



© Lloyd Russell.

Problem-Based Learning: From where to where?

John Hamilton, University of Durham

IS THERE A PROBLEM WITH PROBLEM-BASED LEARNING?

Thirty-six years ago I was first caught up in problem-based learning (PBL) at McMaster University in Canada. PBL was the energising but controversial innovation of the time. Three recent occasions remind us that it remains so:

1. In *The Clinical Teacher* David Taylor described introducing PBL at Liverpool¹. His title made it sound daunting: 'Reflections from the salt mines'.
2. Dr Pham Thi Tam from Can Tho University of Medicine and Pharmacy, Vietnam sought help from members of the *Network: TUFH* to establish PBL. Advice and experience

was shared through the pages of its newsletter: 'If there is determination to do so, you should have no difficulty'.

3. At *AMEE 2004* a review of the evidence for the value of PBL left some developing countries, committed to PBL, expressing new anxieties: 'Had they backed a loser?'

Is PBL a winner or a loser? Where did it come from, where may it go? The editor asked for my personal reflection.

WHERE DID PBL COME FROM?

Abraham Flexner and PBL McMaster? The underlying principles I think were spelt out in 1910 by Abraham Flexner². Science is not the facts, nor the

laboratories, but a rigorous method of thinking:

'The main intellectual tool of the investigator is the working hypothesis... wherein is it irrelevant in bedside practice?...he [the physician] too frames his hypothesis now called diagnosis...the sick man's progress is nature's comment and criticism.'

And so it was to the 'Proper Basis of Medical Education':

'From the standpoint of the young student... the old, known and understood are all alike new to him; and the teacher seeks to ...carry him through the process of the thinker, and not of the parrot.'

'The student is throughout to be kept on his mettle. He does not have to be a passive learner just

Where did PBL come from, where may it go?

Enacting the principles was the challenge for McMaster



Abraham Flexner in 1929.

because it is too early for him to be an original explorer.

'In methods of instruction...out and out didactic treatment is hopelessly antiquated; it belongs to an age of accepted dogma or supposedly complete information, when the professor "knew" and the student "learned".'

Dewey, a contemporary in educational reform, was of a like mind³:

'...science has been taught too much as an accumulation of ready made material which students are to be made familiar, not enough as a method of thinking, an attitude of mind, after the pattern of which mental habits are to be transformed.'

If the hypothetico-deductive process is the key to learning then

the intermediary processes, the steps taken, the organisation of learning, are the means to enact the principles. Enacting the principles was the challenge for McMaster.

McMaster and PBL

I joined the Faculty in May 1969, five months ahead of the students. There were twenty of us in all. Bill Spaulding was the first Chair of the Curriculum and I followed later.

From Case Western Reserve came integration of the sciences through the study of body systems. From Harvard School of Business came case based study through group discussions. In many schools discussion of problems, usually clinical cases, had been used to consolidate learning. What was to be new here was

the reversal of the order, starting with the problem and deriving from it the objectives for learning.

I cannot recall if the influence of Flexner was clearly recognised. But the approach was along his lines. The challenge was to create a coherent operational curriculum based on principle. Two stories illustrate how principle and experience worked together. They both have to do with the tutorial, the workshop of PBL.

1. Self directed learning

Jim Anderson, Professor of Anatomy, ran Phase 1 of the curriculum. His approach gained direction from an unusual experience. For some years he had been measuring the growth of children in the Toronto twin study. In adolescence, drugs or disaffection led some to drop out of school. Jim set up 'Cool School' to allow them to study topics of their choice without constraint of timetable or exam. Jim was tutor, and provided learning resources; but the students taught themselves. This self-directed learning reawakened motivation, and many returned to standard school.

Was there something here for our curriculum? We tried it ourselves with Jim as tutor and studied a topic new to us so the experience would be like that of a new medical student. Our topic was Teilhard de Chardin, the priest, anthropologist and philosopher who had been much studied by Jim. A PhD student of de Chardin's work was available as an expert resource.

My difficulty was motivation. I found it hard to make time to study. I wanted the answers. Jim would facilitate our learning as a group, but would not teach. Our resource expected us to sort out our learning objectives before seeing him. I had chosen the topic for the sake of the experiment, and not because I wanted



© Lloyd Russell.

to learn about it - at least, not just then. Others made more time and learnt with interest. The experience helped us refine the tutorial.

2. Non-expert Tutors

Some tutors who were expert in a topic dominated their tutorials, leaving no room for student initiative. Students lost interest. The tutor needed expertise as a facilitator of learning rather than expertise in the topic. But were these mutually exclusive? It was thought so, and from this came the 'non-expert tutor'. It was, I think, a misunderstanding of how expertise could be used. Jim was of the same mind. PBL should not keep students away from expertise. Its value depends on how it is used. Innovation must always guard against its own orthodoxy. The tutorial role remains contentious.

PBL: WHAT THEN?

Maastricht, starting a new school, chartered a plane to McMaster and returned to introduce their own PBL curriculum. Newcastle in Australia drew lessons from both. Together with others, including Ilorin, Nigeria, to which I shall

return, they met in the West Indies in 1978 to form the Network of Innovative Medical Schools. Over the years this has expanded and diversified and is now the *Network-TUFH*, to which Dr Tam turned for help. It encompasses PBL and community based education and extends to all health professions.

Newcastle, Australia

Students entered in 1978:

'The use of patient centred problems will encourage the student to apply his newly gained learning, reinforcing this learning and providing rapid information on the success of his studies.'

'Problem based learning allows complete and continuous integration of the basic and clinical sciences.'

*'Only the constant practice of formulating and answering searching questions is likely to create the habit of continuing education.'*⁴

I joined as Dean in 1984. Written cases had been largely presented to students all in one piece. A curriculum review initiated in 1983 concluded that

this presentation failed to provide a framework for progressive exploration of the issues. In the revised curriculum cases were presented as an evolving story and started, as do patients, with the initiating symptom. Each major step in the evolution of the case required a revisiting of previous hypotheses and conclusion, a redefinition of the problem and a renewal of learning objectives. This followed the process of clinical reasoning as it was intended to do.

In 1995 the curriculum was displayed in a widely attended participatory workshop⁵. Students demonstrated tutorials and appraised the value and the hazards of PBL. Workshop participants from Australia and Britain were on the point of refashioning their curricula, mostly through PBL. In Australia we tutored the new developments and PBL was judged to be a success⁶.

PBL: WHAT NOW?

PBL has been taken up by other health professions, and in many countries. The clinical case remains the mainstay. But it need not be. Just as suitable as a

Just as suitable as a starting point is a technical or scientific problem

starting point is a technical or scientific problem, a population data set, a preventive health challenge, or a problem in health service governance such as an adverse outcome of health care or a breakdown in safety. The community itself could be the theme. The following examples contain ideas of how PBL might evolve.

- In the field of architecture: in the 1980s, our Newcastle colleagues out-stripped us by analysing what architects had to tackle in the real world. Many of their roles had no preparation in the curricula of the time. They introduced a PBL curriculum in which planning for a real project on a known site was the task. Students worked in groups to prepare a business and architectural plan. Bank managers, environmentalists, town planners and city engineers were part of their resource, advising and constraining them as they would a professional architect. Every graduate was employed immediately - always a good sign.
- In agriculture: around 1980 the Hawkesbury Agricultural College, in New South Wales, under the leadership of Richard Bawden transformed itself into 'an organisation as a learning system', binding its staff and students to an engagement with the rural community. Students would 'learn to deal with "real world" agricultural and rural situations through their experiential involvement with them'. There were no lectures, staff were freely available as experts, and students found it energising and inspiring.
- In medicine, the medical school set up in 1978 at Ilorin, Nigeria, made a commitment to village communities. Our students lived in villages for part of every year. They became part of the community, defined with them

their problems and did something about them. We called that Community Based Education and Service (COBES) - an example of Community Based Learning (CBL).

We did not recognise COBES as PBL, but in the Flexner way it was. The problems were real, right in front of them and had never before been studied in that community. Exploration of specific themes such as childhood nutrition, weaning, polio, blindness, and beggars each led to a clearer understanding of the community. The developing world has ample examples of such initiatives and to them we should look for guidance.

- Again in the field of medicine, the University of Durham, in co-operation with Newcastle, UK, has placed its course at Queen's Campus in the Tees valley, an area still suffering the social and economic effects of loss of industry and jobs. The community has become part of our curriculum. Students define, study and enter into it through attachments to volunteer agencies such as a domestic abuse refuge, support systems for disabled school children, prisons, health systems for asylum seekers - in all, seventy options. As at Ilorin, this represents elements of the process of PBL, although we don't call it that. We call it Tees Based Learning (TBL).

PBL: WHAT NEXT?

PBL has more than come of age. The next arena for PBL might well be the community as a whole. Our best tutor for that will be the developing world.

We already have a lexicon of varieties: PBL, CBL, TBL. What next? EBL: *The Centre for Excellence in Enquiry based Learning (EBL)* has been established at

Manchester. It will strengthen the national capacity in PBL, to develop, diversify and evaluate this Flexnerian approach to learning.

REFERENCES

1. Taylor DCM. Reflections from the salt mines - Eight Years Experience of Problem Based Learning. *The Clinical Teacher* 2004; **1**(2): 59-61.
2. Flexner A. *Medical Education in the United States and Canada*. New York: The Carnegie Foundation, 1910.
3. Dewey J. Science as subject-matter and as method. *Science* 1910; **31**: 121.
4. Clarke RC, Engel CE. Medical Education with a difference. *Programmed Learning and Technology* 1979; **16**: 70-87.
5. Henry R, Byrne K, Engel C, editors. *Imperatives in Medical Education. The Newcastle Approach*. Newcastle University: New South Wales Faculty of Medicine and Health Sciences, 1997.
6. Finucane PM, Johnson SM, Prideaux DJ. Problem Based Learning - its rationale and efficiency. *MJA* 1998; **168**: 445-448.

FURTHER READING

- Network-Towards Unity for Health (Network-TUFH). URL: <http://www.the-networktufh.org>.
- Hamilton JD. The McMaster Curriculum: A Critique. *BMJ* 1976; **1**: 1165-1234.
- Spaulding WB. *Revitalising Medical Education. McMaster Medical School. The Early Years. 1965-1974*. Philadelphia & Hamilton: B C Decker Inc, 1991.
- Albanese MA. Treading tactfully on tutor turf: does PBL tutor content expertise make a difference? *Medical Education* 2004; **38**(9): 918-920.
- Bawden R. A learning approach to sustainable agriculture and rural development: Reflections from Hawkesbury. Training for agricultural and rural development, 1995-96. (FAO, 1996). Available from URL: <http://www.fao.org/sd/EXdirect/EXan0010.htm>
- Hamilton JD, Ogunbode O. Medical Education in the Community: A Nigerian Experience. *Lancet* 1991; **338**: 99-102.
- Manchester University awarded Centre for Excellence in Enquiry-Based Learning. News Release Available from URL: <http://www.manchester.ac.uk/newsarchive/title,11816,en.htm>