

21. PROBELL: A FINNISH PROBLEM-BASED LEARNING (PBL) RESEARCH NETWORK

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INTRODUCTION

This chapter describes the origin, activities and research results of ProBell, the research group for Problem-based Learning in Finnish Higher Education. The name ProBell has no special meaning as a word in Finnish; however, it does mean something in English. The first part of the name, “Pro” refers to the “progress or advantage of PBL”. The second part, “Bell” can refer to a bell ringing the good news of PBL for a new way of bridging education and work, theory and practice.

ProBell’s work is about the links between theory, practice and research in PBL. At a theoretical level, the group researches how to develop knowledge and competence in changing society. Its aim is to shed light on the epistemological basis and implementations of PBL in education and learning at work. At a more practical level, ProBell seeks to develop PBL practice. This chapter outlines our theoretical framework and gives examples of our recent research findings. We also briefly describe some of the more practice oriented development projects we have been involved in, including launching a long-term training programme for practitioners of PBL and curriculum development in different fields. You can keep in touch with the development of ProBell through our website www.uta.fi/eduta/probell

THE START OF PBL IN FINLAND AND THE BIRTH OF PROBELL RESEARCH GROUP

The first implementation of PBL in Finland began in the 1990’s in medicine at the University of Tampere and was followed shortly by physiotherapy at the Pirkanmaa Polytechnic. Some years later, in 1999, PBL was introduced into the education of kindergarten and primary teachers at the University of Tampere. The interest in PBL has increased rapidly in numerous fields of vocational higher education programmes, especially in polytechnics. (Poikela, E. and Poikela, S., 1997; 2001; Poikela, S. 2003; Nummenmaa and Virtanen, 2001.)

The ProBell group was set up in 2000 at the University of Tampere when we invited some researchers and teachers interested in PBL to come together. We decided to organise a national meeting to gather more practitioners of PBL and to get to know each other. There are seven senior researchers and eight doctoral students in ProBell. The first national meeting on PBL was organised in April 2001 in Tampere. It became an annual event gathering from seventy to one hundred teachers, researchers and education developers from higher education in different fields and disciplines. Every conference has had international keynote speakers including Karin von Schilling from MacMaster Canada, Gaynor Sadlo from Brighton, UK, Terry Barrett from Ireland, Madeleine Abrandt-Dahlgren, Charlotte Silèn and Lars-Owe Dahlgren from Linköping, Sweden. In June 2005 ProBell organised an international PBL conference in co-operation with Lahti Polytechnic (www.lamk.fi/pblconference)

During 2001 the members of ProBell were developing and focusing their research ideas. We also started to develop a shared research plan and succeeded in getting some funding from the

Finnish Academy as a part of the multi-scientific national research programme Life as Learning (LEARN) conducted during the years 2002–2006 (www.aka.fi/learn). So far, two doctoral dissertations have been finished and published (Poikela, S., 2003; Alanko-Turunen, 2005). The main findings of these dissertations will be summarised in this chapter. The members of ProBell have also written four text books about PBL in Finnish and several articles and conference papers both in Finnish and English.

At the same time most of the ProBell researchers have been actively involved in several development projects in different organisations concerning pedagogical development at University and at work, tutor training and mentoring, curriculum development, assessment and evaluation. Two major projects aimed for practitioners of PBL have been “PBL-PD”, Professional Development Studies in PBL (60 ECTS credits) during 2002-2005 and “PBL-IT”, PBL and Interactive Technology (20 ECTS credits) during 2004-2006. Projects are funded by European Union and the State Provincial Office of Southern Finland. Participants are mainly teachers from polytechnics in different parts of Finland. These projects have supported teachers in their aim to develop their work and institutions on the basis of the concept of Problem-based Learning.

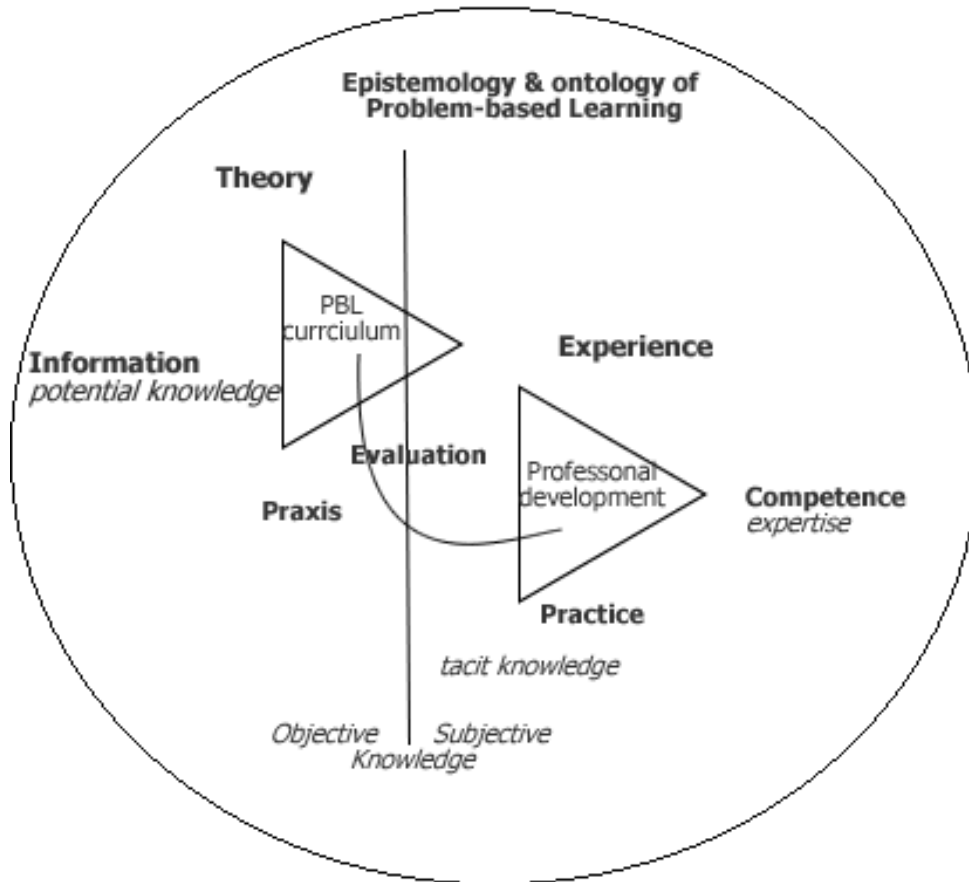
The ProBell group received an award for “good teaching” from Tampere University in 2002 for its activities. The reason for the award was “innovative work in researching, developing and implementing Problem-based Learning”.

PBL AND IDEAS OF KNOWLEDGE – HOW TO DEVELOP COMPETENCE IN A CHANGING SOCIETY?

The focus of ProBell’s research is in on the epistemological, pedagogical and curricular basis of PBL. The prerequisites of developing education and the professional practices are connected to general processes of change and the educational systems in society. The societal change and the idea of lifelong learning demand redefining relationships between research, education and professional practices. The knowledge gained in education goes out of date quickly and loses its value for working life. The educational system faces a difficult situation when the gap between work and education becomes too wide. We argue that the necessary professional skills and knowledge needed in working life cannot be taught through traditional formal education and training. Working life demands new kind of competencies and that is the strength of PBL which integrates many elements regarded essential in effective high quality learning and working, such as self-directed or autonomous learning, critical and reflective thinking skills, and the integration of disciplines.

We emphasise two special aspects in researching learning in professional context. Firstly, concepts of knowledge, cognition and learning are comprehended situationally and contextually. Secondly, knowing, expertise and cognition are also products of the context in which they are presented. Knowledge acquisition and using knowledge are not separate processes. Knowledge, cognition and learning are further bound to a certain physical, psychological, social and cultural context in which they are formed and to which they refer. The context gives a meaning to learning and professional development in the communities of education and work. We try to capture these complex processes in figure 1 (Poikela, E. and Poikela, S., 2005).

Figure 1: The contextual basis of Problem-based Learning



In the traditional curriculum practical knowledge is separated from theoretical knowledge. Learners are not always able to apply theories and models in order to solve problems in practical situations, and knowledge implanted into the memory is easily forgotten. It is impossible for the learner to integrate these two aspects into experiential learning. Correspondingly, emotional events are just experiences; there is no theoretical understanding. Conventional education fails in two areas: firstly, learners do not learn to solve problems in professional practice and secondly, they will not learn skills of learning to learn which are essential in the climate of continuous change that characterises working life and professional development.

The left-hand triangle depicts what can be achieved through a good education, and the right-hand triangle depicts those skills what can be learned through professional practice. Education itself cannot produce complete professional competence, but there should be an awareness of the dimensions and processes taking place between the PBL curriculum and professional development, and attention should be given to the meaning of tacit knowledge. These processes, occurring between education and working life, should be analysed and assessed carefully.

THE RESEARCH OF PROBELL

The research programme of ProBell is entitled “Problem-based Learning as a strategy for developing knowledge and competence in the context of education and work”. The aim is to analyse the benefits of PBL on the different levels of education and to evaluate changes in learning and working cultures.

Figure 2: ProBell Members and their research interests

<p>Esa Poikela, leader of ProBell (esa.poikela@ulapland.fi) & Sari Poikela: <i>Developing Context-Based Assessment (CBA) in the frame of PBL</i></p> <p>Anna Raija Nummenmaa, leader of research project, LEARN (psannu@uta.fi) & Kirsti Karila (kirsti.karila@uta.fi): <i>Problem-based Learning as a strategy in developing multiprofessional expertise</i></p> <p>Merja Alanko-Turunen (merja.alanko-turunen@helia.fi): <i>Negotiating interdiscursivity in a PBL tutorial site</i></p> <p>Helvi Kaksonen (helvi.kaksonen@uta.fi): <i>Learning at work as a part of a PBL environment</i></p> <p>Heleena Lehtonen (heleena.lehtonen@uta.fi): <i>Motivation and Learning in PBL</i></p> <p>Jyri Lindén (jyri.linden@uta.fi): <i>Developing Critical Reflection in Teacher Education – Problem-based curriculum as a realisation of critical pedagogy</i></p> <p>Marja-Leena Lähteenmäki (marja-leena.lahteenmaki@piramk.fi): <i>Construction of knowledge and competence in physiotherapy - comparing PBL cases in Finland and Sweden</i></p> <p>Timo Portimojärvi (timo.portimojarvi@uta.fi): <i>Problem-based Learning in a virtual environment</i></p> <p>Sari Poikela (sari.poikela@ulapland.fi): <i>Tutoring in PBL - work community as environment for creating and processing knowledge</i></p> <p>Juri Valtanen (juri.valtanen@uta.fi): <i>Does the Format of a Problem Matter for Students’ Effective Learning?</i></p> <p>Jorma Virtanen (jorma.virtanen@uta.fi) & Anna-Raija Nummenmaa: <i>Problem-based curriculum as a learning environment - constructing a new kind of curriculum in early childhood education</i></p> <p>Satu Öystilä (satu.oystila@uta.fi): <i>University teacher as tutor - facilitating group process</i></p> <p>International senior researcher partners: Gaynor Sadlo, University of Brighton, UK: <i>PBL Web directory</i> Charlotte Silén, University of Linköping, Sweden: <i>Relationship between self-directed learning in education and learning at work</i></p>
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In the following sections, we will take a closer look at the results published in doctoral theses. (Poikela, S., 2003; Alanko-Turunen, 2005).

The challenges of PBL from the individual and organisational perspectives

Problem-based Learning is certainly a pedagogical and curricular strategy impacting on many factors at all levels of an organisation. In her dissertation, Sari Poikela (2003) analysed the complexity and interaction of these processes using an ethnographic study as a method for focusing on the development of tutors’ (teachers’) knowing and expertise in the context of problem-based pedagogy. Tutor and teacher are used interchangeably. PBL was approached from the teacher’s perspective and the focus was broadened to include organisational factors also.

The empirical data consisted of observation of tutorials, tutor interviews and journals gathered from two organisations (the Faculty of Medicine, University of Tampere and the Department of Physiotherapy Education, Pirkanmaa Polytechnic) from 1996 to 1997 and during 2001. Different methods of data collection were combined to reach a multifaceted understanding of the phenomena. Theories of learning at work and the knowledge environment of work were also further tested with data and found as useful theoretical tools for analysing and identifying the core elements of tutors' work.

Results showed that PBL changes the culture of learning in many ways. It changes the relationship between learner and teacher, the collegial relations between teachers and it also has an impact at the organisational level. In the broadest sense, all the functions of an organisation have to be re-evaluated and re-organised according to the principles of problem-based pedagogy and learning. Curricular development becomes a collaborative process continuously evolving and integrating every single teacher in the process. Ideals and practices have to correspond with one another at the level of action. If these meanings at the meta and macro levels of an organisations are disregarded, PBL is easily misunderstood as a static construction of a doctrine rather than as a transforming educational strategy. From the teacher's perspective, PBL demands fundamental reflection on one's own values and work practices. Development as a PBL tutor is not only a matter of managing the techniques of facilitating learning or designing problems. The core of PBL goes deep into conceptions of knowledge and learning and seeing these as tools for comprehension.

The aim of problem-based pedagogy is not only to learn about the specialist knowledge, but also about the process: developing problem-solving skills, abilities to work and interact as a team member, being able to analyse and think critically. The development of these skills also formed the core of tutor's/teacher's learning at work. Change in the teachers' pedagogical knowledge involved gaining a new understanding of their role and its meaning in relation to students. When starting with PBL, some tutors identified themselves as "managers of learning" and their pedagogical attitude was based on a reproductive model of learning. They were afraid that if they had insufficient expertise they might even misguide students or lead them in a false direction. However, some tutors described themselves more as "facilitators of learning" even in the beginning.

According to the analysis of the data gathered in 2001, all the tutors defined themselves mainly as facilitators. Tutors also identified themselves as "enablers," or resources, or even as empowerers of learning. These descriptions indicated that their pedagogical attitude had changed over the years and revealed a more reflective pedagogical attitude. Tutors realised that in tutorials their expertise had new meaning. Different elements of being a facilitator and an expert, started to fit together more fluently. On the one hand, subject expertise solely does not make a tutor a good facilitator. On the other, a good facilitator also needs sufficient subject expertise. Interestingly, Schmidt and Moust (2000), ended up with similar conclusions in their large-scale quantitative studies regarding the meaning of tutors' content expertise.

Tutors managed to steer themselves from a culture of working alone to a culture of sharing responsibilities, genuine trust and co-operation. Changes brought about by PBL caused feelings of uncertainty for both teachers and students. The change and development demanded of the tutor has to be supported. Otherwise, there is a risk that both teachers and students will retain their former secure roles with the result that the so-called change is little more than "cosmetic". In such cases, tutorials will reveal the same norms as any other teacher-directed teaching situation, making it impossible for tutors to develop skills of activating and facilitating learning. Sometimes teachers can feel that co-operation, rather than enriching work, acts as an extra burden. However, research results showed that PBL encouraged and supported teachers both in collective cooperation and in personal professional development.

Negotiating interdiscursivity in a PBL tutorial site

The students' role as passive observers of a lecture is radically changed when they become active participants in collaborative PBL tutorial discussion. This was the starting point in Alanko-Turunen's (2005) published dissertation. The purpose was to describe and analyse a PBL tutorial discussion as an interdiscursive site for collaborative knowledge construction in the seventh and eight phases of the tutorial procedure within business and management education, and examined how the interdiscursivity was anchored in the notion of postmodernism. The seventh and eight phases of the tutorial discussion include the synthesis and the social validation of knowledge, and also an assessment of the learning process.

The case study was from Helia, the Helsinki Business Polytechnic. It concentrated on eight closing PBL tutorial discussions dealing with the theme "Identifying and Building Customer Relationships". The tutorials took place in autumn 2001, during the second semester of the International Business Programme and the analytic interdisciplinary approach was critical discourse analysis.

Several genres from the realms of education, personal life and business were reconstructed from the tutorials. The students also constructed three discourses of learning and knowledge in the tutorials, the most dominant being the discourse of the received knowing. There were also the discourse of diverse ways of knowing and being in PBL tutorials, and the discourse of emerging knowledge construction. Four discursive resources were identified as being drawn on by tutorial participants as they talked the basics of international marketing into being. Two were more dominant, the discourses of the sacred marketing code and the international marketing actor. Two were less dominant, the discourse of fragmented and globalised markets, and the discourse of performing in a company.

The genres and discourses of education seemed to be mixed with genres and discourses of business life. An order of discourse is not a closed, rigid system, but rather an open system which is put at risk by what takes place in actual interactions. By studying the construction processes taking place in the new PBL tutorial context, the study presented the multitude of discursive practices colonising the tutorial site. Previous studies have concentrated on particular roles and processes taking place in the tutorials. However, the main concern was to understand the tutorial as constantly negotiating its existence as a collaborative knowledge construction site, both as a PBL tutorial site and as a site for talking international marketing into being, while at the same time constituting and being constituted by institutional and structural practices. The tutorial discussion site is constantly under "construction". The dynamic accomplishment of a PBL tutorial required frequent interventions by the tutor, particularly during the early phase in which the PBL curriculum was being implemented.

EXAMPLE OF THE DEVELOPMENT PROJECTS OF PROBELL – SUPPORTING AND EMPOWERING PBL PRACTITIONERS

One example of the development projects and so far the largest, was Professional Development Diploma on Problem-based Learning (PBL- PD), designed for teachers in different fields of professional higher education in Finland. The sixty ECTS credited programme was run from 2002 to 2005. The twin aims of the programme were to provide continuous professional development in PBL for teachers in higher education and to put our theoretical and empirical research into practice (Poikela, E. and Poikela, S., 1997; Poikela, E. and Poikela, S., 2001). The idea for the programme grew when we secured EU funding for the development project for further training for teachers. We felt that it was not enough to write about PBL. It was important to use these ideas as a basis for planning and organising a long term pedagogical training. The students of PBL-PD (29 students enrolled on the programme) represent the

Finnish professional higher education in several different fields, e.g. health sciences, forestry, business, hospitality management and engineering.

PBL-PD studies focused on the understanding of PBL and its possibilities as a strategy for developing professional expertise and knowing. The aim was to increase and deepen the ability to act as a tutor and facilitator of learning and also to be able to transform the curriculum and evaluation practices according to the principles of PBL. One of the aims was also to increase both national and international collaboration and networking with PBL practitioners in different fields and levels of education. This proved to be very fruitful and positive and feedback was given about the challenges of being a learner in a group of people from different professional backgrounds. However, it was not always easy because established ways of doing and thinking were challenged in multiprofessional groups. This was because studies were organised according to the principles of PBL. Knowledge and knowing were processed, produced and shared at tutorial groups guided and facilitated by a professional tutor. It was felt very important to gain an experience as a learner in a tutorial group. It is an opportunity teachers do not get very often. All the modules included face-to-face tutorials, lectures or workshops and independent study supported by WebCT.

Feedback and assessment information was gathered from the participants. Our aim was also to analyse how students have developed their professional expertise as practitioners of PBL. The data consisted of a questionnaire with open questions (October 2003) and reflective group discussion (January 2005). Results show that the programme achieved its aim to support not only the individual empowerment of teachers but also the organisational development and also helped curriculum reforms. One tutor commented:

The way the modules have been done has supported my development as a tutor and as a whole the programme has strengthened my previous thinking and ...through that has helped me "to be strong" in my very heterorganic work community and in the curriculum work.

In the small group discussion participants reflected what the programme had meant to them. Interestingly, many felt that the initial teacher training (50 ECTS credits) they had studied before was like a starting kit to start teaching. However, it was not enough for lifetime professional development as a teacher. So, it was felt necessary to have support for professional development. Some of the participants thought that PBL-PD programme had gave them special "empowerment" in their work. These feelings are put in a nutshell in a comment: "A pedagogue has arisen in us".

Participants of PBL-PD carried out many kinds of development projects in their own organisations. These were reported on the form of project reports. Some examples of the projects are:

- Implementation of PBL in engineering education, PBL curriculum in Mechatronics, Lahti Polytechnic;
- Change Agents not Victims of Change - Preparing for Changing to PBLin forestry, Tampere Polytechnic;
- Developing a virtual study guide for the PBL programme in business, Pirkanmaa Polytechnic;
- What kind of assessment Problem-based Learning demands – case study of social care program, Kymenlaakso Polytechnic;
- Developing Assessment and Evaluation in Problem-based Curriculum - Experiences of Physiotherapy Education and Clinical Practice, Mikkeli Polytechnic;
- Continuous professional development of PBL tutors in physiotherapy, Pirkanmaa Polytechnic;

- Designing a new PBL curriculum in Business, Kemi-Tornio Polytechnic;
- Starting PBL in Nursing, Häme Polytechnic and Pirkanmaa Polytechnic;
- Exploring the possibilities of PBL in Fashion and Textile Design, University of Art and Design

Some of these projects are reported also in conferences nationally and internationally, especially in the conference *Problem-based Learning – Bridging Work and Education* in Lahti, Finland in June 2005. Abstracts, full papers and conference book are available www.lamk.fi/pblconference. PBL-PD also encouraged the participants to network in their own professional field. So, even though the programme is now finishing it seems that several networks will continue.

ProBell researchers have actively supported the development of the further training and consultation unit, Eduta Institute, Faculty of Education, University of Tampere. Most of the PBL training and consultation is coordinated through Eduta. ProBell researchers have been training and mentoring teachers all over Finland. For example, Turku Polytechnic asked for introductory PBL training for teachers in 2002. At the moment, ProBell researchers are still mentoring different study programmes which are beginning to apply PBL.

CONCLUSIONS AND LOOKING AHEAD

In this chapter, we have described the start of the research group ProBell and its activities. We call it a research group but feel that to research is not enough. We could not have been developing ourselves and the group without actively interacting with different fields of education and being involved in several training projects. Organising and participating in national and international meetings has been especially important for generating ideas.

PBL is no longer considered a radically new approach. The use of PBL has been expanded to curricular, pedagogical and organisational levels. PBL has been formally recognised and applied in Finland. Since PBL has in some sense “institutionalised” in recent years we face new challenges both in research and development work. One of these is developing quality assurance and evaluation systems at all levels compatible with the ideas of PBL. Quality assurance in higher education is a topical question around the world and has become a key driver of how things need to be seen to be done in higher education organisations. However, research on quality assurance in PBL is rare. Some of the important factors to look at in the future are:

- evaluation of PBL at organisational levels
- evaluator as a change agent in an action research approach
- developing a model for analysing the processes of evaluation
- building the links between PBL and learning at work

The links between PBL and learning at work are obvious and clear. Our further challenge is to develop a set of criteria for evaluating and assessing PBL applications in higher education and in the workplace. Having started ProBell in Finland we are now supporting the development of a national PBL network in Ireland.

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