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Book Review

Management of change: Implementation of problem-based and project-based learning in engineering

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de Graaff, E. & Kolmos, A. (Eds.). (2006). *Management of change: Implementation of problem-based and project-based learning in engineering*. Rotterdam: Sense Publishers. 232 pp. ISBN 978-9087900137, \$49.00 (pbk.)

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Problem-based learning and related pedagogical frameworks are instructional strategies that have a large research base; their implementation ranges from single courses and degree programs to entire universities adopting a PBL-based curriculum. Although widely praised and empirically proven to engage students, provide authentic learning in the context of workplace problems, and offer a learning environment that affords deep and situated learning, PBL has not been widely implemented. The questions then arise: Why is this so? and How can we support the change process to integrate PBL within existing infrastructures and curricula? *Management of change*, edited by Erik de Graaff and Anette Kolmos, sets out to address these questions and make available some practical frameworks for change, with initial results. The assembled group of authors provides the theoretical bases, the results of empirical studies, and case descriptions about models of change processes related to the implementation of PBL in universities.

The book is structured into four sections: The first, "Setting the PBL Scene," provides a theoretical and historical summary of PBL and project-based learning, particularly emphasizing and contrasting the European traditions, centered around Aalborg and Roskilde, which developed in parallel and independently with the North American approach, largely informed and shaped by McMaster's medical curriculum and the work of Harold Barrows. The section concludes with an in-depth discussion of the commonalities and differences between problem-based and project-based learning. Following the European tradition, the authors propose that both PBL and project-based learning share the same pedagogical frameworks and, in practice, cannot be separated.

The next section, "Management of Change," addresses the process of change, common misconceptions (myths) about PBL, such as its supposed cost-ineffectiveness, and the role of institutional leadership and faculty development. Although a change model and several variations are introduced, the articles in this section would benefit from a stronger integration of existing change frameworks, in particular, Everett Rogers's "Diffusion of Innovations" (2003) and Peter Senge's "Organizational Change Model" (1990).

The third section, "Effect of the Implementation of PBL," explores issues ranging from curriculum and sequencing processes, to teachers' and students' perceptions of the change process and PBL, to PBL as an agent for change for interdisciplinary teaching, to a consideration of gender inclusiveness.

The final section on "Case Studies and Good Practice" includes detailed examples of implementation and change history, providing both top-down and bottom-up approaches. Of particular value is the chapter by Donald Woods "Helping students gaining the most from their PBL experience," with its focus on a student-centered participatory design approach, presenting students' voices and experiences as a sounding board for the iterative design process.

The collection thoroughly introduces the many flavors of PBL and argues strongly for the commonalities between PBL and project-based learning; it therefore takes a refreshingly nondogmatic position on how to define PBL. The empirical studies and case studies, however, seem to indicate that the process and the ease of implementation, as well as the barriers to and champions for change towards a PBL orientation, are dependent on the definition of PBL and the degree of curriculum change it requires. As the study by Mariane Frenay et al., "Project- and Problem-based Learning in the Engineering Curriculum at the University of Louvain," shows, for example, changing the larger engineering curriculum engenders quite different issues than introducing PBL into a small curriculum unit.

A strength of the book is that Eric de Graaff and Anette Kolmos acknowledge from the beginning that only newly founded universities have adopted PBL as a guiding principle for their entire curriculum and that this volume's emphasis is to document change processes within different institutional and historical contexts with a focus on the results of empirical research. The book gains additional depth by the focus on engineering curricula, which provides a tremendous challenge due to the existence of (over)prescribed curricula.

The individual chapters lack, at times, an introduction to their own theoretical standing and framework, as well as an in-depth description of methodologies used. Fortunately, the introductory chapters, which are designed to provide larger frameworks, partially compensate for this. However, the collection's balance of theoretical and historical work with empirical research, evaluation studies and case studies provides an opportunity to engage with the main questions. It places such questions into different contexts and

examines the political factors of introducing such a large change process into existing institutions and their curricula. Overall, the book stands between a researcher and practitioner audience, but provides an excellent introduction and in-depth orientation into the broad range of approaches when PBL-oriented curricula are introduced into universities and classrooms. It certainly convinces readers that more research in this subfield of PBL is necessary.

References

- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
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