Fourth Issue of the Journal of Problem Based Learning in Higher Education

Jacob Davidsen, Thomas Ryberg *

INTRODUCTION TO THE FOURTH ISSUE

We are pleased to introduce the fourth issue of the Journal of Problem Based Learning in Higher Education. Current issue is composed of five research papers and two PBL cases. These address different aspects of PBL in higher education as and represent an international experiences and knowledge with contributions from Brazil, Denmark, Germany and Morocco. The first three papers and the two cases touch upon the role of the teacher in facilitating problem based learning processes. These papers address the complex questions of how teachers can actually implement and teach PBL to students. The fourth paper reports on students' attitudes towards different types of exams (e.g. individual exams and group exams) in two engineering programs at Aalborg University. The fifth paper compares three different learning designs in an introductory computer science course on programming. The current issue explores a diverse set of aspects related to research in Problem Based Learning: teachers and supervisors roles, implementation of PBL curricular, assessment formats supporting PBL and new advances in combining technology and PBL.

Papers:
- Derfoufi, Sanae, Benmoussa, Adnane, El Harti, Jaouad, Ramli, Youssef, Taoufik, Jamal, and Chaouir, Souad. "Impact of Active Teaching Methods Implemented on Therapeutic Chemistry Module: Performance and Impressions of First-Year Pharmacy Students." *Journal of Problem Based Learning in Higher Education* 3, no. 2. doi:10.5278/ojs.jpblhe.v0i0.1207.
- Hernandez, Carola, Ravn, Ole, and Valero, Paola. "The Aalborg University PO-PBL Model from a Socio-Cultural Learning Perspective." *Journal of Problem Based Learning in Higher Education* 3, no. 2. doi:10.5278/ojs.jpblhe.v0i0.1206.
- Mühlfelder, Manfred, Konermann, Tobias, and Borchard, Linda-Marie. "Design, Implementation, and Evaluation of a Tutor Training for Problem Based Learning in Undergraduate Psychology Courses." *Journal of Problem Based Learning in Higher Education* 3, no. 2. doi:10.5278/ojs.jpblhe.v0i0.1195.
- Dahl, Bettina and Kolmos, Anette. "Students' attitudes towards group based project exams in two engineering programmes." *Journal of Problem Based Learning in Higher Education* 3, no. 2. http://dx.doi.org/10.5278/ojs.jpblhe.v0i0.1108

*Jacob Davidsen, Aalborg University, Rendsburggade 14, 9000 Aalborg, DK, Email: jdavidsen@hum.aau.dk
Thomas Ryberg, Aalborg University, Rendsburggade 14, 9000 Aalborg, DK, Email: ryberg@hum.aau.dk

- Lykke, Marianne, Coto, Mayela, Jantzen, Christian, Mora, Sonia, Vandel, Niels. "Motivating students through positive learning experiences." *Journal of Problem Based Learning in Higher Education* 3, no. 2. http://dx.doi.org/10.5278/ojs.jpblhe.v0i0.1130

Cases:

- Amaral, Joao Alberto Arantes do, and Gonçalves, Paulo. "The Use of System Thinking Concepts in Order to Assure Continuous Improvement of Project Based Learning Courses." *Journal of Problem Based Learning in Higher Education* 3, no. 2. doi:10.5278/ojs.jpblhe.v0i0.1174.
- Amaral, Joao Alberto Arantes do, Gonçalves, Paulo, and Hess, Aurélio. "Creating a Project-Based Learning Environment to Improve Project Management Skills of Graduate Students." *Journal of Problem Based Learning in Higher Education* 3, no. 2. doi:10.5278/ojs.jpblhe.v0i0.1178.

Papers

In the first paper, Sanae Derfoufi, Adnane Benmoussa, Jaouad El Harti, Youssef Ramli, Jamal Taoufik and Souad Chaouir report a study from Casablanca Medical and Pharmaceutical College in Morocco. In their paper "Impact of active teaching methods implemented on therapeutic chemistry module: Performance and impressions of First-year pharmacy students", they have found that the Case Method, originally described by Barrows (1986), could facilitate students learning. However, the authors also note that professors need to acquire complex teaching skills to integrate the Case Method into curriculum. To ensure that teachers acquire such complex teaching skills the authors suggest making pedagogical workshops aiming at this. Thus the paper addresses a central concern in PBL research – namely the role of the instructor/teacher in PBL environments. A structured design for scaffolding student's participation, reflection, critical thinking and dialogical skills is presented and evaluated through pre and post-tests. Among other things, the results show interesting student views on: the difference between traditional lectures and the Case Method and the positive experience of working together in teams to solve a problem.

In the second paper, titled "The Aalborg University PO-PBL Model from a Socio-cultural Learning Perspective" by Carola Hernandez, Ole Ravn and Paola Valero, the authors present and discuss some of the principles of Project Organized – Problem Based Learning (PO-PBL) at Aalborg University particularly based in studies from the Faculty of Science and Engineering. The authors develop their argumentation about PO-PBL by revisiting some of the basic principles of PBL from a sociocultural perspective. As pointed out by the authors, it is important that research on PBL focus on how students are learning together in their groups, rather than focusing on individual learning processes and outcomes in PBL settings. In PBL research the group, they argue, should be the unit of analysis. In addition, the authors argue that learning should be viewed as a process of participation in scientific communities with fellow students and teachers/supervisors, and as such also an issue of identity and becoming a certain type of practitioner. Thus, the paper also addresses the role of teachers in PBL universities, e.g. what type of questions should teachers ask to promote a scientific discourse?

By revisiting some of the core principles of P0-PBL the authors manage to highlight the positive relation between the competences gained at a PBL university compared to traditional educational institutions. Furthermore, it is clear that these competences are increasingly needed to become 'an engineer in the real world' in the 21st century. In the final discussion, Hernandez, Ravn and Valero suggest that more research is required on how groups function and how teachers can engage with the students in a mutual learning partnership.

The third paper titled "Design, implementation, and evaluation of a tutor training for problem based learning in undergraduate psychology courses" by Manfred Mühlfelder, Tobias Konermann and Linda-Marie Borchard presents and discusses how student tutors can introduce PBL to new students at the university. Based in a "Train the Tutor" (TnT) program and Hungs (2006) 3C3R model the authors outline a pedagogical model for introducing PBL at university level. By making more experienced students introduce PBL to new students several learning goals were achieved: the tutors had to develop metacognitive, facilitator and tutor skills in order to teach new the students. The study further shows that intensive training of PBL tutors ("Train the Tutor") promotes development of critical metacognitive skills and behavioural skills compared to other instructional methods, such as self-study.

In the fourth paper by Bettina Dahl and Anette Kolmos, the authors present a study of students' attitudes towards individual and group-based exams from two educational programmes "Architecture and Design" (A&D) and "Software Engineering" (SE) at Aalborg University. A&D and SE are both engineering programs; however, curricula and intended learning outcomes differ, which might also influence students' attitudes towards exams. Dahl and Kolmos highlight the culture of each program as a crucial frame influencing students' attitudes towards exam formats. In addition, the authors show that around half of the student group across both programs indicate that the group exam format influence their preparation for the exam. In spite of the different attitudes towards exams between the two students groups, a majority of the students express that group exams provides a better opportunity to show project and process related competences during exams. In conclusion, the authors argue that 'there is *not* a "one size fits all" exam when assessing PBL projects", however, it requires careful management from the programs and study boards to make sure that exams encompass assessment of the individual and group, the curricular as well as the PBL related competences. Finally, Dahl and Kolmos hypothesise that "Educational change might be very difficult if all curriculum elements always have to be aligned", however, as pointed out by the authors a misaligned curriculum might foster difficulties in predicting what students learn or how they will act upon these more uncertain circumstances.

Fifth paper titled "Motivating students through positive learning experiences: A comparison of three learning designs for computer programming courses" by Marianne Lykke, Mayela Coto, Christian Jantzen, Sonia Mora, Niels Vandel compare three different learning designs in terms of their motivational affordances for students learning to program. The authors describe

an experimental, controlled comparison of three learning designs from an introductory computer programming course in Costa Rica: '1. A traditional teacher-led course; 2. A problem based learning (PBL) course; and 3. A PBL course combined with the use of LEGO Mindstorms Robots.' The purpose of the study was to explore how these learning designs could motivate students and eventually decrease dropout rates among computer programming students, which is recognised as an internationally well-known problem. Methodologically the study applies three different techniques: surveys, walk-alongs and non-participant observations. Initially the authors believed that a combined learning design utilizing PBL and LEGO Mindstorm robots would motivate students most. However, the results show that the pure PBL learning design was more motivating for the students. Further that the students value a closely present supervisor to guide and direct the group. In addition, the authors present a very interesting survey method to probe and understand students' experiences – a method which could perhaps be of wider interest in relation to understanding PBL in Higher Education.

Cases
Joao Alberto Arantes do Amaral and Paulo Gonçalves present a case exploring relations between PBL and System Dynamics Theory in a MBA course in Brazil. The authors present a design developed over a period of 12 years for integrating PBL into a traditional curriculum with a main emphasis on building relationships with external partners – what the authors refer to as Community Partners. According to the authors it is possible to improve teachers and 'students' enthusiasm and commitment by improving the quality of educational resources and the teaching methodology'. Due to the historical trajectory of this project it is possible to see how the numbers of projects and community partners have increased over time.

In "Creating a Project-Based Learning Environment to Improve Project Management Skills of Graduate Students" Joao Alberto Arantes do Amaral, Paulo Gonçalves and Aurélio Hess introduce a case from the MBA degree in Project Management at the University of São Paulo, Brazil. This case equally shows how universities and NGO's can work together to solve problems in the local community. As resonating well with the existing PBL literature, the authors also found that students became motivated by the intense collaboration between theory and practice.

We wish to thank all authors for their contribution and a very special thanks to all the reviewers who have provided excellent comments and suggestions for improvements to the individual papers.

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ABOUT JPBLHE

Editorial team and the Editorial board:

BACKGROUND OF THE JOURNAL

The idea and foundation for creating JPBLHE emerged as an outcome of the establishment of the PBL academy at Aalborg University (www.pbl.aau.dk). The PBL Academy at Aalborg University (AAU) is a-cross faculty initiative to ensure the continuous development of the Aalborg University Model of Problem Based Learning (PBL). However, to ensure a vibrant development of PBL it is of the utmost importance to keep up with international research, and to contribute to ongoing development of PBL as an area of research. Therefore, one of the goals of the academy was to initiate an international, interdisciplinary open access journal with a specific focus on PBL in Higher Education. The journal has thus emerged as a collaboration between a number of research environments in Aalborg University e.g. "The UNESCO chair in Problem Based Learning", "e-Learning Lab – center for user driven innovation, learning and design", and "the Department of Learning and Philosophy" to name a few. Although the journal has grounding in these environments the ambition is to create and sustain a truly international and interdisciplinary journal. In relation to this, it is also important to emphasise that the journal does not foreground or favour particular approaches or PBL models. Rather, the aim is to explore, discuss and render visible the many different ways in which PBL is practiced within Higher Education. Therefore, we have aimed to establish a broad, internationally oriented Editorial Board composed of prominent and esteemed researchers within PBL; and we hope to be able to continuously expand the Editorial Board, the Editorial team, and the number of reviewers and authors. With this first issue, we feel that we have managed to attract both an international and interdisciplinary set of papers and authors, and we hope the readers will find the discussions and findings as interesting as we do.