The Interdisciplinary Journal of Problem-based Learning

The Interdisciplinary Journal of Problem-based Learning (IJPBL) is published bi-annually by Purdue University Press. IJPBL publishes relevant, interesting, and challenging articles of research, analysis, or promising practice related to all aspects of implementing problem-based learning (PBL) in K–12 and post-secondary classrooms.

Editor
Peggy A. Ertmer, Purdue University

Book Review Editors
Johannes Strobel and Sandra C. Williamson

Editorial Board
George Bodner, Purdue University
Nada Dabbagh, George Mason University
Cindy E. Hmelo-Silver, Rutgers University
Woei Hung, University of North Dakota
David Jonassen, University of Missouri
Johannes Strobel, Purdue University

Advisory Board
Thomas Duffy, Indiana University
Alexus Macklin, John Heinz History Center
John Savery, University of Akron
George Watson, University of Delaware
Donald Woods, McMaster University

Consulting Editors
Stacey Lowery Bretz, Miami University
Ellen Lynch, University of Cincinnati
Olive McKeown, St George’s Medical School
John R. Mergendoller, Buck Institute for Education
Mary Kay Orgill, University of Nevada
Chandra Hawley Orrill, University of Georgia
Sanghoon Park, Northwestern State University
Sung Hee Park, Ewha Womans University
Drew Polly, UNC Charlotte
Heather R. Purichia, Penn State College of Medicine
Mary Lynn Quartaroli, Northern Arizona University
James Quinn, Oakland University
Jason Ravitz, Buck Institute for Education
Petrea Redmond, University of Southern Queensland
Donna Russell, University of Missouri-Kansas City
Regina Schoenfeld-Tacher, Colorado State University
Mary B. Shoffner, Georgia State University
Phillip J. VanFossen, Purdue University
Andrew Walker, Utah State University
William R. Watson, Purdue University
Harold B. White, University of Delaware
Sandra C. Williamson, Wilmington University
Brent G. Wilson, University of Colorado Denver
Alyssa Wise, Simon Fraser University
Aman Yadav, Purdue University
Stephen Pui-ming Yeung

Editorial Assistant
Christopher Mong

Cover Designer
Jennifer A. Neese

ISSN 1541-5015
Submission Guidelines

Submission of articles that report on original research, classroom or project descriptions and evaluations, syntheses of the literature, assessments of the state of the art, and theoretical or conceptual positions that relate to the use of PBL, including the planning, management, operation, and evaluation of PBL are highly desired. Please note that for original research, we expect to see an explanation of the research question(s), description of the methods employed, analyses used, and recommendations for implementation and further research.

**Length:** Manuscripts should be between 10 and 25 double-spaced U.S. standard letter size (8½” × 11”) pages in length. In addition, an abstract of approximately 125 words is required.

**Style:** Manuscripts should be prepared according to the APA format as described in the *Publication Manual of the American Psychological Association* (5th ed.). Manuscripts not conforming to these specifications will be returned to the author for proper formatting.

**Format:** Manuscripts should be submitted electronically through the journal website, [http://docs.lib.purdue.edu/ijpbl/](http://docs.lib.purdue.edu/ijpbl/). Articles may be uploaded in either of the following formats.

- MS Word for Windows using only the truetype versions of standard PostScript fonts (Times, Arial, Symbol)
- Rich Text Format (RTF) with the same constraints for fonts

Manuscripts submitted to *IJPBL* need to be free of identifying characteristics, including author names, acknowledgments, and references to the author(s)’s previous or forthcoming work. All references to the authors should be replaced with the word Author throughout the manuscript.

**Review Process:** Manuscripts are reviewed first by the editorial board. Those that are appropriate for the journal are sent to at least two experts in PBL scholarship, particularly in the primary author’s discipline or content area. All reviews are blind, that is, without identifying the authors to the reviewers. On the basis of the reviewers’ recommendations, the *IJPBL* editor will decide to publish the manuscript as submitted, to request a significant revision and resubmission, or to reject the manuscript for publication. In all cases the author will be notified of the decision, and a copy of the reviewers’ comments will be provided. The review process is expected to take between 2–4 months.

If you have any questions, please contact Dr. Ertmer at pertmer@purdue.edu.
Contents

Special Issue
Research on Problem- and Project-based Learning (PBL) in Engineering Education

Introduction
Peggy A. Ertmer 4

Students’ Perceptions of Their Learning Experiences in an Authentic Instructional Design Context
Nada Dabbagh and Cecily Williams Blijd 6

A Cognitive Support System to Scaffold Students’ Problem-based Learning in a Web-based Learning Environment
Xun Ge, Lourdes G. Planas, and Nelson Er 30

Using Questioning to Facilitate Discussion of Science Teaching Problems in Teacher Professional Development
Meilan Zhang, Mary Lundeberg, Tom J. McConnell, Matthew J. Koehler, and Jan Eberhardt 57

Book Review: Implementing Systems Engineering Techniques into Health Care: An Investigation into Using Problem Based Learning in Medical Schools to Teach Systems Engineering by Joe Fitzler
Reviewed by Mark A. Best 83

The Interdisciplinary Journal of Problem-based Learning
Volume 4, Number1  Spring 2010
ISSN 1541-5015