



Published online: 10-21-2014

Problem-Based Learning: An Inquiry Approach

Heather Purichia

North Carolina State University, hpurichia@gmail.com

IJPBL is Published in Open Access Format through the Generous Support of the [Teaching Academy at Purdue University](#), the [School of Education at Indiana University](#), and the [Jeannine Rainbolt College of Education at the University of Oklahoma](#).

Recommended Citation

Purichia, H. (2015). Problem-Based Learning: An Inquiry Approach. *Interdisciplinary Journal of Problem-Based Learning*, 9(1).

Available at: <https://doi.org/10.7771/1541-5015.1522>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

This is an Open Access journal. This means that it uses a funding model that does not charge readers or their institutions for access. Readers may freely read, download, copy, distribute, print, search, or link to the full texts of articles. This journal is covered under the [CC BY-NC-ND license](#).

THE INTERDISCIPLINARY JOURNAL OF PROBLEM-BASED LEARNING

BOOK REVIEW

Problem-Based Learning: An Inquiry Approach

Heather Purichia (North Carolina State University)

Barell, J. (2007). *Problem-based learning: An inquiry approach* (2nd ed.). Thousand Oaks, CA: Corwin Press. 192 pp. ISBN 978-1412950046. \$80.95 (hardcover); \$36.95 (paperback).

John Barell's book, *Problem-Based Learning: An Inquiry Approach*, is a guide to the use of inquiry within a problem focused environment. Arranged like a textbook, the K–12-oriented work provides bold headings, large graphics, advanced organizers, and chapter activities to guide the reader through the material.

The eight chapter book is divided into two parts: 1) preparation and 2) application.

“Part I: Preparation” is comprised of three chapters, explaining *inquiry* as a process, describing how to design an environment to support inquiry, and providing an overview of designing a curriculum commensurate the use of inquiry strategies. A brief, two-paragraph, working definition of problem-based learning (PBL) is provided to frame the discussion, as it is applied to the topics of this book. Inquiry is at the center of the PBL process, regardless of specific application utilized, and is the focus of this book. The first part lacked a detailed explanation of inquiry, a discussion of the foundation of PBL, explanations of various iterations of the PBL process, and information on the various theories and reasons that explain the centrality of inquiry to PBL.

Given PBL is a student-centered and student-directed curricular model, designed to foster transfer and *cognitive flexibility* (Barrows & Kelson, 1993), the learning environment is expected to be commensurate with these goals. The book begins with a discussion on the design of the environment, including why designing for inquiry is important, and includes a discussion on question types. A deeper discussion of the PBL process that addresses the shift from teacher-centered to student-centered, the difference between student-centered and student-directed, and the importance of both to a successful PBL curriculum is needed. While problem-based learning and inquiry learning environments are practically indiscernible, a discussion of the two models should be included, to establish a common understanding of the constructs (Hmelo-Silver, Duncan, & Chinn, 2006). Success of a PBL program largely depends on the quality of the tutor (Barrows, 1988) and on

the commensurability of the task with the type and amount of scaffolds (Hmelo-Silver, et al., 2006). The number and type of scaffolds incorporated into the environment are predicated on learners' schemata with the concepts and skill germane to the presented problem. Thus, a discussion on scaffolds, the role of the facilitator, and strategies for shifting the role of the teacher in real classroom settings was expected and omitted. A largely held criticism of PBL and IL environments is they are minimally guided. Rather than direct instruction, scaffolds are built into the environment. Scaffolds can be of several types a) those that make disciplinary thinking and strategies explicit; b) those that embed expert guidance; c) scaffolds that reduce cognitive load (Hmelo-Silver et al., 2006). Making disciplinary thinking and strategies explicit can be obtained facilitator use of modeling, coaching, and prompting, as well as the use of structures, such as advanced organizers. The book includes advanced organizers, but could benefit from a detailed explanation of how to create and implement them in a classroom. PBL has long utilized experts, as part of the inquiry process. In the process of exploring learning issues, learners will come to see the necessity of expert knowledge and will, often, stop the group process to consult an expert. While the expert knowledge may include direct instruction, it is not the same as embedding direct instruction into the process. A discussion of this distinction and how to structure the environment to provide for easy access to expert knowledge, would have been beneficial. Reduction in cognitive load has gained attention in recent years, particularly with the increase in online learning environments (Sharma & Hannafin, 2007, Kim and Hannafin, 2011). Random access hypermedia, which allows for a vast amount of information to be available at once and the various manners of facilitator interaction in the online environment, necessitate an understanding of instructional tactics such as adaptive release, where the information is provided to learners, only after acquisition of instructor determined prerequisite knowledge. K–12 teachers need information on specific scaffolding techniques that include overviews, guidance

on how to create and implement the techniques, when each is appropriate, and how many can be utilized together that goes beyond a simple graphic. As classrooms evolve to a blended environment and strategies such as flipping the classroom become more prevalent, a discussion of how to utilize PBL in an online classroom should be included.

A long-standing concern regarding PBL is curricular coverage—will course objectives be met? Standards-based curricula and the national movement to Common Core intensifies this question. The author addresses the curriculum and standards in the last chapter of Part I, but fails to provide information on strategies to illustrate the link between problems, curricular objectives, and standards, such as curricular matrices. Types of assessment are only briefly mentioned, without an explanation of how to implement those types of assessment to demonstrate objectives and standards have been met. Inquiry journals are discussed and exercises are presented to help guide readers through their use, but the book could have benefitted from a discussion of the development and use of student portfolios, linking it to the brief explanation of authentic assessment.

“Part II: Application” consists of five chapters, describing the manners in which inquiry is applied in a problem-based curriculum. Chapter 4 details a ten-step process for creating unit plans, then provides a sample unit, describing how each step is employed for the sample unit. There are several useful graphics in this chapter, such as “Paul’s Concept Map” (p. 74), that illustrate how to outline a unit and conceptualize unit components, which can provide a useful guide to problem development and the identification of the concepts and procedures, upon which unit objectives will rest. Chapter 5 highlights what has historically been referred to as the *PBL process* (Barrows & Tamblyn, 1980). The book presents strategies whereby the learner identifies what is known, what the individual wants/needs to know, how the learner intends to know, what is expected to be learned, how the information obtained will be applied, and what new questions may arise from the process. These highlighted strategies omit key features of the PBL process, such as the generation of hypotheses as a first step, which leads to a tutor-lead inquiry process, or the generation of a list of what is known and what needs to be learned, which are crucial features of most widely utilized PBL models. While strategies such as graphic organizers, reflective journals, and whole class discussion are well-researched strategies designed to support critical thinking, they are not strategies often associated with PBL (Barrows, 1986; Barrow & Kelson, 1993; Barrows & Tamblyn; 1980, Hmelo-Silver, 2004). Chapter 5 does a nice job of keeping focus on questioning and the various ways the presented strategies keep the group process asking “what do I need to know” and “how can I find out”? This focus highlights inquiry as the central tenet of this book.

Chapter 6 provides a nice description of the student inquiry process, particularly highlighting the need to have students reflect on the group process and their own learning, while providing many useful templates to use in the classroom. Chapter 7 addresses a multidisciplinary approach to Inquiry, particularly, teacher collaboration, integration of multiple concepts, and critical thinking integration. PBL, inherently, integrates multiple concepts and requires critical thinking. A discussion of these concepts and their relation to PBL and critical role in the use of inquiry would have been beneficial as a precursor to the application strategies. The final chapter provides a discussion and templates for assessment of inquiry and the objectives for the unit or individual problem. A brief discussion of the types of assessment begins the chapter. Self-assessment is presented, but a more comprehensive presentation of reflection would have been beneficial.

The book is organized like a textbook to be utilized in a workshop, in that it provides a brief synopsis without much elaboration on each of the chapter topics and subtopics, utilizes large-sized headings, graphics, and a layout that directs readers to key points and organizational strategies. Workbook features, such as “Stop and Think,” follow each subtopic and present questions to stimulate reader inquiry. While this is a great supplemental feature for course or workshop, it’s not a convincing resource for developing a deep understanding of PBL or inquiry, as presented. The “Stop and Think” and other exercises provide abundant scaffolds that are constraining, due to the overuse of organizing tools embedded within the layout. The exercises in each chapter could provide a springboard to a rich discussion and exploration of the topics, but that opportunity is minimized due a surface-level, well-defined, and overly simplified presentation of the topics.

Given the title, one would expect to be provided with an overview of the various definitions of PBL, a description of several of the most widely utilized iterations of the instructional model, and a detailed explanation of inquiry—a cognitive process employed during and an essential criteria of the PBL process. While the book focuses on inquiry, it fails to provide a comprehensive description of problem-based learning and the decades of research supporting the model. The book approaches PBL in a narrow, seemingly specific manner, yet spends only two short paragraphs explaining PBL.

The majority of the book presents examples, templates and graphic organizers, which are appropriate for individuals who are interested in identifying a set of resources, with a brief discussion of how and why each is used. Those looking for an academic resource, to develop an understanding of inquiry—what it is, how it’s initiated and sustained within a PBL environment, and why it’s essential to the PBL process—will be disappointed.

References

- Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical Education*, 20(6), 481–486. <http://dx.doi.org/10.1111/j.1365-2923.1986.tb01386.x>
- Barrows, H. S. (1988). *The tutorial process*. Springfield: Southern Illinois University School of Medicine.
- Barrows, H. S., & Kelson, A. M. (1993). *Problem-based learning: A total approach to education*. Springfield: Southern Illinois University School of Medicine.
- Barrows, H. S., & Tamblyn, R. (1980). *Problem-based learning: An approach to medical education*. New York, NY: Springer.
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266. <http://dx.doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Swell, and Clark. *Educational Psychology*, 42(2), 99–107. <http://dx.doi.org/10.1080/00461520701263368>
- Kim, M. C., & Hannafin, M. J. (2011). Scaffolding problem solving in technology-enhanced learning environments (TELEs): Bridging research and theory with practice. *Computers & Education*, 56(2), 403–417. <http://dx.doi.org/10.1016/j.compedu.2010.08.024>
- Sharma, P., & Hannafin, M. J. (2007). Scaffolding in technology enhanced learning environments. *Interactive Learning Environments*, 15(1), 27–46. <http://dx.doi.org/10.1080/10494820600996972>
- Spiro, R. J., Coulson, R. L., Feltovich, P. J., & Anderson, D. (1988). Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains. In V. Patel (ed.), *Proceedings of the 10th Annual Conference of the Cognitive Science Society* (pp. 375–383). Hillsdale, NJ: Lawrence Erlbaum.