources such as seminar rooms and library materials as well as

staff time. The shortage of health care professionals has led to pressure to dramatically increase the undergraduate student numbers; the underlying implication is that this can occur by simply providing larger lecture theatres. A Problem-based Learning curriculum is organised around small (8-10 students) group sessions in seminar rooms. This may have considerable implications for the capital budget requirements for schools/faculties wishing to change to Problem-based Learning or where there is a need to take on large increases in the numbers of students. Savin-Baden (2000) also commented on how interprofessional undergraduate education may also be viewed by university management as a cost-cutting opportunity and that somehow Problem-based Learning provides this opportunity.

### **Staff Priorities**

Heads of schools or departments are increasingly concerned with the requirement for staff to be research productive with assessments such as the Research Assessment Exercise (RAE) in the UK, driving research to the top of the priority list for academic staff in higher education. In Australia, where there was a governmental initiative to refocus the emphasis towards education, Taylor et al (1998) reported that in a study they carried out, respondents believed that in spite of this initiative, education was under-valued in higher education compared with research. There is a concern that these research pressures may produce an elite group of staff whose main focus is research and that teaching is not seen as prestigious. The lack of a reward or recognition structure for staff actively involved in the educational structures in a curriculum compounds the view that such contributions may jeopardise academic career progression and so discourage involvement. It is ironic that the pressures that encourage staff to become heavily involved in research are the same ones that discourage them from getting involved in Problem-based Learning, which places such high value on research and evaluation.

In medical and dental schools this tension between research and teaching is further compounded by commitments to provide clinical services, as funding for some staff positions may be dependent on provision of secondary and tertiary patient care services for the health care system. Service provision also brings in patients who are vital for the clinical teaching of undergraduates in health sciences as well as research opportunities for academic clinicians.

### **The Bologna Agreement**

The move within the European Union towards convergence and transferability in undergraduate education through the Bologna Agreement also brings challenges, particularly in the application of the European Credit Transfer System (ECTS). Well integrated problem-based rather than discipline-based curricula are not easily suited to the application of credits for courses and facilitating student transfers. Nonetheless all member states within the European Union are committed to fully implementing the Bologna Agreement.

### **STRUCTURAL REQUIREMENTS FOR PBL**

When considering the structures needed to support a Problem-based Learning curriculum it is important to remind ourselves of the reasons why a school/faculty would wish to adopt this approach to learning. Problem-based Learning provides the opportunity for students to learn in a context in which they will be practising (e.g. learning to deal with the complexity of patient care). Contextual learning requires an interdisciplinary approach requiring both horizontal and vertical integration within the curriculum. The structures need to support and maintain this integration of the content of the curriculum and the importance of achieving integration within a Problem-based Learning curriculum necessitates central overall control of the curriculum. The requirement for small-group, self-directed learning leads to the requirements for seminar rooms, trained tutors and library facilities, all of which require considerable administrative support.

## **THE DUBLIN DENTAL SCHOOL AND HOSPITAL**

In the Dublin Dental School & Hospital (Trinity College Dublin) there is a Curriculum Committee which is comprised of a wide range of academic staff involved in undergraduate education from within the Dental School, various university departments and student representatives from each year of the programme. This committee approves policy in respect of the curriculum and is chaired by the Curriculum Coordinator who has overall responsibility for managing and implementing the curriculum. Each year of the five-year programme has a Year Coordinator who is responsible for liaising with the tutors and students, assembling the written assessments from the relevant staff and chairing the Year Planning Group meetings each term. The Curriculum Coordinator and Year Coordinators are senior academic staff members with other commitments such as research, teaching and service provision.

The restructuring in Trinity College Dublin, which came into effect in July 2005 has designated that there will be a senior academic member of staff to be appointed as Director of Teaching and Learning (Undergraduate) in each school for two years, renewable for a further two years. This position has three main areas of responsibility (i) general management of the undergraduate programme (ii) promotion of best practice and innovation in education and (iii) development of overall policy with regard to both existing teaching programmes and proposed new programmes. This new position is very similar to the current Curriculum Coordinator in the Dental School & Hospital and is a clear recognition by the university, of the need for a designated senior academic to be responsible for the curriculum. The Curriculum Coordinator is currently supported by a Dental Studies team with one post assigned to administration of the PBL component including the examinations, another assigned to timetabling for all students and staff and a team leader to oversee developments such as the software.

### **Content**

Most of the content of the curriculum is delivered in blocks of problems which follow a theme or topic. The Planning Group is an interdisciplinary group, which writes and reviews problems for the block as well as updating reading lists or other resource material. The Year Coordinator regularly meets with the tutors to note any comments or issues that may have arisen in relation to the blocks. At the end of each term, the Planning Group reviews not only the content of the blocks but other aspects of the curriculum for that year. This process ensures that the Problem-based Learning component is synchronised with, for example, dental laboratory skills or clinical training or other aspects of the curriculum.

Student feedback on the problems and on tutor performance is obtained at the end of each block. Each tutor is provided with a copy of the students' feedback on their own performance and an indication of their rating compared with other tutors. This feedback provides valuable insight into tutor performance.

### **Assessments**

Assessment methods in Problem-based Learning curricula usually complement the educational method which results in continuous assessment with a range of types of assessments. These include written assessments of various types, objective structured clinical examinations (OSCE), clinical examinations and simulations. High stake end-of-year assessments are much simpler and less costly to organise but lack validity and reliability when assessing professional competence.

There is a written assessment at the end of every term in each year (except the fifth year). These assessments consist of different types of multiple choice questions as well as short answer

questions. There is an agreed proportion for each type of question and once the agreed numbers of questions has been assembled all staff involved will meet with the Year Coordinator to preview the examination paper. This process represents an important quality control mechanism in the production of written assessments in that the questions are carefully read for clarity and appropriateness by all staff involved in the process. An examination review meeting attended by the staff members who set the questions and the students involved in the examination takes place very shortly after the examination. The Year Coordinator reviews each question giving students the correct answer while the relevant staff members are available to provide clarification if required. As many of the multiple choice questions are of the “*Choose the Best Option*” type this clarification provides valuable feedback and learning opportunities for students. Of course, if students can find credible sources of information which contradict the “correct” answer then allowance will be made for this in the marking and in some cases a question may be dropped from the scoring if it has proved to be unsatisfactory. The process of examination preview and review are thus essential but time consuming aspects of the assessment process.

Other aspects of the assessment process are demanding on resources, for example, an Objective Structural Clinical Examination, (OSCE) usually requires clinical material (radiographs or study casts) and perhaps simulated patients. As well, venues for the examination and holding venues for the student group awaiting the examination are required, all of which contribute considerable costs in terms of personnel hours and material costs.

Assessment for the whole year involves collation of the results of, not only the end of term assessments, but also the results from all other assessments such as OSCEs, assessment based on laboratory practical sessions, scores from the Problem-based Learning tutorials, project-based learning and the completion of clinical competences. At the end of the academic year all assessments are assembled for the external examiners to review, a process which involves up to four thousand sheets of paper.

### **Timetabling**

The nature of small group learning presents challenges to timetabling which become greater when there is a need to coordinate with clinical training. For example, in year two of the dental undergraduate programme in Dublin there are three Problem-based Learning tutorials per week. As students are expected to undertake four to six hours study per tutorial these need to be spaced out evenly throughout the week. Fincham & Schuler (2001) stressed the importance of scheduled study time in the Problem-based Learning curriculum. There can be a recurring threat to this time in the curriculum for study and reflection, especially as the curriculum may be measured in terms of student contact hours or hours per subject/discipline in the curriculum. There may also be pressures to introduce new methods or techniques into the curriculum.

### **Tutors**

There has been much discussion in the literature on the role and qualities of tutor while are appropriate for Problem-based Learning. As well as subject-matter expertise, qualities such as an ability to communicate well with students in an open and empathetic manner have been described as determinants of learning in tutorials (Schmidt & Moust, 1995). Recruitment and retention of tutors with these desirable qualities represents an ongoing challenge for the Dublin Dental School and Hospital where there has been a trend in recent years towards using tutors with more content expertise. Tutoring in the first and second years involves a commitment to being available for three two-hour sessions per week, covering widely divergent topics - from basic sciences to ethics and public health in the first year and the biomedical sciences such as physiology and biochemistry as well as dental subjects like cariology in the second year. The

third and fourth years have one tutorial session per week (covering two themes), and for these the tutors are mainly dentists with some doctors.

Recruiting recent dental graduates has proved to be a very valuable source of tutors for these later years. These dentists have the advantage of being very familiar with the programme and the Problem-based Learning process. They are also likely to be undertaking the examinations that are necessary to enter postgraduate training programmes and, as a result, are revising similar subject matter to the undergraduate curriculum, albeit in more depth. For the first two years of the dental undergraduate programme a number of postgraduate students from the basic and biomedical sciences have been recruited to be tutors. Although this group have no previous experience of Problem-based Learning, following training, they have proved to be successful tutors and tutoring is seen as a welcome addition to their curriculum vitae. Neither the recent graduates nor the postgraduate students are likely to be in a position to stay on for a number of years as tutors.

### **Technology**

It is vital to have a centralised administrative support system to coordinate the assessment process as well as the complex timetabling required for a Problem-based Learning curriculum. It is easy to understand that increased resources are required in a Problem-based Learning curriculum not only for the small group teaching but for the support and administration required to deliver the process. Another area of potential for development currently being explored by the Dublin Dental School & Hospital is the use of customised computer software to manage the curriculum, especially the problem-based component. Such software will be used to manage the content of the block books, including the reusable learning objects (such as photographs, radiographs and study casts) associated with the blocks, the assessment process and to map the content of the curriculum. Such systems could also be used to collect the feedback from students and tutors grades for tutorials. This is currently done manually.

### **THE MAASTRICHT FACULTY OF MEDICINE**

The Faculty of Medicine of the University of Maastricht started de novo with a Problem-based Learning programme in 1974 and annual intake of 50 students. This intake has steadily risen to the current intake of approximately 350 per year. There is a Faculty Council at which all groups, including students and non-academic staff, are represented. The Faculty Council delegate's executive power to the Faculty Board, which in turn delegates to the elected Curriculum Committee, composed of six academics and six students. While the faculty structure is prescribed by law, the lower level structure was devised by the Faculty of Medicine. Virtually all decisions about structure and content of the curriculum, including examination procedures must be reviewed by the Curriculum Committee and approved by the Faculty Council which is also an elected body consisting of six academics, three support staff and three students (Majoer & Kollé, 1997).

The Maastricht Faculty of Medicine has developed a system of documenting educational activities in full time equivalents (FTEs) for teaching in individual departments and, importantly, in decisions on promotion of individual faculty members. Academic status and promotion is dependent on devoting at least 15% of time to education and research respectively, with task such as tutorship being distributed evenly among staff. Majoer & Kollé (1997) describe how the FTEs related to the various and important roles within a Problem-based Learning curriculum are calculated. When an academic accepts a specific role, the number of hours related to that role is credited to his/her department. Heads of departments review the quantity and quality of the individual staff member's contribution to education and discrepancies larger than 10% between FTEs allocated and actually provided are discussed at

the annual evaluation. Appropriate adjustments in budgetary allocation or staff teaching are made over a number of years. Promotion to assistant and associate professor is based on performance in the educational process as well as scientific output. In exceptional cases, performance in education may be the main criterion.

Each educational role has been classified according to workload and importance in the educational process. There are clear requirements for time spent in the various categories of roles with eligibility to undertake certain categories of roles, being determined by satisfactory performance in duties such as tutor and supervisor. The Director of Education manages the budget for teaching and each department applies for an allocation based on the amount of teaching, as well as the other contributions to education made by departmental staff. This system, although quite bureaucratic, provides strong motivation for staff and departments to remain involved in the education process as well as spreading the roles across all of the staff. It also discourages stagnation within the system, with the regular change of roles preventing staff taking on or being given exclusive ownership of aspects of the curriculum.

## CONCLUSION

In order to deliver on the advantages of student-centred, self-directed, integrated learning, a Problem-based Learning curriculum requires a centralised management structure to manage the content and delivery of the curriculum. A coordinator/director (from the senior academic staff) with the necessary administrative support is also essential. The management structure needs to be multidisciplinary and encourage student involvement. The importance of the various time-consuming roles in this educational approach needs to be formally recognised and valued in the academic promotional process. The regular rotation of staff through the various roles which will occur as a result of this recognition will stimulate renewal of the curriculum and prevent stagnation.

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