

## INTRODUCTION AND EVALUATION OF PROBLEM BASED LEARNING IN METABOLIC BIOCHEMISTRY

C. ZIMITAT, S. HAMILTON, J. de JERSEY, P. REILLY and L. WARD

Problem-based learning (PBL) is a constructivist educational approach in which a problem serves as the stimulus for student learning. It promotes active independent learning, student reasoning and communication skills. PBL became an additional component of our traditional 26 lecture- and 12 practical-based metabolic biochemistry course. Each of the 2 x 2 hr PBL sessions, in which a group of seven to eight students met with a tutor, ran over a two-week period. Assessment included: PBL case summaries, 2% each (P/F) and a mid-semester PBL exam, 15% of final grade. Formative and summative evaluation of PBL cases, tutor and self-performance by students provided essential feedback about this course.

More than 70% of the class (n=231) enjoyed PBL and felt that it was an interesting way to apply their knowledge to real-life situations. Overall, 50% of students favoured the three 'unstructured' cases which gave maximum student control over learning, whereas 25% of students favoured the two 'structured' cases with set questions. Some cases covered the effects of alcohol on metabolism, carbohydrate malabsorption and management of hyperammonemia and hyperlipidemia. The class was equally divided as to preference of metabolic/nutritional over medical aspects of the PBL cases. Regardless of such preferences, 82% of the class believed that PBL improved their understanding of metabolism. Many students made positive comments about the active linking of metabolic pathways in tutorials, social aspects of PBL and the opportunity to engage in biochemical discussions. Increased integration of PBL, practical and lecture material and tighter organisation were areas identified for improvement.

Critical evaluation of group performance and self performance is an important skill, but was down-played in this course because PBL was just a part of one of many subjects in which students were enrolled. Most of the class felt that there was sufficient emphasis on group dynamics, still 23% of students did not feel entirely comfortable in this setting, though the majority did. Students felt that the tutors (Biochemistry graduates with research experience) were enthusiastic, encouraged active participation by all group members, stimulated deep analysis of the problems and facilitated learning without being too directive. The majority of students (70%) indicated that the role of the tutor was essential to the success of PBL in this course.

Over half of the class agreed that PBL should constitute no more than 30% of the overall assessment and a similar proportion of the class thought that each PBL case should be worth more, say 5% each, because of the work involved. The majority of the class approved of assessing individual and group work and believed that PBL exams require more time than traditional exams. The overwhelming majority of students agreed that PBL should be continued as an integral part of the metabolic biochemistry course.

Supported by a University of Queensland Action Learning Project Grant, 1994/95.

---

Department of Biochemistry, University of Queensland, Brisbane Queensland 4072