7. Literature resources for PBL

Many have asked for a reading list of key articles and books. Howard Barrows created such a list and kindly gave me permission to use this as a starting resource. I have added my own recommendations.

7.1 BOOKS


This book is designed to help teachers wishing to develop tutorial or facilitator teaching skills in PBL.


Brown, G. and M. Pendleberry (1992) "Assessing Active Learning: parts 1 and 2" CVCP Universities' Staff Development and Training Unit, University House, Sheffield, S10 2TN, UK


New York: Association Press.

Tutor technique is very close to PBLI card. It explains to the learner what is expected of him and what are the teacher's responsibilities in a self-directed study course. The third section explains how both can find materials needed for their respective roles and how to effectively evaluate learning.

Fearon Publishers.

Mager, R.F. (1972) "Preparing Instructional Objectives," Fearon Publishers, Belmont,
CA.


This is a collection of three lectures by Medawar discussing the inductive and intuitive thinking processes involved in the scientific method of thought.

Meiring, S.P. (1980) "Problem solving.. a basic mathematics goal: Part 1, becoming a
better problem solver; part 2, A resource for problem solving," DaleSeymour
Publications, PO Box 10888, Palo Alto, CA.


A panel of educators with expertise in a cross-section of disciplines and perspectives were asked to give their ideas as to how technology would change education by the year 2020. This is a collection of their individual, as well as, what all agreed should be goals for education through technology.

Press, Cambridge MA. A classic with emphasis on concept maps and Gowin vee approaches.

Resnick, L.B. (1989) "Education and Learning to Think," National Academy Press,
Washington, DC

and Row Publishers.


Schon describes reflective thinking or problem-solving development in many situations and professions with special emphasis on medical and educational professions.


The author emphasizes the psychological side of problem-solving, why it works in the classroom as well as in every day "real" life. Also discusses necessary components of an ill-structured problem and arguments for changing education to follow a more problem-solving curriculum in the classroom.

7.2 NEWSLETTERS

***PROBE, the Australian Newsletter about PBL. To subscribe contact PROBLARC, CALT, University of Newcastle, University Drive, Callaghan, NSW 2308, Australia. <g.ryan@unsw.edu.au>

7.3 E-MAIL BULLETIN BOARDS

****PBLIST: started July 1993 at the University of Texas Health Science Center in San Antonio. Focuses on PBL in the health sciences.

Send the following one-line e-mail message to

<Listproc@sparky.uthscsa.edu>

SUBSCRIBE PBLIST Your-first-name Lastname

****PBL-LIST: the Australian centered list managed by Roger Hadgraft, Monash University. To subscribe send the following one-line e-mail message to

<Majordomo@eng.monash.edu.au>

subscribe PBL-LIST

** Cooperative Learning. To subscribe send the following one-line e-mail message to

<Listserver@jaring.my>

Subscribe CL Your-first-name Lastname

7.4 ARTICLES

Lists six outcomes and three levels of development for each: Critical thinking and decision-making abilities, Communication abilities, Responsible use of the values and ethical principles, Social awareness and social responsibility, Self-learning abilities and Habits and Social interaction and citizenship. Gives examples of the development of these abilities as part of the fabric of different courses in Pharmacy.


A discussion on reflective thinking and how and why it should be a goal in teaching. Using Dewey's definition of reflective thinking, Baron tries to describe the phases a person goes through in the thinking process to gain reflective thought.


This paper offers a classification for the many varieties of educational methods that are referred to as Problem-based. It supports the argument that each method addresses the possible educational objectives for PBL to differing degrees. Educators should be aware of this when choosing a particular technique. The method used by the PBLI is referred to as "Reiterative PBL."


Since many medical schools are concerned about the number of tutors required to work with small groups of students in PBL, this paper describes the design and application of PBL in a second year medical school class in immunology of seventy-two students involving the whole class and using only one, non-expert tutor.


The effectiveness of PBL in a first year neuroscience course was evaluated by comparing a subset of students given several PBL experiences using a standardized patient to students who volunteered for the PBL experience but were denied the ongoing neuroscience course. The surprising finding was the PBL group sought more direct experiences with actual neurological patients.

This article centers around a study of student motivation. Students were given material to study at home in both control and experimental groups. The reason given to control group for material was testing; to the experimental group, to teach material to another student. At conclusion of two weeks, the students who were to teach had a better understanding of subject that the control group. The conclusion of researchers: if given the task of tutoring, students are motivated to gain a complete understanding of material given.

Berkson (1993) "Problem-based learning: have the expectations been met," Academic Medicine, 68, S79-S88.


The article compares the strengths and weaknesses of conventional, mastery learning, and small-group tutor styles of teaching and the "2 sigma problem" in the assessment of student learning and retention at the end of the unit of study and longer-term retention. Several factors are considered besides teaching styles; such as home environment, outside influences, and the differences in the students themselves.


An argument for problem-based learning, but addresses the difficulties inherent in PBL such as; problem-structure, teacher and student motivation and sustaining interest with practical suggestions and also how technology can help.


Chamberlain, J. (1978) "Eliminating your SDBs: self defeating behaviours", Brigham Young University, Provo, UT.


This article discusses effective situated cognition in conjunction with everyday problem-solving by use of a series of videotaped situations. Two sets have been developed at the writing of the article; one centers around math skills and the other around language arts in intermediate and jr. high classrooms.


Report on reliable evaluative instrument for problem-based learning and how it was developed at the University of Limburg Medical School.


A study based on the effectiveness of PBL versus the traditional study course at Temple University School of Medicine. The outcome of the two-year study revealed that PBL students tested lower on test scores at the end of study than the traditional students, but retained much more after retesting a year later.


Keller describes the curriculum style he and others developed. It encourages students to travel through "learning segments" in a certain course of study and proceeding to the next segment only after passing a mastery text-which may be taken as many times as needed. Includes a brief explanation of evolution and criteria for development of the program.


An explanation of the development of the PBL process and the steps involved in tutoring a lesson. Based on Dr. Barrows' development of the PBL technique and how it follows the natural human problem-solving skills we all unconsciously use. Also, gives a basic explanation of the tutor/teacher role and structuring problems in the PBL technique.


Marton, F. and R. Saljo (1976) "On Qualitative Differences in Learning, outcome and process," Bri. J. Educational Psychology, 46, 4-11.


Second year medical students at Southern Ill. Un. School of Medicine discuss the strengths and weaknesses of their 2 year experience in a PBL curriculum with suggestions for improvement from a learner's point of view.


An explanation of criteria for creating a problem and important steps and points to consider when writing and facilitating a successful problem. The Barrow's method and the PBL structure are central in this discussion of effective implantation of problem-based learning.


The process of problem-based learning is described and measured against traditional learning principles.


The functional context method calls for breaking learning into small segments, starting with simple tasks to build upon. The study that is the subject of this article also found; 1) learning must have functional significance of the student; 2) must be relevant to goals of the instruction. This method was originally developed for Army fields radio repairmen with the assistance of the Human Resources Research Office and George Washington University.


University of Western Virginia engineering department findings based on 6 years of open design curriculum for freshman students. Results emphasize better grades and better student understanding of subject matter.


Wilkerson, LuAnn (1994) Identification of Skills for the Problem-based Tutor: Student and Faculty Perspectives", School of Medicine, University of California, Los Angeles, preprint.


A discussion on levels of learning, the learning process and where PBL is most effective. It also introduces different types of problem structures and teacher roles. Very good for understanding the thinking process necessary to successfully carry off a problem-based experience as a student and as a tutor.


7.4 VIDEOTAPES

Barrows, H and H. MacRae (undated) "The Tutorial Process in PBL," Southern Illinois University School of Medicine, Office of Educational Affairs, PO Box 19230, Springfield IL 62794-9230

*** Daitz, B. (undated) "Learning medicine," The University of New Mexico School of Medicine, 2400 Tucker Dr., Albuquerque, NM 87131. Hour-long with much emphasis on the practical internship component. For PBL groups, I prefer to start with the helicopter and Jamie Opal as the simulated patient. This provides one of the better illustrations of small group, self-directed PBL in action.

de Grave, William and colleagues (1993) four videotapes (in English) "Problem-based learning in the tutorial group," (35 min, ISBN 90-5398-021-0) Shows a tutorial group working through the PBL process.

"Opinions about PBL in the tutorial group," (11 min, ISBN 90-5398-020-2) Students give their reactions to PBL;


Department of Educational Research and Development, Medical School, University of Limburg, Box 616, 6200 MD Maastricht, the Netherlands.


"Common Problems" (20 min) Introduces 5 to 6 common problems through a vignette and offers different types of solutions. Used for students and tutors to stimulate discussion. Faculty of Medicine, University of Toronto, Toronto, M5S 1A8

* Suzuki, D. (undated) "Doctors of Tomorrow," form the CBC program "The Nature of Things," available from the Filmmaker's Library, 124 East 40th St., New York, NY 10016. 30 min., difficult to see the small group, self-directed PBL in action.

* Tough, Allen, G. Griffin, Bill Barnard and Don Brundage (undated, ca 1980) "The Design of Self-directed Learning," Dept. of Adult Education, Ontario Institute for Studies in Education (OISE), Toronto, ON. Three videotapes plus a manual. The tapes show Griffin discussing, with two former students, the transitions the students had to make in adapting to this SDL approach; Griffin and the students exploring the components that Griffin includes in the design of SDL (creating a supportive learning climate, importance of students reflecting on their learning experiences, the importance of learning partners and the "closure activities of the group critique" that she uses for each session and for the course). In the third tape, Tough questions learning contracts and Barnard and a student evolve a learning contract. Later in the same tape, Tough and his students discuss his approach.

** Wales, C.E. (1974) "Guided Design," University of West Virginia, Morgantown, WV. Excellent illustration of tutorless groups and how to use PBL in large classes. Tends to take a global view so that we cannot hear much discussion within the groups. Useful for educators but less appropriate to show to students because of the dated appearance, style and clothing of participants.

WGBH Boston NOVA program "Can we make a better doctor" describes the New Pathways program at Harvard.

[Wood, D.R.] (1994) "The MPS SDL program," Department of Chemical Engineering, McMaster University, Hamilton, ON (24 min) Woods introduces ideas of subject-based versus problem-based, outlines the context of 1 instructor with 5 to 8 tutorless groups. See students preparing agenda, running the Goals, Teach and Feedback meetings. Closes with Woods interviewing a student about her journal on "Being a Chairperson." The latter is mostly talking with little detail.
Another tape called "Student Response to SDL" interviews the students seen in the videotape "The MPS SDL program." Nothing startling is revealed other than the student's strong preference for this approach. Of limited value to either educators or students.

Back to [PBL](#)