Jouni Tuomi (ed.)

PBL EXPERIENCES AND RESEARCH IN NURSING EDUCATION

Problem-Based Learning Experiences and Research in Nursing Education

Jouni Tuomi (ed.)

Contents

Foreword

The publication you have in your hands concerns pedagogical developments at the Pirkanmaa University of Applied Sciences (PIRAMK). From the very beginning PIRAMK has adopted, as one of its principal methods, a critical and research-based approach to its work. This requires not only systematic evaluation but also development which is based on this evaluation. This publication is a realisation of that principal, in this case how to adapt problem-based learning and its evaluation to our nursing study programs.

The renewal of the curriculum and the development of problem-based learning methods have been key challenges for PIRAMK. These changes have required courage from both teachers and students, as well as a new kind of thinking and new ways of working. It has also meant hard work and commitment, flexibility and getting to know the subjects of those participating in the process. This deserves real gratitude. New working methods and approaches often involve uncertainty and doubt. Successful development work demands open observation, conceptualisation and a commitment to realising ideas. This systematic way of turning ideas into experiences and evaluating them from several points of view has, at its best, helped us to understand the effects of problem-based learning, as well as to appreciate the wholeness of the situation. Without systematic feedback it is only the opinions that are expressed the loudest that are given weight. Because the operation of higher education institutes should be based on examined knowledge, it is essential that new teaching methods are systematically evaluated.

This experiment began eight years ago, and the development of problem-based learning is still continuing in other study programs at PIRAMK. In 2000 the quality prize awarded by The Finnish Higher Education Council to the physiotherapy study programme encouraged the adoption of problem-based leaning across PIRAMK. It has been important that each study programme finds its own kind of problem-based learning application which produces positive learning outcomes and is in accord with the reality of the study environment. It is all about turning theory into practice.

A large amount of the work involved in the early stages of developing the nursing study programme has now been published. I hope this will encourage the reader to find new approaches for developing their own work.

Tampere 11. 1. 2010

Päivi Karttunen
Vice Principal

Jouni Tuomi

1. Introduction; Problem-Based Learning

All the chapters in this publication are abstracts of original articles. Only this introduction is the length of the original. However, a list of sources can be found at the end of each article.

Some researchers regard PBL (problem-based learning) as a global learning trend (Poikela E. 2002), while others (Savin-Baden & Major 2004) suggest that the growth of PBL is something akin to religious hysteria. Nevertheless, PBL has strong political support in health care studies. Among others, the World Health Organisation, the World Bank Group and the ENB (The English National Board for Nursing, Midwifery and Health Visiting) have begun to publicly support PBL-based training. In the 1990s, for example, the World Bank Group set as a condition for financing nursing training in developing countries, that the study programme had to be based on the PBL idea. (Wilkie 2000.) On the other hand, scientific evidence about the success of PBL in health care training is contradictory. In one meta-analysis (Dochy ym. 2003) PBL is regarded as a perfect solution, whereas two other studies (Colliver 2000, Newman 2005) indicate that PBL had failed to deliver the expected learning outcomes. In Moust et al's article (2005) a number of Maastricht professors express their disappointment regarding the results of the PBL programme in their own universities. According to Newman (2005), the studies agreed on only one point: that PBL is expensive to implement.

One study (Wilkie 2000) suggests that one reason for the positive aura enjoyed by PBL is the scientific journals. Firstly, a notable number of the PBL studies which have been published in these journals are qualitative studies based on small amounts of data and lasting only a short period of time. Secondly, in the reporting of qualitative studies there is a trend: successful results are more likely to be reported than those which were unsuccessful. This might create an illusion of mass support since ten studies reporting successful experiments are more significant than one describing a failure. This is one reason why critical PBL reports can be buried under a mountain of studies reporting the success of PBL. From the point of view of qualitative research the situation is paradoxical: quantity has become significant even in qualitative studies.

Implementations of PBL are varied and so too are the motives for adopting the approach (Robinson 1993; Kjellgren ym. 1993; Egidius 1996; Boud & Feletti 1997; Poikela S. 1998; Almtun 2000; Wilkie 2000; Price 2003). By simply multiplying Savin-Baden's (2000; 2003; Savin-Baden & Major 2004) cross-tabulation of PBL implementation one can roughly estimate that there are over a thousand varieties of PBL. These variations are so wide-ranging that it would be naïve to presume that one could offer a definition which would satisfy everybody. In Finnish academic circles even the translation creates passions.

Should it be 'ongelmaperustainen oppiminen' (problem-based learning) or 'ongelmalähtöinen oppiminen' (learning using a problem as a starting point) (Poikela S. 2003). Nobody dares to use Finnish term 'ongelmakeskeinen' (problem-centered) (Nikkarainen & Hoppu 1994) any longer in this context. Another question dividing opinions is what PBL learning actually is (Wilkie 2000; Poikela S ym. 2002; Price 2003). This is why it is particularly difficult to decide what kind of evaluation would be relevant in PBL-oriented training.

In this report, the concept of problem-based learning is described with the abbreviation PBL or in Finnish with abbreviation OPO (ongelmaperustainen oppiminen). The concept includes everything that is meant by the term PBL in both international and Finnish literature. The Finnish term OPO refers to the application of the PBL model created by Poikela and Nummenmaa (2002), Poikela S. (2003) & Poikela (2005). The nursing study programme as well as the study programme of emergency medical services at Pirkanmaa University of Applied Sciences (PIRAMK) was based on this application. Key goals were a movement to a curriculum that was entirely based on PBL, commitment to a constructive learning philosophy, the perception of the learning process as a scenario, and the adoption of the eight step scenario model with its weekly changing learning task. (See Chapters 2 and 18.)

The curriculum development process at the PIRAMK aimed, at least partly, to redesign the nursing programme in accordance with the method of problem-based learning being tried in the mid-1990s. During the initial stage the implementation was course-specific except in adult

education where PBL was carried out on a wider basis. In the autumn of 2002 a more comprehensive approach was adopted and PBL was used in the training of all new nursing students. By 2007 problem-based learning was the method of study for nearly 800 students and more than 50 teachers in the training programmes of nursing care and emergency care. It would be false to claim that the reform progressed painlessly among teaching staff or that students accepted new developments without voicing criticism and challenging teachers. At times, even the administration of the institute did not fully understand the extent to which the learning environment and learning challenges had changed.

During the same autumn that problem-based learning was being implemented at PIRAMK, a large-scale research project aimed at evaluating this reform was being initiated by the vice principal Päivi Karttunen. The objective of this project was to support and to develop a study program of nursing and emergency care based on problem-based learning. Wider objectives of the study concerned teachers' well-being at work and how this could be supported in times of major change. The project was divided into three branches of study: the first concentrated on the students; the second on the teachers; and the third focused on the philosophic and practical underpinnings of nursing and emergency care education based on PBL. This study branch merged partly with the second which concerned teachers.

The purpose of this report is to describe the PBL-based reforms of the training programme of nursing care and emergency care that took place at the PIRAMK. The aim is also to cover related

experiences such as reflections arising from this process and proposals for further development. This report cannot describe all the studies that were carried out under the auspices of the project since not all have been completed (as of spring 2008). As the studies proceeded, some changed in character while others settled on the margins of the original research topic, or even outside them. This report does not explicitly concentrate on observations which are related to the teachers' well-being at work although this material will be found implicitly if, for example, approaching Chapters 8–12 from the point of view of Karasek and Theorell's (1990) job demand-control model. This report differs from international PBL studies by offering a general emphasis in which the students' voice is no longer the loudest. In this report, the students' viewpoint receives less attention because of changes in emphasis in the component studies which were not originally intended.

The report has been divided into six parts. The first describes how PBL and problem-centered learning came to PIRAMK as well as the methodology chosen for its implementation. The second part concentrates on the developments that have taken place in the students and the changes in the way they are examined. In the third section the stars are the teachers and here their experiences are related. Representatives from working life and the students themselves provide the focus for the fourth section which looks at the learning of students and the grades they achieve. In the fifth part the emphasis is on the students' views and experiences. The final section offers a summary of the articles contained in this publication and looks at possible directions for educational

development at the PIRAMK from spring 2008 onwards. We also return to the original question of why the reform was started and what has been achieved by it.

Figure 1 (next page) summarises as a timeline the reforms that tookplace in the nurse training programme at PIRAMK. The segments which relate to the chapters in this publication have been indicated.

Based on the available information this report seems to represent the world's widest and most varied description of a PBL reform process carried out within one training programme. It also offers a lengthy follow-up which examines the effects of problem-based learning on both teachers and students. However, this triangulation study of problem-based learning has one major drawback: nobody calculated the real price of the reform or its cost-effectiveness. Even though the primary objective of the studies, reports and comments contained in this book is to support and to develop problem-based learning in the training programmes of nursing and emergency care in PIRAMK, I believe as an editor that the observations presented here also have a more general use in the development of PBL-based learning.

I would like to take this opportunity to thank our students, practice supervisors and colleagues for their participation in creating this book. Thanks are also due to the writers of the articles, especially those who have given up their own time to answer our inquiries and participate in our interviews. We are also grateful the management of PIRAMK for the support which has made it possible to do the research and complete this book.
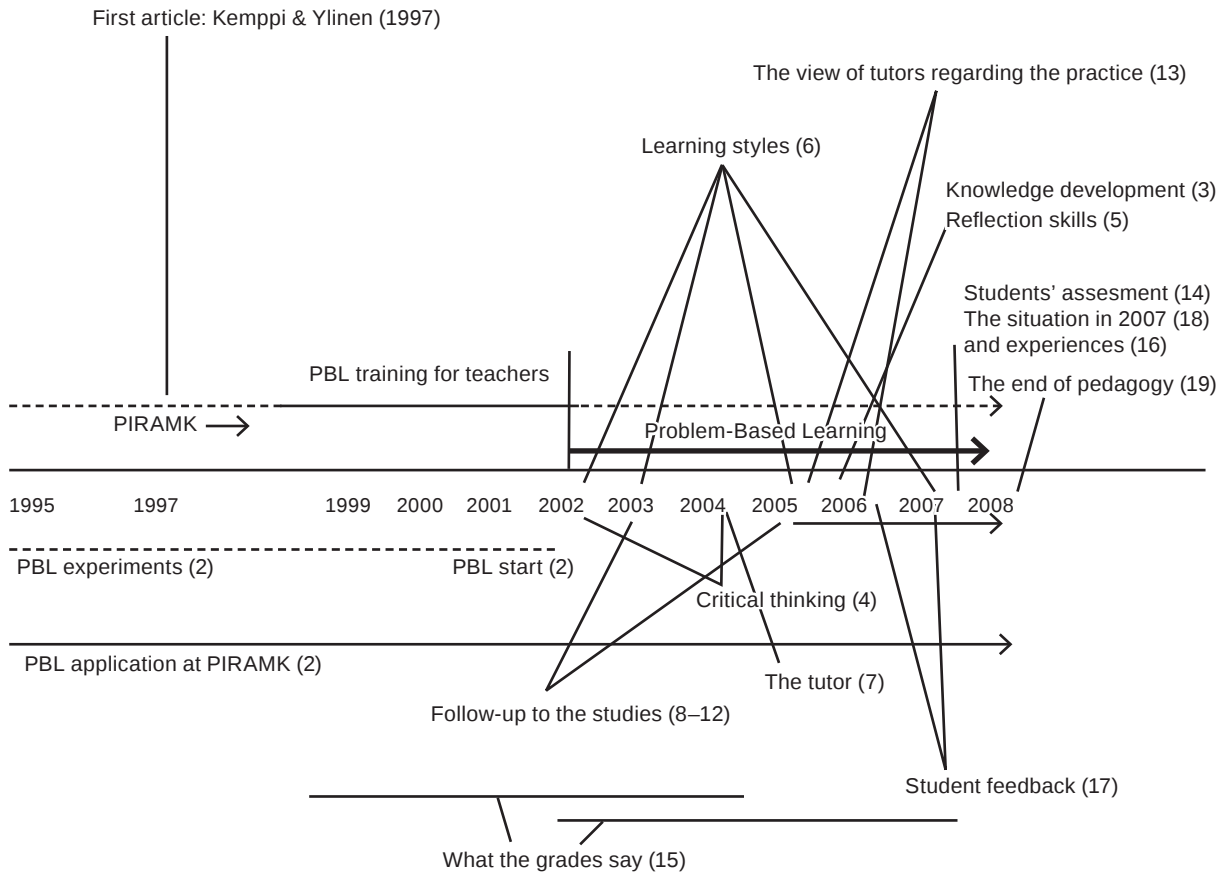
Figure 1. Timeline 1995–2008. The implementation of problem-based learning in the nursing studies programme of PIRAMK and the period described in the articles of this book.

Sources

Almtun B. 2000. Utveckling av basgrupparbete för studenter och handledare i kliniska studier. *Vård i Norden 20* (56) 50–54.

Boud D & Feletti GE (eds.) 1997. *The challenge of problem-based learning* (2nd ed). London; Kogan Page.

Colliver JA. 2000. Effectiveness of problem-based learning curricula: research and theory. *Academic Medicine 3* (75) 259–266.

Dochy F, Segers M, Van den Bossche P & Gijbels D. 2003. Effects of problem-based learning: a meta-analysis. *Learning and instruction 13*, 533–568.

Egidius H. 1996. *Problembaserad inlärning – en introduktion.* Lund; Studentlitteratur.

Karasek RA & Theorell T. 1990, *Healthy work; stress, productivity and the reconstruction of working life.* New York; Basic Books.

Kemppi A-M & Ylinen R. 1997. Tarvitaanko herätystä vai organisaation muutosta? Ongelmalähtöinen oppiminen – keino kehittää opettajuutta. Kirjassa A Tarkiainen & R Vuorinen (toim.) *Työyhteisö oppimassa – laadun arviointia projektityöskentelynä.* Jyväskylän ammatillisen opettajakorkeakoulun selvityksiä ja puheenvuoroja 10. Jyväskylä, 67–75.

Kjellgren K. Ahlner J, Dahlgren LO & Haglund L. 1993. *Problembaserad inlärning – erfarenheter från Hälsouniversitetet.* Lund; Studentlitteratur.

Newman M. 2005. *A pilot systematic review and meta-analysis on the effectiveness of problem-based learning.* The Campbell Collaboration Systematic Review Group. Middlesex University. www.ltsh-01.ac.uk/doors/pbl_report.pdf

Moust JHC, Berkel HJM & Schmidt HG. 2005. *Signs of erosion: Reflections on three decades of problem-based learning at Maastricht University.* Higher Education 50, 665–683.

Nikkarainen T. & Hoppu K. 1994. *Ongelmakeskeinen opetus, ongelmalähtöinen oppiminen ja aktivoivat opetusmenetelmät.* Duodecim 110, 1548–1555.

Poikela E. 2002. Johdanto. Kirjassa E. Poikela (toim.) *Ongelmaperustainen pedagogiikka – teoriaa ja käytäntöä.* Tampere; Tampere University Press, 7–19.

Poikela E & Nummenmaa A-R 2002.Ongelmaperustainen oppiminen tiedon ja osaamisen tuottamisen strategiana. Teoksessa E Poikela (toim.) *Ongelmaperustainen pedagogiikka, teoriaa ja käytäntöä.* Tampere; Tampereen yliopistopaino, 33–52.

Poikela E & Poikela S. 2005. Ongelmaperustainen opetussuunnitelma. Teoria, kehittäminen ja suunnittelu. Teoksessa E Poikela & S Poikela (toim.) *Ongelmista oppimisen iloa. Ongelmaperustaisen oppimisen pedagogiikan kokeiluja ja kehittämistä.* Tampere; Tampere University Press, 27–52.

Poikela S. 1998. *Ongelmaperustainen oppiminen. Uusi tapa oppia ja opettaa?* Hämeenlinna; Tampereen yliopiston opettajankoulutuslaitos.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen.* (Akateeminen väitöskirja) Tampere; Tampere University Press.

Poikela S, Lähteenmäki M-L, Poikela E. 2002. Mikä on ongelmaperusteista oppimista ja mikä ei? Kirjassa E. Poikela (toim.) *Ongelmaperustainen pedagogiikka – teoriaa ja käytäntöä.* Tampere; Tampere University Press, 23–32.

Price B. 2003. *Studying nursing using problem-based & enquiry-based learning.* New York; Palgrave.

Robinson V. 1993. *Problem-based methodology. Research for the improvement of practice.* Oxford; Pergamon Press.

Savin-Baden M. 2000. *Problem-based learning in higher education: untold stories.* London; SHRE and Open University Press.

Savin-Baden M. 2003. *Facilitating problem-based learning. Illuminating perspectives.* London: SHRE and Open University Press.

Savin-Baden M & Major CH. 2004. *Foundations of problem-based learning.* London; SHRE & Open University Press.

Wilkie K. 2000. *The nature of problem-based learning.* Teoksessa S. Glen & K Wilkie (eds) Problem-based learning in nursing. A new model for a new context? New York; Palgrave, 11–36.

Part I
Where It All Started

Leena Minkkinen and Anna-Mari Äimälä

2 Implementing Problem-Based Learning In Nursing Education At Piramk 2002–2006

Background: Experiments in the application of adult education in nursing

During the early 1990s students of adult education who were studying for a degree in nursing repeatedly complained that the teaching was fragmented, overlapping and failing to keep up to date with recent developments. In attempting to resolve these problems in the spring of 1995 it was felt that reforming the contents of the education alone would be an insufficient response. The PBL that was being implemented at the universities of Ärhus and Linköping (in Sweden) seemed to offer an alternative approach, and above all, new educational opportunities. Both the head of the nursing college and the principal of the adult education institute reacted positively to the proposal that PBL become a part of adult education. The planning process began in the autumn of 1995 with a small team of teachers.

In January 1996 a PBL education course worth two credits was arranged for all teachers of adult education and for any others interested in the subject. While some teachers were enthusiastic about the new approach, others expressed reservations. In the spring of 1996, while planning for the following academic year, it was decided that a PBL approach would be adopted for the new groups beginning in the autumn. Although putting together the plan was time-consuming, it seems unlikely that a new way of studying and teaching could have been initiated without considerable teacher input. The careful planning of the resources meant that all participants had a sense of security in a new and unfamiliar situation. Although the costs of implementing PBL were not examined, the precise nature of the planning meant that costs were kept under the control.

During the initial phase students were astonished by the approach and wondered whether it was some kind of game. After a few months a key objection surfaced: who could guarantee the validity of the information? There was a feeling that information was less trustworthy when it came from a student rather than an expert. Students expressed the worry that they were "teaching each other". These concerns were the subject of continuous group discussion, and while some students quickly adjusted to the new method of study, others needed more time.

In some cases the students' traditional style of working hampered the completion of the learning tasks, and in others students did not understand the significance of the learning task within the overall pattern of study. There was also a realisation that tutorial sessions which followed the same routine bored both teachers and students. Attempts were made to seek shared solutions to this problem but

it was difficult to do this without knowing what kinds of alternatives were available.

From the beginning, participating teachers worked in pairs as this allowed them to plan and discuss the project together. During the first year all teachers wrote a learning diary and every other week there was a teachers' PBL meeting in which issues that had arisen could be aired. The teachers were exercised by many of the same concerns as the students. For example, how could one be sure that something important did not remain untaught? In addition, the new role as tutor was unfamiliar to teachers who wondered when to intervene in discussions or whether they were intervening in an appropriate way. There was uncertainty about what a good tutor was and worries that there were too few resources available for the planning.

A small proportion of the teachers did not want to participate in the PBL teaching at all. On the other hand, the teachers who were interested in creating something new were fully committed to developing PBL teaching and working hours were not counted. Another challenge was preparing new or temporary teachers for PBL teaching. This was mostly accomplished through the use of teacher pairs.

The starting point for the development process

As the turn of the millennium approached, it became apparent in discussions among the nursing teachers that a number of changes were needed also in the nursing education. Several challenges had to be addressed. Now the recession was over, many students were persuaded to take short-term jobs both in and outside nursing. With the amount of contact teaching reduced to less than half of the credit (18 hours of lectures / 20 hours of independent tasks and an exam), students were using the increased "leisure-time", as they saw it, to work. Eventually they no longer had the time even to attend the lectures. The number of absences was giving cause for alarm and gaps in student learning were becoming apparent in more and more students.

Another challenge was the phenomenon of constant social change and forecasts about the know-how demands of the future which had created new objectives for the education. Traditional transfer of knowledge to students and the need to learn information by heart were regarded as inadequate and outmoded. Future nurses would have to learn new skills even during their training period. As a result "learning to learn" would be especially important, and students would have to adopt the attitude and skills of lifelong learning from the very beginning of their studies.

Inspired by positive experiences of problem-based learning, a comprehensive development of teaching in accordance with this approach to learning was already underway. In nursing education PBL had been implemented in various forms since 1995 (Kemppi & Ylinen 1997) both in adult education and in the nursing degree programme. By 1997 the teaching of nursing ethics at the polytechnic had been employing PBL principles with a reasonable level of success. On the whole PBL seemed to offer a modern solution to the challenges faced by nursing teachers.

However, when it was agreed in 2000 to implement PBL on a large scale across the nursing studies programme, the development of the model did not

follow the pattern of the earlier implementations. Instead, a PBL method which had been in use already for several years in the physiotherapy department was copied with a fair degree of success. One could say that the physiotherapy department, which had adopted PBL in 1995 (Poikela & Lähteenmäki 2003), had a key mentoring role in the development of nursing education. The choice of method could be characterised more as an optimistic expectation rather than a critical result of analysis.

The transition to problem-based learning

The transitional phase was preceded by a two-year curriculum planning process and a training period in which teachers educated themselves to become tutors (2000–2002). The teachers of the first year were trained first, while the rest moved to PBL when it was required by their teaching. The teacher's role moved from that of a lecturer and a disseminator of information to that of a tutor responsible for making the learning process possible. The most important new skill to learn was to be quiet and to follow and direct the learning of the group.

During the transitional stage (2002–2005) teachers taught according to both the new and the old method. This familiarised them with PBL, but also made them nervous of the time when all teaching would be implemented according to PBL. A special worry was how the tutoring of all the small groups and the required space would be arranged.

The beginning of problem-based learning

The implementation of PBL began in the autumn of 2002 in the teaching of new nursing students and this was continued throughout their education (3½–4–4½ years depending on the degree). During these years the majority of teachers were trained as tutors and learned to work according to PBL. With growing experience, the advantages and challenges of PBL became more apparent (Tuomi & Äimälä 2008a; 2008B).

To structure the learning process Poikela's (1998) so-called scenario cycle model (see Figure 1; next page) was adopted. The cycle and continuity of the learning are emphasised as a starting point. At its core is the directing and evaluation of both the learning and the process. In this model the problem, in other words the starting point, takes the form of a scenario which initiates the problem-solving or learning process. In turn, the evaluation promotes and supports the learning process. In this model the constant nature of the evaluation is emphasised and the importance of the tutoring is in carrying out these two basic tasks.

PBL was carried out in accordance with this clear structure so that a tutor group was introduced to a new theme using starting points designed by different teachers. This small group of students decided (Figure 1. Stages 1–5 of the cycle) what they needed to know about the subject, what they already knew and agreed on the learning task (tutor group meeting, tutorial I) together. This was followed by independent work lasting about a week (Figure 1. Stage 6 of the cycle) after which the students reconvened to present what they had learned in the same small group (Figure 1. Stages 7 and 8 of the cycle: tutor group meeting, tutorial II). Participation in the tutorials was compulsory and absentees had to perform extra tasks. Inde-

pendent working was supported by expert lectures, lessons in the practice classes as well as by working life contacts.

At the end of the study unit separate tutor groups (e.g. 4–6 groups) assembled for a seminar which pieced the learning together. Although the forms of these seminars varied, the students were always responsible for the contents. Attendance was obligatory.

The model for the PBL cycle (Figure 1) was implemented with very few variations. Initially the students were given two starting points per week but this was soon cut down to one because the days were full of lectures and practical lessons and there was not enough time to prepare tutorial tasks. A new starting point was begun every week and the students were encouraged to work in study circles between the tutorials (Figure 1; Stage 6 of the cycle).

Roles within the tutor group were assigned at the beginning of each cycle and these continued for two sessions: a chairperson, a secretary and an observer. The chairperson's task was to direct the work, while the secretary recorded the results

A NEW TASK

1. STARTING POINT

2. BRAINSTORMING
(free association)

3. MAKING THE RESULTS
OF BRAINSTORMING
SYSTEMATIC

8. COMPARING THE
LEARNING RESULTS TO
THE STARTING POINT

EVALUATION
–learning
process

(evaluation of the learning results)

4. CHOOSING AN IMPORTANT
AREA/AREAS FROM THE POINT
OF VIEW OF LEARNING

7. ANALYSIS OF LEARNING
IN RELATION TO EARLIER
LEARNING TASKS AND
KNOWLEDGE

5. MODIFYING THE LEARNING TASK/TASKS

(deepening the knowledge, reflecting) (defining the needs of learning)

6. INDEPENDENT STUDYING

(acquiring knowledge and learning)

Figure 1. The eight stages of the PBL cycle

in the group folder. The observer's role was to offer feedback on the way the group worked. The teacher also provided feedback when the tutorial ended. The work of the tutor group could influence the students' final grades.

The students' orientation into the new approach began when they received the PBL guides in the post together with the letter of acceptance to the programme. This was followed by a two-hour PBL orientation session during the first days. During the tutorials the method of study followed the "learning by doing" approach which students were quick to adopt.

Sources

Kemppi A-M & Ylinen R. 1997. Tarvitaanko herätystä vai organisaation muutosta? Ongelmalähtöinen oppiminen – keino kehittää opettajuutta. Kirjassa A Tarkiainen & R Vuorinen (toim.) *Työyhteisö oppimassa – laadunarviointia projektityöskentelynä.* Jyväskylän ammatillisen opettajakorkeakoulun Selvityksiä ja puheenvuoroja 10. Jyväskylä 1997, 67–75.

Poikela S & Lähteenmäki M-L. 2003. *Ongelmaperustainen oppiminen (PBL) ja tutorina kehittyminen.* Kever 4/2003. www.tokem.fi/kever/kever.nsf/ (16.12. 2003)

Tuomi J. & Äimälä A-M. 2008a. *Vuoden kokemuksella sanoisin...* (Tässä kirjassa)
Abstract in English: *After one year's experience I would say…* (See Contents)

Tuomi J. & Äimälä A-M. 2008b. *Paluuta entiseen ei ole* (Tässä kirjassa)
Abstract in English: *There is no returning to the past, but…* (See Contents)

Part II
Researching The Change

Päivi Karttunen

3 The Development Of Knowledge And Knowing In Nursing Students During Problem-Based Learning

The aim of the study and the research problems

During their education nursing students encounter a wealth of information concerning the world of nursing. In the course of their training theoretical examination of issues is undertaken with the help of knowledge produced from a variety of sciences in a conceptual or written form. To the students, practical experiences and experiential knowledge form an important starting point which cannot be replaced by theoretical teaching (see Knight, Moule & Desbottes 2000). The student's own developing knowledge construction which can also be defined as personal knowledge consists of these different sources and it is created through the processing of information. (Karttunen 1999.) It has been assumed that problem-based learning will support this process because the student's own knowledge construction is subject to constant examination (Bechtel, Davidhizar & Bradshaw 1999; Dolmans et al. 2001.)

The aim of this study was to shed light on the factors that relate to the handling and the use of knowledge by nursing students.

Research problems

1. What methods do students have for acquiring knowledge about nursing during their training and what changes have taken place in these?
2. What is the significance of the theoretical knowledge and has this changed during the training period?
3. What is the significance of the experiential knowledge and has this changed during the training period?
4. What is the significance of the ethical knowledge and has this changed during the training period?
5. How do students evaluate their own skills and has this changed during their training period?
6. To what extent have the factors relating to the acquisition of knowledge changed during the training period?

Research data and methods

A structured questionnaire was compiled for the purpose of data collection and it was issued to students during their first and the fourth years in the nurse training programme. In 2002 sixty-nine students from the training programme responded to the questionnaire and in 2005 sixty-six students from the same cohort graduated from their studies.

The Tixel-programme was used in the analysis of the data. In 2003 and 2005 the averages and

dispersions were calculated variable-specifically from the collected data. When comparing changes which took place over the two years with the Tixel-programme, the results were tested to determine whether the variables were statistically significant.

Results

The students' methods of forming ideas about nursing were assessed using 11 different items. A statistically significant change took place only in discussions with teachers which were regarded as considerably more important (p = 0.04539*). The significance of the theoretical knowledge was measured using five different items; however, here, no statistically significant changes were evident. The importance of experiential knowledge was estimated using six different items. Once again, no statistically significant changes took place during the course of the students' education. Ethical knowledge relating to the care of patients was examined through four different items and here a change was evident. Thinking about solutions that were related to the patient's care from the point of view of the values and principles of nursing (p = 0.04494*) was statistically symptomatic. (p = 0.05744).

The factors related to students' self-evaluation were examined from five different perspectives. Statistically significant changes took place in two particular areas over the course of students' education: "I need feedback from the nursing workers" (p = 0.0249*) and "I am able to identify changes which take place in my nursing skills" (p = 0.00048***). The acquisition of knowledge

and the revising of knowledge (9 points of view) had been divided into three separate dimensions so that the process by which a student formed their ideas about nursing (3 points of view) could be gauged. Statistical changes took place with regard to the following items: "the idea of nursing can be actively revised by the student" (p= 0.03633*) and "students create their own way of acting based on their own knowledge construction and experiences" (p = 0.00683**). When it came to sources of information (3 points of view) the change took place regarding the item "uses many sources of information when making decisions" (p = 0.06084). It was possible to perceive changes for items which describe the formation of new knowledge (3 points of view), and the change (p = 0.02147*) which took place in testing knowledge that had been acquired earlier (p = 0.07195).

According to the students, there was very little knowledge in the education process that they could not use in practice (M = 2.59)

Examination of the results

It has been observed that experiential knowledge plays a key part in nursing (Berragan 1998; Paukkunen 2003), a notion that the students in this study also appreciated. The students in Carey & Whittaker's (2002) study emphasise that one important advantage of problem-based learning is the fact that handling other students' experiences and difficult situations in tutor groups had been important from the point of view of the learning and that these experiences were valuable in later

actions. According to the study results, ethical knowledge was also highly valued. The teaching method used has had an effect on ethical problem-solving (Numminen & Leino-Kilpi 2007).

On the basis of these results one can observe that during the education process students' certainty regarding their own knowledge formation increases. The statistical changes that occur in connection with creating an individual idea of nursing and knowledge construction support this view, a finding reflected in earlier research results which have surveyed problem-based learning. (Heliker 1994; Williams 2004.) This is also supported by the fact that earlier learned knowledge is adapted more than before and that experiential knowledge is widely utilised. One advantage of problem-based learning is that it develops the skill of revising knowledge construction (Hmelo Silver 2004). On the other hand, when the ideas of the PIRAMK students were studied, it appeared that the students experienced a degree of uncertainty about their own knowledge (Karttunen 2008).

Sources

Baxter P & Rideout E. 2006. *Second-year baccalaureate nursing students´ decision making in the clinical setting.* Journal of Nursing Education 45 (4), 121–127.

Bechtel G, Davidhizar R & Bradshaw M. 1999. Problem-based learning in a competency-based world. *Nurse Education Today 19,* 182–187.

Berragan L. 1998. Nursing practice draws upon several different ways of knowing. *Journal of Clinical Nursing 7* (3), 209–217.

Biley F & Smith K. 1999. Making sense of problem-based learning: the perceptions and experiences of undergraduate nursing students. *Journal of Advanced Nursing 30* (5), 1205–1212.

Biley, F & Smith, K. 1998. 'The buck stops here': accepting responsibility for learning and actions after graduation from a problem-based learning nursing education curriculum. *The Journal of Advanced Nursing 27* (5), 1021–1029.

Burnard P. 1987. Towards an epistemological basis for experiential learning in nurse education. *Journal of Advanced Nursing 21*, 314–193.

Brown B, O´Mara L, Hunsberger M, Love B, Black B, Carpio B, Crooks D & Noesgaard C. 2003. Professional confidence in baccalaureate nursing students. *Nurse Education in Practice 3*, 163–170.

Carey L & Whittaker K. 2002. Experiences of problem-base learning: issues for community specialist practitioner students. *Nurse Education Today 22*, 661–668.

Carper B. 1978. Fundamental patterns of knowing in nursing. *Advances in Nursing Science 1* (1), 13–23.

Chan A. 2002. A lived experience of dualism between the natural and human science paradigms in nursing. *Journal of Advanced Nursing 40* (6), 739–746.

Corlett J, Palfreyman J, Staines H & Marr H. 2003. Factors influencing theoretical knowledge and practical skill acquisition in student nurses: an empirical experiment. *Nurse Education Today 23*, 183–190.

Creedy D, Horsfall J & Hand B. 1992. Problem-based learning in nurse education: an Australian view. *Journal of Advanced Nursing 17*, 272–733.

Dale A. 1994. The theory – theory gap: the challenge for nurse teachers. *Journal of Advanced Nursing 20*, 521–524.

Dolmans D, Wolfhagen I, van der Vleuten & Wijnen W. 2001. Solving problems with group work in problem-based learning: hold on to the philosophy. *Medical Education 35*, 884–889.

Elomaa L. 2003. *Research Evidence Implementation and its Requirements in Nursing Education.* Turku Turun yliopiston julkaisuja D 532. Akateeminen väitöskirja.

Ferrari E. 2006. Academic education´s contribution to the nurse-patient relationship. *Nursing Standard 21* (10).

Ferguson L & Day R. 2005. Evidence-Based Nursing Education: Myth or Reality. *Journal of Nursing Education 44* (3), 107–115.

Frost M. 1996. An analysis of the scope and value of problem-base learning in the education of health care professionals. *Journal of Advanced Nursing 24* (5), 1047–1053.

Getliffe K A. 1996. An examination of the use of reflection in the assessment of practice for undergraduate nursing students. *Internation Journal of Nursing Studies 33* (4), 361–374.

Heikkilä A. 2005. *Ammattikorkeakoulusta valmistuneiden hoitotyön opiskelijoiden tutkitun tiedon käyttö.* Turun yliopisto. Väitöskirja.

Hmelo-Silver 2004. Problem-Based Learning: What and how do students learn. *Educational Psychology Review 16* (3), 235–236

Janhonen S. 1992. Miten sairaanhoitajakoulutusta kehitetään? Hoitotiede 4(5), 216–219.

Jaroma A. 2000. *Koulutus ja tuleva toiminta hoitotyössä: kysely kätilö, sairaanhoitaja- ja terveydenhoitajaopiskelijoille.* Kuopion: Kuopion yliopiston julkaisuja 83.

Järvinen A, Koivisto T & Poikela E. 2000. *Oppiminen työssä ja työyhteisössä.* WSOY. Helsinki

Karttunen P. 1999. *Tietoa hoitotyön toimintaan: sairaanhoidon opiskelijoiden käsityksiä tiedosta ja tiedon suhteista toimintaan.* Acta Universitatis Tamperensis 651. Akateeminen väitöskirja. Tampereen yliopisto. Tampere

Karttunen P. 2008. *Opiskelijoiden kokemuksia ongelmaperustaisen oppimisen eduista ja haitoista.* (Tässä kirjassa, luku 17)

Kennedy C. 2004. A Typology of knowledge for district nursing assessment practice. *Journal of Advanced Practice 45* (4), 401–409.

Knight C, Moule P & Desbottes Z. 2000. The grid that bridges the gap. *Nurse Education Today 20*, 116–122.

Kuiper R & Pesut D. 2004. Promoting cognitive and metakognitive reflective reasoning skills in nursing practice:self-regulated learning theory. *Journal of Advanced Nursing 45* (4), 381–391.

Manninen E. 1999. Longitudinal study of Finnish nursing students' preferences for knowledge in nursing practice. *Scandinavian Journal of Nursing Science 13*, 83–90.

Nelms T & Lane E. 1999. Women´s way of knowing in nursing and critical thinking. *Journal of Professional Nursing 15* (3), 179–186.

Numminen O & Leino-Kilpi H. 2007. Nursing students´ethical decision-making: A review of the litterature. *Nurse Education Today 27*, 796–807.

Nousiainen I. 1998. *Osastonhoitajien ja ylihoitajien käsityksiä sairaanhoitajan työn osaamisalueista.* Jyväskylä: Jyväskylän ammattikorkeakoulu.

Nurmela T. 2002. *Ajattelun taito ja lupa ilmaista.* Acta Universtitatis Tamperensis 860. Tampere. Akateeminen väitöskirja.

Paukkunen, 2003. *Sosiaali- ja terveysalan yhteistyöosaamisen kehittäminen. Koulutuskokeilun arviointitutkimus.* Kuopio: Kuopion yliopisto. Akateeminen väitöskirja.

Rowan C J, McCourt C & Beake, S. 2007. *Problem based learning in midwifery – the teachers perspective.* Nurse Education Today 27, 131–138

Sarvimäki A. 1988. Nursing care as a moral, practical. Communicative and creative activity. *Journal of Advanced nursing 13*, 426–467.

Stenfors, P. 1999. *Tieteellisen ja kriittisen ajattelun kehitys hoitotyön koulutuksessa.* Acta Universitatis Tamperensis 657. Akateeminen väitöskirja. Tampere. Tampereen yliopisto.

Williams A. 2001. An Antipodean evaluation of problem-based learning by clinical educators. *Nurse Education Today 19*, 659–667

Vinson J. 2000. Nursing´s epistemology revisited in relation to professional education competencies. *Journal of Professional Nursing 16* (1), 39–46.

Paula Stenfors

4 The Developement Of Critical Thinking In Nurse Training Programmes Which Use Problem-Based Learning

Introduction

One way of assessing the success or possible weaknesses of problem-based learning is to look at the development of students' critical thinking during the training. Many studies of nurse training both in Finland and abroad have repeatedly shown that the student's ability to think, especially critically, develops very little, if at all, during the process of study (Säämänen 1995; Tanner 1997; Stenfors 1999; Sarajärvi 2002; Poikela & Poikela 2005). In this part of the study the researchers focused on how the critical thinking of students developed during their studies and whether problem-based learning improved this skill.

Research materials and methods

The data was collected from the 171 students who began their studies in the nurse training programme at PIRAMK in 2002. The syllabus was based on the problem-based learning method and the first measurements were made during the spring term of 2003 while the students were still in their first academic year. At that time 109 voluntary students from the nursing programme took part to the study (64 %), of which 84 were nursing students and the remainder were midwifery and public health nursing students. Later measurements were made between December 2005 and February 2006 (n=52). The Watson-Glaser Critical Thinking Appraisal (WGCTA), which seeks to measure critical thinking, was used as a research tool. This had been translated into Finnish in 1999 for a dissertation and the results were analyzed statistically with the help of the Tixel-statistics programme. The observation matrix which is connected to the test meant that the points for each respondent were easy to count. The difference between the starting measurement and final measurement was observed using a t-test to compare the means.

Results

In the first test the average for the critical thinking ability of the nursing students was 56.06 and in the second it was 57.04. The result is very similar to those achieved in USA nursing programmes. The difference between the first and final measurement was not statistically significant and quite typical when the development of critical thinking is followed for two or three years. Some small developments can be noticed in this study. The amount of test points increased by less than one

point while the standard deviation remained very similar. (Watson & Glaser 1991) Generally, the result is very much like the outcome of a 1995 study monitoring nursing students' critical thinking. However, in this study the average difference between the starting and final measurements was statistically significant. Then the average of the nursing student's starting measurement was 55.3 and final measurement was 58.3. The standard deviation varied from 6 to 4 (Stenfors 1999).

Conclusions

Permission for the study was sought from the management of PIRAMK. Once permission had been granted the students were asked to participate in the critical thinking test on a voluntary basis.

In this study the results for the Finnish nursing students are good by international standards. Also the results reflect other studies in that general critical thinking ability does not develop over a period of a few years. It is obvious that such a short follow-up time is insufficient to reveal profound cognitive development and maturing. Also, taking the final measurements at the last stage of studies when students are likely to be most tired may have affected the results.

The development of problem-based learning still requires a great deal of work. Furthermore, careful consideration must be given to how much students should have teacher-centered lectures and in which subjects. Students' thinking skills and ability to structure knowledge are not developed in a vacuum. The most challenging aspect of teaching is to foster the thinking skills of the student. It is also the case that students' self-directing skills have often been overestimated. However, a nurse of the future must be able to quickly synthesize new information and think critically. The critical thinking ability of nursing students has already been the subject of much research, but in Maynard's (1996) study the graduated nurses who had been in working life for a few years, achieved higher points than the students who were completing their studies. It would indeed be useful to study how critical thinking develops during working life itself.

WGCTA	n	M	SD	t	p
spring 2003	109	56.06	6.36	0.84	0.40
autumn 2005	52	57.04	7.02		

Figure 1. The critical thinking ability of the nursing students at PIRAMK

Sources

Armstrong E. 2000. Ongelmalähtöisen oppimisen hybridymalli. Teoksessa D Boud & G Feletti (eds) *Ongelmalähtöinen oppiminen uusi tapa oppia.* (Suom. Birktedt, J., Hellgren, E., Hintsanen, A., Ingalsuo, T., Saarinen, V., Suominen, M., Toivanen, M.& Viitanen S.) Helsinki; Hakapaino, 161–175.

Beers G & Rowden S. 2005. The effect of teaching method on long-term knowledge retention. *Journal of Nursing Education.* 44, 511–514.

Bell M, Heye M, Campion L, Hendricks P, Owens B & Schoonover J. 2002. Evaluation of process-focused learning strategy to promote critical thinking. *Journal of Nursing Education.* 41, 175–177.

Brunt B. 2005. Models, measurement, and strategies in developing critical-thinking Skills. *Journal of Continuing Education in Nursing 36* (6) 255–262.

Dochy F, Segers M, Bossche P & Gijbel, D. 2003. *Effects of problem-based learning: a meta-analysis. Learning and Instruction XX, Mode 1.* Pergamon. www.elsevier.com./locate/learninstruc/ (24.3.2003).

Eriksson E, Virtanen-Vaaramaa H, Björkroth R, Laitinen R, Mattila L-R, Rekola L, Ruotsalainen T & Sarajärvi A. 2005. *Hoitotyön koulutuksen kehittämishaas-teet - hoitotyön johtajien, opettajien ja hoitotyöntekijöiden näkemykset.* Turun yliopisto, hoitotieteen laitoksen julkaisuja, Tutkimuksia ja raportteja, Sarja A47.

Ferguson L & Day R. 2005. Evidence-based nursing education: myth or reality? *Nurse Educator 44*, 107–115.

Fontayn M., 2005. The interrerationships among thinking skills, research, knowledge and evidence-based practice. *Journal of Nursing Education 44*, 439.

Higuchi K & Donald J. 2002. Thinking processes used by nurses in clinical decision making. *Journal of Nursing Education 41*, 145–152.

Koivunen E, Knakkunen P & Suominen T. 2007. Hoitohenkilöstön käsityksiä hoitovirheiden syistä ja niiden ilmoittamisesta. *Tutkiva Hoitotyö 5* (3) 10–15.

Kvist T. & Vehviläinen-Julkunen K. 2007. Vastavalmistuneiden sairaanhoitajien osaaminen erikoissai-raanhoidossa hoitotyön johtajien arvioimana. *Tutkiva Hoitotyö 5* (3) 4–9.

Margetson D. 2000. Miksi ongelmalähtöinen oppiminen on haaste? Kirjassa D Boud & G Feletti (eds) *Ongelmalähtöinen oppiminen uusi tapa oppia* (Suom. Birktedt, J., Hellgren, E., Hintsanen, A., Ingal-suo, T., Saarinen, V., Suominen, M., Toivanen, M.& Viitanen S.) Helsinki; Hakapaino, 53–62.

Maynard C. 1996. Relationship of critical thinking ability to professional nursing competence. *Journal of Nursing Education 35* (1) 12–18.

Meyer T. 2005. Academic and clinical dissonance in nursing education: are we guilty of future to rescue? *Nurse Educator 30*, 76–79.

Myrick, F. 2002. Preceptorship and critical thinking in nursing education. *Journal of Nursing Education 41*, 154–162.

Nurmela T. 2002. *Ajattelun taito ja lupa ilmaista.* (Akateeminen väitöskirja) Acta Universitatis Tamperensis 860, Tampereen yliopisto, Hoitotieteen laitos.

Pithers R & Soden R. 2000. Critical thinking in education : a review. *Education Research 42*, 237–249.

Poikela E & Poikela S. (Toim.) 2005. *Ongelmista oppimisen iloa – ongelma-perustaisen pedagogiikan kokeiluja ja kehittämistä.* Tampere; University Press.

Puolimatka T. 1995. *Kasvatus ja filosofia.* Helsinki; Kirjayhtymä.

Sarajärvi A. 2002. *Sairaanhoidon opiskelijoiden hoitotyön näkemyksen muotoutuminen sairaanhoitajakoulutuksen aikana.* (Akateeminen väitökirja) Acta Universitatis Ouluensis D Medica 647. Oulun yliopisto.

Siu H, Laschinger H, Spence K & Vingilis E. 2005. The effect of problem-based learning on nursing studests' perceptions of empowerment. *Journal of Nursing Education 44*, 459–469.

Staib S. 2003. Teaching and measuring critical thinking. *Journal of Nursing Education 42*, 498–508.

Stenfors P.1999. *Tieteellisen ja kriittisen ajattelun kehitys hoitotyön koulutuksessa.* (Akateeminen väitöskirja) Acta Universitatis Tamperensis 657, Tampe-reen yliopisto, Hoitotieteen laitos.

Stewart S & Dempsey L. 2005. A longitudinal study of baccalaureate nursing students' critical thinking dispositions. *Journal of Nursing Education 44*, 81–84.

Säämänen J & Leino-Kilpi H. 1992. *Ammatillisen peruskoulutuksesta valmistuvien hoitajien valmiudet tutkimuksen käytön edellyttämään kriittiseen ja tieteelliseen ajatteluun.* Opetushallitus julkaisuja. Helsinki: Valtion painatuskeskus.

Tanner C. 1997. Spoc would have been a terrible nurse (and other issues reated to critical thinking in nursing). *Journal of Nursing Education 36* (1), 3–4.

Walthew P. 2004. Conceptios of critical thinking held by nurse educators. *Journal of Nursing Education 43*, 408–411.

Watson G & Claser E. 1991. *Watson-Glaser critical thinking appraisal, British manual, Form A,B and C. The Psychological Corporation Sidcup*. Kent; Harcourt Brace Jovanovich Publ.

Päivi Karttunen

5 The Development Of Reflective Skills In Nursing Students During Their Education

**The background and the
purpose of the study**

Reflective skills are seen as an essential part of nursing education and student know-how and problem-based learning is regarded as one means of promoting these skills (Williams 2001). The purpose of this study was to examine within the nurse training programme how much the students are able to identify their own reflective skills and to what extent these skills are developed during the training period.

The implementation of the study

To examine reflective skills a questionnaire was drawn up in which students were asked to estimate their own reflective ability with the help of 20 questions. In 2002 one hundred and twenty nursing students filled in the questionnaire and in 2005 sixty-seven students from the same cohort completed it a second time just before their graduation.

Average variables were formed from the questions on the questionnaire which covered each part of the reflective skill. These were then tested using the SPSS programme by counting the alpha values of Cronbach for each variable. Utilising the Tixel programme the students' test results from the years 2003 and 2005 were analysed and any changes that had taken place.

Results

According to the results, self-awareness was expressed by how often students return to situations they have experienced and to the feelings which are related to these situations. This was clarified with two average variables which described the return to earlier situations and activities. During the training period no statistically significant change occurred with these average variables.

The realisation of what has been learned formed the third dimension describing reflective skills. Here a statistical, symptomatic change (p=0.05039) took place as the nursing education progressed. The ability to describe the situation was measured with two average variables: the skill of perceiving the situation (p= 0.00245**) and the skill of describing the situation (a change that was not statistically significant). The latter skill was clearly the strongest skill during the education assessed by the students.

The three following average variables represented the students' ability to analyse situations: the ability to analyse one's own knowledge (a non-statistically significant change), the ability to analyse a situation and factors which are re-

lated to it (p=0.01765*) and the ability to imagine different alternatives (a symptomatic change, p= 0.05683). The average variable which measures the reflective skill described the ability to create a synthesis and form new information (a symptomatic change, p=0.08213).

The study also clarified which methods, other than the student's own thinking, are used in situations which emerge during the training. Discussion with the teacher increased a little (0.08 units). Furthermore, in 2005 the extent to which students think about and reflect on situations together with the staff of clinical practice places yielded an average figure of 3.05 while the dispersion was 0.54. At the final stage of the training period the analysis of situations with the staff seemed to become nearly as important as the examination of situations with the other students.

Examination of the results

Usually the students identified the most common action as describing their own experiences as well as returning to their actions. Contrary to Duke & Appleton's (2000) study, there was no change in the ability to describe the situation, this aptitude was already present at the beginning of the studies and was the PIRAMK students' best skill.

One area that receives little attention is the extent to which students are aware of their own learning and its depth even though this learning and know-how is under constant examination during the training period. This area of know-how can be connected to the self-awareness of the student and to their level of self-knowledge which is

not necessarily regarded as an easy skill in other fields of study (Getliffe 1996; Glaze 2002)

According to the analysis of the polytechnic students, a change took place regarding skills they saw as difficult such as finding new solutions and new information (see Duke & Appleton 2000). One can suppose that the improvement in these skills is partly due to problem-based learning where the synthesis of information as an essential part of the process.

It is commonly supposed that it also possible to transmit so-called experts' tacit knowledge through stories which reflect on experiences. The areas of self-analysis and personal know-how are two aspects of development which it is important to support. These skills can be developed by consciously directing attention to the reflection process and ensuring that students receive varied feedback on their know-how (see Claze 2002).

Sources

Atkins S & Murphy K. 1993. Reflection: a review of the literature. *Journal of Advanced Nursing 18*, 1188–1192.

Brown B, Matthew-Maich N & Royle J. 2001. Fostering reflection and reflective practice. Teoksessa E Rideout (ed.) *Transforming Nursing Education Through Problem-Based Learning*, 119–164.

Clarke B, James C & Kelly J. 1996 Reflective practice: reviewing the issues and refocusing the debate. *International Journal of Nursing Studies 33* (2), 171–180.

Craft M. 2005. Reflective writing and nursing education. *Journal of Nursing Education 44*, (2), 53–57.

Glaze J. 2001. Reflection as a transforming process: student advanced nurse practitioners' experiences of developing reflective skills as part of a MSc programme. *Journal of Advanced Nursing 34* (5), 639–647.

Glaze J. 2002. Stages in coming to terms with reflection: student advanced nurse practitioners' perceptions of their reflective journeys. *Journal of Advanced Nursing 37* (3), 265–272.

Duke S & Appleto J. 2000. The use of reflection in a palliative care programme: a quantitative study of the development of reflective skills over an academic year. *Journal of Advanced Nursing 32* (6) 1557–1568.

Getliffe K. 1996. An examination of the use of reflection in the assessment of practice for undergraduate nursing students. *International Journal of Nursing Studies 33* (4), 361–374.

Fisher T & Somerton J. 2000. Reflection on action: the process of helping social work student to develop their use of theory in Practice. Social work education 19 (4), 2000.

Jerlock M, Falk K & Severinsson E. 2003. Academic nursing education quidelines: Tool for bridging the cap between theory, research and practice. *Nursing and Health Sciences 5*, 219–228.

Karttunen P. 1999. *Tietoa hoitotyön toimintaan: sairaanhoidon opiskelijoiden käsityksiä tiedosta ja tiedon suhteista toimintaan.* Acta Universitatis Tamperensis 651. Akateeminen väitöskirja. Tampereen yliopisto. Tampere

Karttunen P. 1997. *Sairaanhoidon opiskelijoiden kokemus oppimispäiväkirjan kirjoittamisesta käytännöllisen opiskelun aikana.* Tampereen yliopisto. Tutkielma.

Kim HS. 1999. Critical reflective inquiry for knowledge development in nursing practice. *Journal of Advanced Nursing 29* (5), 1205–1212.

Liimatainen L, Poskiparta M, Karhila P & Sjögren A. 2001.The development of reflective learning in the context of health counselling and health promotion during nurse education. *Journal of Advanced Nursing 34* (5), 648–658.

Mezirow J. 1991. *Transformative dimensions of adult learning.* Jossey-Bass; San Fransisco.

Riley-Doucet C & Wilson S. 1997. A three-step method of self-reflection using reflective journal writing. *Journal of Advanced Nursing 25*, 964–968.

Ruth-Sahd L. 2003. Reflective practice: A critical analysis of data-based studies and implications for nursing education. *Journal of Nursing Education 42* (11), 488–497.

Teekman B. 2000. Exploring reflective thinking in nursing practice. *Journal of Advanced Nursing 31* (5), 1125–1135.

Williams A. 2001. An antipodean evaluation of problem-based learning by clinical educators. *Nurse Education Today, 19*, 659–667.

Williams B. 2001. Developing critical reflection for professional practice through problem-based learning. *Journal of Advanced Nursing 34* (1), 27–34.

Jouni Tuomi & Anna-Mari Äimälä

6 Changes In The Learning Style With Problem-Based Learning

Introduction

The results of PBL have rarely been examined using objective indicators to assess changes in students' learning styles. The purpose of this study was to describe the changes in the students' learning styles as indicated by Kolb's (1984) Learning Style Inventory (LSI) while studying according to a problem-based learning methodology.

Data acquisition and analysis

The data was collected in two stages using Kolb's LSI indicator. The first stage took place in autumn 2002 when students of the nursing programme were beginning their studies. For the midwifery students the first data set was collected a year later in 2003 as soon as they started their education. The students answered the questions posed by Kolb's LSI indicator and were informed that if they wished to know about any changes in their learning style, they could add their name to the form and the teacher would make copies for them. The second stage of data collection was carried out via the internet. One of the researchers sent an email informing those about to complete their studies that it was possible to redo the learning style test they had undergone at the beginning of their studies. A total of thirty-three students completed both LSI indicator tests: twenty of these qualified as nurses and thirteen as midwives. The numbers from the tests were processed with the SPSS 15.0 for Windows programme. The significance levels of the results were examined using the Mann-Whitney test. Finally, the data was presented as a series of tables both in percentage terms and according to frequency.

Results

In this study students' learning styles were categorised according to whether they were accommodating, diverging convergencing or assimilating. Accommodating and diverging were emphasized in his study. During the training period there were changes in all the learning style categories. There was a decline in the diverging and assimilating styles and an increase in the accommodating and converging styles. On the continuum of learning styles the conceptual and concrete were the dominant forms. In the analysis according groups, the nursing students and the midwifery students differed from one another especially in terms of reflective and active thinking. The nurses' scores for active experimentation had risen while those of the midwives had decreased. However, the changes in the learning profile were relatively similar in the different student groups. To summarise, in

spite of the perceived changes, the learning styles and learning profiles were relatively stable for these students.

Consideration of the results

Participation in the study was voluntary. The students used their own names for research-related purposes but information remained confidential.

Proponents of problem-based learning promise that the method changes both student learning and learning outcomes (Poikela S. 2003). It may be supposed then that the student's learning style and learning profile will also change. In many studies (Caprio et al. 1999; White 1999; Baker et al. 2007) this refers to increased activity among the students, which is regarded as a change in the students' learning styles and learning profiles. Students may learn differently but according to the results of this study the learning styles remained relatively unchanged among the nursing and midwifery students. About 46% (n=33) of the students who took part in the testing had the same learning style at the end of their studies as they had at the beginning.

In a study by Barker et al. (2007) the learning style remained unchanged (n=29) in two out of three students (62%), while our data put the figure at about every second of the students. This difference can probably be explained by the fact that in Barker's study the group consisted of 29 students who had participated in the same courses, whereas for this research only those who were interested in the subject were chosen. Furthermore, the period between the two measurements in Barkers' study was only a few courses' long,

rather than 3½ or 4 ½ years which was the case in our sample. Neither had the students' curriculum been designed according to the principles of PBL; instead they pursued simultaneous courses which had a different pedagogical orientation.

The data suggests that, on average, nursing students' learning styles shifted towards the conceptual as well as the active, a result that is partly paralleled by White et al. (1999). In their study (n=15) the largest increase was in conceptualisation and there was also a rise in active experimentation. In the study by Barker et al (1999) reflective observation and concrete experience were also examined. However, while that study showed a decrease in reflective observation, our data suggested a reduction in concrete experience.

International PBL and learning style studies are based on short periods of time so major and thorough changes in learning style or learning profile cannot be expected. Is 3½ or 4½ years follow-up time long enough to see these changes? Kolb (1984) considers learning as a process which changes all the time but the personal qualities of the learner will affect learning and so too will the subject choices made during the studies. In this sense, it would sensible to study how education – including that of nursing students – affects learning styles.

The midwifery students' learning styles remained more fixed than those adopted by nursing students despite the extra year of study. When completing their studies, the midwifery students were more reflective than the nursing students (p*) who, when they graduated, had a more active approach to learning, compared to the midwifery students (p**). It was possible to perceive these

differences from the very first stage of the train-
ing but the differences between the student groups
were also significant in the sense that midwives
have a 3½ year nursing education which is practi-
cally the same as that experienced by the nurses.
This raises a question about the relationship be-
tween the learning style and the length of study. Is
one more year of study significant from the point
of view of developing thinking?

Sources

Barker CM, Pesut DJ, McDaniel AM & Fisher ML. 2007. Evaluating the impact of problem-based learning on learning styles of master's students in nursing administration. *Journal of Professional Nursing 23* (4) 214–219.

Caprio B, Illesca M, Ellis P, Crooks D, Droghetti J, Tompkins C & Noesgaard C. 1999. Student and faculty learning styles in a Canadian and a Chilean self-directed, problem-based nursing program. *Canadian Journal of Nursing Research 31* (3) 31–50.

Ekola J. 1988. Ammattitaito ja opettamisen perusteet. Teoksessa J. Kari (toim.) *Tutkimuspohjaista koulutusta kohti. Professori Veikko Heinosen juhlakirja 7.5. 1988.*

Heikkilä J. 1985. *Luokanopettajakoulutukseen pyrkivän oppimistyyli.* Turun yliopiston kasvatustieteiden tiedekunnan julkaisusarja A 104.

Kolb DA. 1984. *Experiential learning. Experience as the source of learning and development.* New Yersey.

White MJ, Amos E & Kouzakanani K. 1999. Problem-based learning: an outcomes study. *Nurse Educator 24* (2) 33–36.

Part III
Teachers' Experiences

Helinä Roto

7 Directing The Tutor Group: A Development Challenge For The Tutor

Introduction

This article focuses on the tutor's skills in directing the group in the context of problem-based learning. The transition to a PBL curriculum brings with it a change in the nature of the teacher's work: the teacher becomes a tutor whose weekly task is to direct the learning of the tutor group. The purpose of my master's thesis was to produce empiric data regarding the actions taking place during tutorials in the field of health care. The study task was to describe how the tutor directs the learning of the tutor group within the context of the tutorial.

Carrying out the empiric study

The research adopted a case study approach and the focus of the study was the field of health care at the PIRAMK. Empiric data was gathered by observing the work of two tutors as they directed students over a series of eight different tutorials and by interviewing the tutor in question after the observations using a semi-structured interview. The students of both tutor groups studied nursing for the first year in the training programme. Group A comprised ten female students and Group B seven females and one male student. During the training period both tutor groups studied compulsory professional studies which are part of nursing edu-

cation. Observation data was gathered from the twelve hours of tutorials that took place in 2004 and this was the focus of a qualitative analysis. Based on this analysis a description of the tutor's work as a director of the group's learning was produced for different stages of the tutorials.

Results and analysis

The way in which the tutor directed the learning of the tutor group during the various stages of the tutorial was very personal. The tutor tried to operate situation-specifically at each stage of the cycle. The directing of the group seemed to be closely tied to the tutor's own life situation, to their knowledge of the contents of the study module, to their familiarity with the student group, to their own control philosophy and also to the working of the group and to the group dynamics. Although it was customary for the tutor to direct the group in an individual fashion, the data reveal a great deal of shared practice. In the study the directing of the tutor group's learning by the tutor was examined according to the stages of the tutorial cycle: how did the tutor operate at the beginning of the tutorial? / at the beginning of a new starting point? / at the brainstorming stage? / at the structuring stage? at the subject choosing and learning task selection stage? And when clarifying what had

been learned, what kind of feedback did the tutor give during the evaluation stage? The tutor directed the group in close accordance with the stages of the cycle and tutor interventions in the operation of the group at each stage of the cycle were situation-specific. While the aim of tutor control was, in both cases, to help students to learn, their control styles differed greatly from one another. I described the control style of the second tutor as a collegially supportive to nursing style. It was evident at all stages of the cycle and involved active interruptions as well as linking the main learning contents to the nursing profession and the learning process. I described the control style of the second tutor as protecting the autonomy of the group and supporting the student's personal growth style. This entailed supporting the group process and giving feedback that encouraged development.

Conclusions

What can be concluded from this study of the personal control styles of tutors? In my view the different ways a tutor directs the learning of the group cannot be evaluated, neither can they be placed in one mould. The core task of the tutors was to help the group and its individual students to learn and to support the development of self-directed learning skills. Familiarity with the group helps the tutor in supporting individual students and their learning paths as well as their vocational growth. This is why the relationship between the tutor group and the tutor should continue over a sufficiently long period. Tutors should be encouraged to direct the learning of the group with the full range of their professional skills and in their own personal way which will vary according to the group or the situation. Obviously, a knowledge of the group, its way of working and students' capacity for self-direction are crucial when the tutor makes a decision to intervene. If the tutor knows the group and sees that the group works cooperatively and diligently with regard to its own learning, then the control style which protects the autonomy of the group is highly appropriate. In such circumstances a tutor then can minimise their interventions and trust the power of the group. Alternatively, if a group is not especially self-directing, or there is an atmosphere of listlessness, then the tutor must intervene in the operation of the group and must support the students' self-direction in regard to its own learning by activating the group in different ways. One can develop as a tutor only by directing the learning of tutor groups continuously and by wanting to develop one's own work. The collegial feedback from other tutors of the work community provides an additional tool for the development of tutor skills.

Sources

Boud, D. (Ed.) 1988. *Developing student autonomy in learning.* London: Kogan Page, 17–25.

Dolmans, D., Gijselaers, W., Moust, J., de Grave, W., Wolfhagen, I. & van der Vleuten, C. 2002. Trends in research on the tutor in problem-based learning: conclusions and implications for educational practice and research. *Medical Teacher 24*: 173–180.

Dolmans, D., Wolfhagen, I., van der Vleuten, C. & Wijnen, W. 2001. Solving problems with group work in problem-based learning. Hold on to the philosophy. *Medical Education 35:* 884–889.

De Grave, W., **Dolmans, D. & van der Vleuten, C.** 1998. Tutor intervention profile: reliability and validity. *Medical Education 32:* 262–268.

Kemppi, A-M. & Tuomi, J. 2004. Opettajan huoli -ongelmaperustainen oppiminen hoitotyön opettajan kokemana. *Ammattikasvatuksen aikakauskirja 6* (4), 50–57.

Maudsley, G. 1999. Roles and responsibilities of the problem based learning tutor in the undergraduate medical curriculum. *British Medical Journal 318:* 657–666.

Mäntylä, R. 2002. *Yksin mutta yhdessä. Opettajat omaa työtä ja oppilaitoksen toimintaa kehittämässä.* Akateeminen väitöskirja. Tampereen yliopisto. Hämeenlinna:Ammattikasvatuksen tutkimus- ja koulutuskeskus ja Hämeen ammattikorkeakoulu.

Neville, A.1999. The problem based learning tutor: Teacher? Facilitator? Evaluator? *Medical Teacher Vol. 21* (4), 393–406.

Poikela, E. & Nummenmaa, A. 2002. Ongelmaperustainen oppiminen tiedon ja osaamisen tuottamisen strategiana. Teoksessa Poikela, E. (toim.) *Ongelmaperustainen pedagogiikka -teoriaa ja käytäntöä.* 2. korjattu painos. Tampereen Yliopistopaino Juvenes Print Oy, 33–52.

Poikela, S. 2003. *Ongelmaperustainen Pedagogiikka ja tutorin osaaminen.* Akateeminen väitöskirja. Tampereen yliopisto. Kasvatustieteiden tiedekunta. Tampere: Tampere University Press.

Roto, H. 2005. *Tutorryhmän ohjaaminen tutorin kehityshaasteena.* Pro gradu -tutkielma. Tampereen yliopisto. Kasvatustieteiden tiedekunta.

Silen, C. 1996. *Ledsaga lärande – om handledarfunktionen i PBI.* Licentiaavhandling. Filosofiska faculten 3/96. Institutionen för pedagogik och psykologi. Linköping: Linköpings Universitet.

Zanolli, M., Boshuizen,H. & de Grave,W. 2002. Students' and Tutors' Perceptions of Problems in PBL Tutorial Groups at a Brazilian Medical School. *Education for Health 15:* 2:189–201.

Öystilä, S. 2001. Ryhmäprosessin hyödyntäminen yliopisto-opetuksen haasteena. Teoksessa Poikela, E. & Öystilä, S. (toim.) *Tutkiminen on oppimista – ja oppiminen tutkimista.* Tampereen Yliopistopaino Juvenes Print Oy, 30–50.

Öystilä, S. 2002. Ongelmakohdat ryhmän ohjaamisessa. Teoksessa Poikela, E. (toim.) *Ongelmaperustainen pedagogiikka -teoriaa ja käytäntöä.* 2. korjattu painos. Tampereen Yliopistopaino Juvenes Print Oy, 88–114.

Jouni Tuomi & Anna-Mari Äimälä

8 Teachers' Experiences Of Problem-Based Learning: Background To The Study And Methodological Implementation

Introduction

In this book the study of "Teachers' experiences of problem-based learning" is reported in Chapters 8–12. This first article describes the background of the study and its methodological implementation. In the four following articles the starting point is the task of the study and the outcomes are also dealt with. The first two articles describe the situation after one year, and the two following reports examine the situation after three years. The researchers conducting the study followed the scientific practice outlined by the National Advisory Board on Research Ethics (2002) and by the Academy of Finland (2003).

Collecting and analysing the research material

The study took the form of an action research, a starting point agreed on by the teachers who began the experiment. Research material was collected as a profile study in two cohorts (Table 1). The study was the follow-up study taking place over three and half years (2002–2006) and followed the experiences of two cohorts. Data was collected via small group discussions that were videoed. These groups ranged from two to five persons depending on how much time each of the teachers had time to join the discussions. The small group discussion took from two to three hours. One of the researchers provided stimulus and direction to the discussion while the other videoed the discussions. Both researchers made notes on the discussions even during the discussions themselves.

Data acquisition

Thirty-two teachers participated in the study in two cohorts: Cohort A comprised fifteen teachers and Cohort B seventeen. Five out of thirty-seven teachers did not participate in the interviews because of heavy work-loads or because they did not teach the classes in question. During the first stage, the problem-based teaching had not yet been adopted in student education. About 86% of the teachers who were involved with the reform during the first two years, participated in the first set of interviews. Both cohorts were interviewed twice at intervals of 1½–2 years (see Table 1; next page). From Cohort A 13 teachers participated in the latter interview and 14 teachers from Cohort B. Three of the five were prevented from participating in the interviews because they had changed their employer and two

had begun to teach other training programmes in which problem-based teaching was not used in more than a few individual courses or in parts of the courses.

During the first phase of the study 32 teachers were interviewed in small groups (see Table 1. Cohort A:1 and Cohort B:1). Everyone described their own experiences of problem-based learning during the first year. An A3 paper was given to teachers beforehand on which there was a monthly line representing the past year. The paper had been horizontally divided into two parts: pluses and minuses. The paper was entitled "The emotional curve from the past teaching year" and the instruction was for teachers to draw a curve which described their own feelings and to reflect on the changes in the curve. The purpose of "the emotional curve"

was to encourage teachers to think about their experiences and their feelings beforehand and with its assistance a discussion about the experiences was started for each teacher. Before the interview the teachers drew "emotional curves" which represented the "highs and lows" of the previous year (see Chapter 9 for more detail). The emotional curves served as starting points for the discussion and provided information for the researchers to analyse.

During the second phase of the study 27 teachers were interviewed in small groups (see Table 1. Cohort A:2 and Cohort B:2). Before the interview teachers were asked to recall their experiences of being a teacher and teaching PBL over the previous 1½ -2 years. To guide their thoughts they received the last question from the previous round of interviews: "Do you believe

	2002	2003		2004		2005	
	autumn	spring	autumn	spring	autumn	spring	autumn
Group, which started with PBL	Group 02 → 160 students						Group completed their degree
Teacher interviews		Cohort A:1 15 interviews				Cohort A:2 13 interviews	
Group, which started with PBL			Group 03 → 160 students				
Teacher interviews				Cohort B:1 17 interviews			Cohort B:2 14 interviews
Group, which started with PBL					group 04 → 180 students		
Group, which started with PBL							Group 05 -> 200 students

Table 1. Interview timetable in relation to the progress of the problem-based learning in study groups. (By autumn 2005 all students studied according to PBL)

in PBL?" and they were asked to think about the following areas: a) their own feelings (Do you have any worries about the future regarding the learning of students?), b) the present situation (What feels as problematic? What feels easy? What works best when using PBL?) and c) future developments (What should be done differently? What should be developed or changed?). The starting point for the discussions was the emotional curve from the first interview. Teachers were asked how they felt at this point of the PBL process.

The teachers participated in the discussions voluntarily, in their own time, on the premises of the educational institute. Twenty-five pieces of recorded discussion lasting a total of 55 hours were accumulated. Each discussion took from 1½ to 3 hours depending on the size of the group.

Description of the participants

Of the 32 teachers who had participated in the first interviews there were seven who had under three years of work experience. The remaining 25 had more than six years of work experience and the majority of these had worked for more than 10 years. Eleven teachers had had earlier experience of PBL, while one of the interviewees had begun teaching without any earlier education about PBL. Those who took part in the later interviews had at least five years of teaching experience, of which two to three years were problem-based. Three of the interviewees had served only as expert lecturers. All of the others had been involved as both tutors and as expert lecturers.

Data analysis

The data was analysed using the method of material-based content analysis (Tuomi & Sarajärvi 2002). The analysis of the first interview took place in summer 2004 and the second in spring 2006.

Sources

Akatemia 2003. *Suomen akatemian tutkimuseettiset ohjeet.* www.aka.fi/julkaisut.

Alexsander JG, McDaniel GS, Baldwin Ms & Money BJ. 2002. Promoting, applying, and evaluating Problem-Based Learning in the undergraduate nursing curriculum. *Nursing Education Perspectives 23* (5) 248–253.

Almtun B. 2000. Utveckling av basgrupparbete för studenter och handledare i kliniska studier. *Vård i Norden 20* (56) 50–54.

Amos E. & White MJ. 1998. Teaching tools: Problem-Based Learning. *Nurse Educator 23* (2) 11–14.

Barker CM. 2000a. Using problem-based learning to redesign nursing administration masters programs. *Journal of Nursing Administration 30* (1) 41–47.

Barker CM. 2000b. Problem-based learning for nursing: Integrating lessons from other disciplines with nursing experiences. *Journal of Professional Nursing 1*6, 258–266.

Barrow EJ, Lyte G & Butterworth T. 2002. An evaluation of problem-based learning in a nursing theory and practice module. *Nurse Education in Practice 2*, 55–62.

Biley FC & Smith KL. 1999. Following the forsaken: a procedural description o*f a problem-based learning program in a school of nursing studies.* Nursing & Health Sciences 1, 93–102.

Bradley P, Nordheim L, De La Harpe D, Innvaer S & Thompson C. 2005. A systematic review of qualitative literature on educational interventions for evidence-based practice. *Learning in Health & Social Care 4* (2) 89–109.

Burns I & Glen S. 2000. A newmodel for a new context? Kirjassa S. Glen & K Wilkie (eds) P*roblem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 1–10.

Celia LM & Gordon PR. 2001. Using problem-based learning to promote critical thinking in an orientation program for novice nurses. *Journal for Nurses in Staff Development 17* (1) 12–17.

Coventry University 2003. www.hss.coventry.ac.uk/pbl/homepage/faqs.htm (luettu 8.3. 2005)

Dolmas D, Gijselaers W, Moust J, Grave W, Wolfhagen I & Van der Vleuten C. 2002. Trends in research on the tutor on problem-based learning:conclusions and implications for educational practice and research. *Medical Teacher 24* (2) 173–180.

Dochy F, Segers M, Van den Bossche P & Gijbels D. 2003. Effects of problem-based learning: a meta-analysis. *Learning and Instruction 13*, 533–568.

Haith-Cooper M. 2000. Problem-based learning within health professional education. What is the role of the lecturer? A review of literature. *Nurse Education Today 20*, 267–272.

Haith-Cooper M. 2003. An exploration of tutors' experiences of facilitating problem-based learning. Part 2 – implications for the facilitation of problem-based learning. *Nurse Education Today 23*, 65–75.

Hmelo CE & Evansen DH. 2000. Introduction problem-based learning: Gaining insights on learning interactions through multiple methods of inquiry. Kirjassa Dh Evensen & CH Hmelo (eds) *Problem-based learning. A research perspective on learning interactions.* New Jersey; Lawrence Erlbaum Ass., 1–16.

Jones A, McArdle PJ & O'Neill P. 2002. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Medical Education 36*, 16–25.

Kelly M & Cantillon P. 2003. What the educators are saying? *British Medical Journal 327* (7428) 1393.

Kjellgren K. Ahlner J, Dahlgren LO & Haglund L. 1993. *Problembaserad inlärning – erfarenheter från Hälsouniversitetet.* Lund; Studentlitteratur.

Kuula A. 1999. *Toimintatutkimus kenttätyötä ja muutospyrkimyksiä*. Tampere; Vastapaino.

Mok E, Lee WM & Wong FK. 2002. The issue of death and dying: employing problem-based learning in nursing education. *Nurse Education Today 22,* 319–329.

Neville AJ. 1999. The problem-based learning tutor: teacher? Facilitator? Evaluator? *Medical Teacher 21* (4) 393–401.

Newman M. 2005. *A pilot systematic review and meta-analysis on the effectiveness of problem based learning.* The Campbell Collaboration Systematic Review Group. Middlesex University. www.ltsh-01.ac.uk/doors/pbl_report.pdf

Pang S, Wong T, Dorcas A Lai C, Lee R, Lee W, Mok E & Wong F. 2002. Evaluation the use of developmental action inquiry in constructing a problem-based learning curriculum for pre-registration nursing education in Hong Kong: a student perspective. *Journal of Advanced Nursing 40* (2) 230–241.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen.* (Akateeminen väitöskirja) Tampere; University Press.

Poikela S & Lähteenmäki M-L. 2003. *Ongelmaperustainen oppiminen (PBL) ja tutorina kehittyminen.* Kever 4/2003. E-lehti: www.tokem.fi/kever/kever.nsf/

Rideout E & Caprio B. 2001. The problem-based learning model of nursing education. Kirjassa E Rideout (ed) *Transforming nursing education through problem-based learning*. London; Jones & Bartlett Publ., 21–49.

Savin-Baden M. 2000a. *Problem-based learning in higher education. Untold stories.* London; SHRE and Open University Press.

Savin-Baden M. 2000b. Group dynamics and disjunction in problem-based contexts. Kirjassa S. Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 87–106.

Schmidt HG & Moust JHC. 2000. Factors affecting small-group tutorial learning: A review of Research. Teoksessa DH Evensen & C Hmelo (eds) *Problem-Based Learning. A research perspective on learning interaction.* New Jersey; Lawrence Erlbaum Associates, 19–52.

Silen C. 1996.*Ledsaga lärande – om hanledarfunktionen i PBL.* (Lisentiatavhandling) Filosofiska fakulteten 3/96. Institutionen för pedagogic och psykologi. Linköping; Linköpings Universitet.

Tavanaiepour D, Schwartz PL & Loten EG. 2002. Faculty opinions about a revised pre-clinical curriculum. *Medical Education 36* (3) 299–302.

Tuomi J. 1996. Dialoginen tutkimuskäytäntö hoitotieteellisessä tutkimuksessa. *Hoitotiede 8*, 29–34.

Tuomi J. & Sarajärvi A. 2002. *Laadullinen tutkimus ja sisällönanalyysi.* Helsinki; Tammi.

Tutkimuseettinen neuvottelukunta 2002. *Hyvä tieteellinen käytäntö ja sen loukkausten käsitteleminen.* www.pro.tsv.fi/tenk

Walker J, Bailey S, Brasell-Brian R & Gould S. 2001. Evaluating a problem-based learning course; an action research study. *Contemporary Nurse 10*, 30–38.

White MJ, Amos E & Kouzekanani K. 1999. Problem-based learning: An ourcomes study. *Nurse Educator 24* (2) 33–36.

Wilkie K. 2000. The nature of problem-based learning. Kirjassa S Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 11–36.

Williams A. 1999. An anpodean evaluation of problem-based learning by clinical educators. *Nurse Education Today 19*, 659–667.

Wolff AC & Rideout E. 2001. The faculty role in problem-based learning. Teoksessa E. Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 193–213.

Jouni Tuomi & Anna-Mari Äimälä

9 Looking Forward Positively

Introduction

The purpose of this study was to describe the experiences of the nursing teachers and the factors which have impressed them in the move to problem-based learning. The research questions were:

1. How did the teachers experience the first year?
2. What factors had affected their teaching experiences?

Data acquisition

One tool for acquiring data was the drawing of an emotional curve which was especially developed for this study. It was based on Gergen's (1994) lifeline-model and the aim was to concretise the changes which had taken place during the interviewees' career. The idea was also to move beyond a subjective interpretation of the career.

The interviews were conducted initially as discussions either in small groups (2–4 persons) or as a dialogue between the interviewer and the teacher. The interviews which were videoed lasted 1½–3 hours depending on the size of the group. The discussion was begun by asking an interviewee to talk about their own "emotional curve" and at the same time others were requested to ask about the graph and express any thoughts it evoked. All the line graphs were explored in a similar manner. The group discussion then con-

tinued with a series of questions in the style of a theme interview, to make sure that all members of the group took a stand on the subjects of the study task. However, the answers to most of these questions had already been given in the earlier discussion. In this sense, the questions were more like summaries which combined the themes.

Later these same teachers were reinterviewed. The number, however, had fallen since the original interviews had taken place because three had changed educational institute or were no longer teaching and three teachers could not make the times set for the interviews. As with the first interviews, the second round was carried out in small discussion groups or as individual dialogues, all of which were videoed. However, the small groups were not the same as in the original interviews. In this interview the "emotional line" produced two years earlier was given to the interviewee before the beginning of the interview. The interviews were begun by discussing how and why thoughts and feelings had changed after that drawing had been produced.

The teachers' experiences of the first year

All the interviewees drew their emotional curve but in this context the subject of the examination was the 28 curves drawn only by the nursing teachers. The curves of the teachers who had acted only as expert lecturers were not examined

here. It was possible to classify the drawings into three main categories on the basis of their appearance: reactive curves, group dynamics curves and this-will-go-well curves.

The emotional curves which we call reactive can be summed up in Figure 1A. The teachers were pulled up and down in the grip of strongly conflicting feelings. On the basis of the interviews they reacted according to how the students had responded to PBL or how students had done their work. These feelings were clearly on the surface as students' behaviour brought them worry or joy.

The emotional curve (Figure 1B) which reflected group dynamics initially rose when everyone was enthusiastic about the new project. After

the honeymoon period, they came up against the day to day work of running PBL and positive feelings gave way to tiredness or despair because the new method did not seem to be operating as the books had promised. Both teachers and students were disappointed with PBL. Sooner or later the teachers rose above the students' feelings and began to work with their tutor groups. Gradually, this produced in teachers a feeling that PBL works, and the curve was no longer primarily directed by the students' reactions, but by the teacher's pedagogic view.

This-will-go-well curves (Figure 1C) were generally rising over time. From the very start these teachers had reacted to PBL as a pedagogical challenge. In a way, these teachers followed
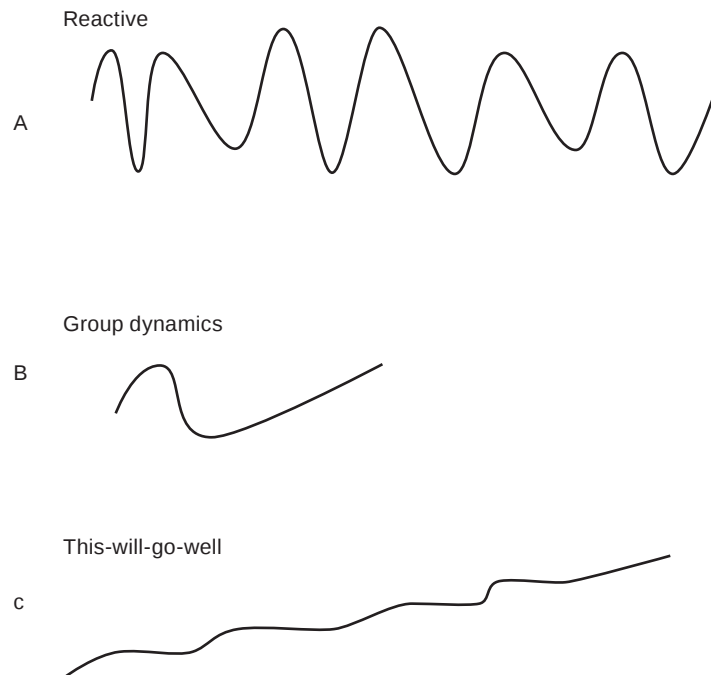

Figure 1. Emotional curves

their own paths. Student idleness or grumbling motivated them primarily to learn more about adapting problem-based learning. Perhaps there were small downturns or periods of disaffection but on the whole the experience of working with PBL grew more positive as time went by.

Conclusions

Through the emotional curves the teachers made their experience of PBL progress during the year in question visible. According to Gergen's (1994) general descriptions all three basic forms of the emotional curve which had emerged in this study represented a progressive story. The B and C curves clearly represented a story model which had moved progressively. Curve A showed a mixture of opposing feelings but it ended on a rising note. A common feature of the curves was a rising line at the end of the basic curves. In this sense one can say that each teacher had achieved or at least had approached their aims in relation to PBL. Since we did not consider asking about these aims or achievements, this area remained undiscussed. In summary it appears that anxiety about the learning of students affected the teaching experiences of those interviewed. The more thoughtful, knowledgeable students made teachers more aware of the weaknesses, shortcomings and strengths of the programme but also of the possibilities for learning it offered.

Sources

Denzin NK. 1984. *Interpretive biography.* Sage; London.

Gergen K. 1994. *Realities and relationships. Soundings in social constructions.* Harvard University Press; Cambridge, Massachusetts and London.

Kemppi A-M & Tuomi J. 2004. Opettajan huoli – ongelmaperustainen oppiminen hoitotyön opettajan kokemana. *Ammattikasvatuksen Aikakauskirja 6* (4) 50–57.

Roberts B. 2002. *Biografical research.* Open University Press; Buckingham, Philadelphia.

Jouni Tuomi & Anna-Mari Äimälä

10 With The Experience Of One Year I Would Say That...

Introduction

The purpose of this study item is to describe key new challenges which arose during the first year in which problem-based learning was adopted. The research questions were: What new challenges were manifested during the first year? How were they dealt with? What new challenges could teachers see approaching in the future?

Results

During the interviews it became evident that the teachers' main concern was the learning of the students. Teachers worried whether students were learning anything. It was not a question of underestimating the student, the concern arose from teachers reflecting on their work and on the meaning of their work. The question of how to support learning is not a new challenge in teachers' work but it was prompted once more by the new approach implicit in problem-based learning. Knowing when to give control of the information to students, when to be quiet and unnoticed on principle in order to allow a learning silence become basic teaching skills in a way that is often very different to those needed in a traditional classroom.

I'm watching a play … is learning happening?

All the stages of the PBL cycle caused concern both as individual events and as part of the whole study entity. Generally, the challenges arose from the perception that the structure of the cycle was too rigid. It was felt that flexible ways of working and alternative possibilities were being missed. Some teachers described the task analysis as a mystifying experience: how was it possible to build something systematically around a subject where no proper analysis had been made? Teachers stated that sometimes they had the feeling that they were watching a play. The tutorial evaluation was also seen as problematic and the interviews offered no easy solution for how to conduct this assessment.

Can I laugh in the right places?

When an attempt is made to move the control of the information to students, teachers need the ability to remain quiet and unnoticed. How long does one have the strength to wait in silence? The voice of experience says that in tutorial meetings uncertainty usually manifests itself as talk. The teacher's non-verbal direction becomes unexpectedly valued as facial expressions, body positions or style of breathing may come under scrutiny without the teacher noticing. If the teacher smiles

or laughs in the wrong place, it can undermine the learning task.

There are situations in which the interventions are seen as straightforward such as in cases for example where students digress to a quite separate issue or have wrong or faulty information. Also, interventions to raise of the level of discussion or to move on from idle chatter were regarded as necessary.

The depth in which issues were handled was a common concern for many teachers. For the tutor it was also a problem to make the students understand how to concretely raise the level of discussion.

New colleagues

Problem-based learning, it is claimed, will give rise to a new work culture. Discussion about content and teaching, and negotiation with other teachers were not new but now these elements had become a condition for the progress of the teaching. The teachers had to attend numerous meetings negotiating how to put their teaching into practice which meant that everything had to be discussed with several colleagues. In this way, the character of the work community had changed. Support was expected in a new way, not only in adapting to the new curriculum but in all practical matters. Earlier, uncolleagial behavior had been hidden among individual cases but in the new situation it was clearly destructive.

The problem of expertise

The question of expertise was especially impor-tant to teachers who worked only as expert lecturers and also to tutors. Discussion about the expertise of the tutors was connected to the question of whether a tutor should be an expert in the substance or the process when directing tutorials. A second question concerned those teachers who served only as expert lecturers. They felt that they had been marginalised as teachers, simply being given big groups and tight schedules. They did not really have time to concentrate on the pedagogical development of the teaching.

Could the teachers' worries be eased?

Clearly there had been mistakes but there were also considerable successes. During the first two years teachers learned the need for continuous training and consideration of the work they were doing. The mentoring and the opportunity to air ideas were helpful in terms of coping with the work.

A new challenge is identified

Because the nature of this study was that of an activity analysis, its outcomes were shown to the teaching staff about half a year after the first interviews of both cohorts. By then the situation had changed: more students were studying according to the new curriculum and less according to the old. This meant that there were even fewer possibilities for flexibility in the plans for the academic year though the use of the older students' timetables. The number of the students and the implementation of the teaching began to create situations in which it was not possible to offer a logical progression in studies to all the students.

Sources

Burns I & Glen S. 2000. A new model for a new context? Kirjassa S. Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 1–10.

Poikela E. 2002. Johdanto. Kirjassa E. Poikela (toim.) *Ongelmaperustainen pedagogiikka – teoriaa ja käytäntöä.* Tampere; Tampere University Press, 7–19.

Poikela E. & Nummenmaa A-R. 2002. Ongelmaperustainen oppiminen tiedon ja osaamisen tuottamisen strategiana. Kirjassa E. Poikela (toim.) *Ongelmaperustainen pedagogiikka – teoriaa ja käytäntöä*. Tampere; Tampere University Press, 33–52.

Poikela S. 1998. *Ongelmaperustainen oppiminen. Uusi tapa oppia ja opettaa?* Hämeenlinna; Tampereen yliopiston opettajankoulutuslaitos.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen.* (Akateeminen väitöskirja) Tampere; University Press.

Poikela S & Lähteenmäki M-L. 2003. *Ongelmaperustainen oppiminen (PBL) ja tutorin kehittyminen.* Kever 4/2003 . Verkkojulkaisu; www.tokem.fi/kever/kever.nsf/ (16.12.03).

Price B. 2003. *Studing nursing using problem-based & enquiry-based learning.* New York; Palgrave.

Puolimatka T. 2002. *Opetuksen teoria. Konstruktivismista realismiin.* Helsinki; Tammi.

Rideout E. & Caprio B. 2001. The problem-based learning model of nursing education. Kirjassa E. Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 21–49.

Robinson V. 1993. *Problem-based methodology. Research for the improvement of practice.* Oxford; Pergamon Press.

Schmidt HG & Moust JHC 2000, Factors affecting small-group tutorial learning: A review of Research. Teoksessa DH Evensen & C. Hmelo (eds) *Problem-Based Learning. A research percspective on learning interaction.* New Jersey; Lawrence Erlbaum Associates, 19–52.

Wilkie K. 2000. The nature of problem-based learning. Kirjassa S Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 11–36.

Jouni Tuomi & Anna-Mari Äimälä

11 There Is No Returning To The Old Style, But...

Introduction

The purpose of this chapter is to describe teachers' experiences and views after the first three years of problem-based learning that took place in the training programmes of nursing and emergency care at PIRAMK in 2002. The research tasks were to describe how teachers felt after three years of the renewal programme: what teachers thought about student development under PBL; what teachers regarded as problems when using PBL in the nursing and emergency care studies; and what suggestions teachers had for improving the learning of students studying nursing and emergency care.

Experiences after three years

It was the teachers' common view that there could be no return to the old system after the experiences of the previous three years, although there was still a great deal to be developed. Teachers were satisfied with the fact that the feedback about students from their clinical practice placements was better than earlier, and teachers especially appreciated the fact that they knew their students better. In tutorials they had a deeper understanding of who knew what and what they knew. The teachers' impression was that while PBL offered these advantages, which was why it had been adopted by PIRAMK, it had also caused new kinds of problems. The basic pedagogical problem of how

to motivate underachieving or lazy students could not be resolved with PBL. An integral part of PBL is student self-direction, but if in practice the actions of students lack commitment, then PBL does not offer anything new to motivate them. According to the teachers, students seemed to grow tired of the way in which the teaching was implemented, some describing the tutorials as kindergarten-like. Students complained that tutorials always proceeded in the same way and coined the phrase "teletubby training" to describe the way in which words and forms were endlessly repeated.

Problems arising from the implementation of problem-based learning

The marginal situation of PBL as it was being implemented caused problems for some teachers in their everyday work. The problem areas pinpointed by teachers were connected with the implementation process. Firstly, there was concern about the teacher student ratio: large student groups (an intake of 160–200 students), large tutor groups (as many as 14–15 students), the large number of tutor groups (at least 10–15 for every year group), and the endless cooperation. Secondly, there was a feeling that PBL implementation had a totalitarian character to it: the conditions of the implementation were inflexible and followed a forced rhythm dictated by the subject teachers' situation. Thirdly, there were problems in how to define

work. In summary it would be fair to say that the massive number of the students and teachers was the common cause of most problems. The sheer scale of the project aggravated difficulties which in other circumstances might not have arisen.

Areas for development in PBL implementation

According to the teachers interviewed, the key areas requiring development in PBL implementation are: undoing the rigid and inflexible teaching arrangements; systematically supporting the teachers' work; and developing and evaluating the students' work.

Summary

Discussion about developing PBL implementation culminated in the issue of pedagogical leadership. This was seen as operating on two levels: the teacher's task is to make possible, to support and assist the student in learning and achieving the objectives of that learning, while the leader's task is to make possible, to support and assist the teacher in this work. The teachers assumed that they were qualified for pedagogical leadership at a grass-roots level and they, in turn, expected their leaders to perform their role for the teachers.

Jouni Tuomi & Anna-Mari Äimälä

12 Does Problem-Based Learning Challenge The Teachers Or Do The Teachers Challenge Problem-Based Learning?

Introduction

This chapter offers a summary of the results for the whole study (Chapters 8–11) and also of their significance. The aim is to assess the changes in the experiences and views of nursing and emergency care teachers that took place during and after the first and the third year of curriculum reform.

The PIRAMK design for problem-based learning in autumn 2005

A model was created on the basis of feedback from the interviewed teachers. It described those elements which affected the implementation of problem-based learning in autumn 2005, as the fourth year of curriculum reform got underway. Figure 1 (next page) describes four key influences on the basis of the teachers' interviews.
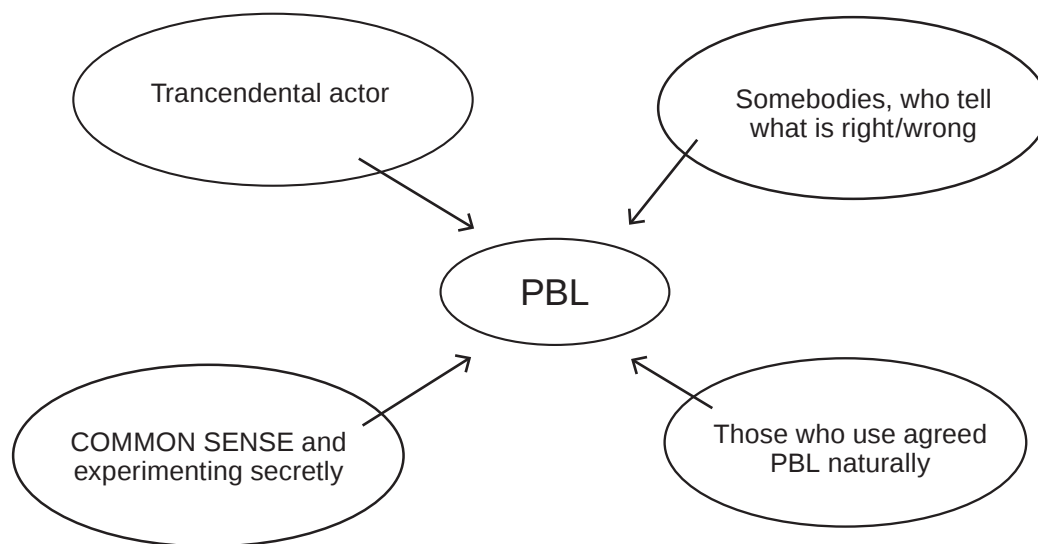

Figure 1. The PBL design of PIRAMK in autumn 2005

On the basis of the teachers' accounts PI-RAMK's PBL implementation is controlled by a kind of a transcendental actor, who has already decided on how PBL is to be adapted and how people are to act within it. This actor's presence is evident in remarks such as "It has been decided in this way", or "This is how it is done" or "This is the way it is supposed to operate". The secret experimenters among the teachers try to quietly bypass this actor's instructions, ignoring the transcendental effect. They actively seek solutions to problems that arise in learning or clinical practice knowing that they are acting against the instructions. In PIRAMK, there are also a group of somebodies who know how to act correctly in given situations or what is wrong and what is right according to PBL. In the teacher descriptions these somebodies take the form of individuals who confirm the appropriate way to act. The fourth group of people work naturally with the agreed approach to PBL. Direction from the transcendental actors works well for them. They know how to act and they are also conscious of instructions from the somebodies, who tell them how to do the right thing. For them PBL implementation at the lesson level goes smoothly without major problems.

The study circle

This study did not resolve the contradictions that appear in PBL (Dochy et al. 2003; Kelly & Cantillon 2003; Newman 2005.); on the contrary, it underlined them. If PBL goes into crisis, it has no tools within it for proceeding without resorting to traditional pedagogical solutions. Teachers did not say it aloud, but Levin's (2001) remark

about teachers committing pedagogical suicide if teaching is based on only one idea summed up the critical attitude of the teachers interviewed. One can say that after the first year the atmosphere was positively expectant, perhaps also a little surprised by the fruitful development. By the third year it was thought that PBL had met, at least partly, those challenges which had been set for it, but at the same time it had also created new problems.

Even though the learning of students was not the primary focus of this study, the results are analogous to the those found in international studies (Amos & White 1998; White etc. 1999; Barker 2000a; Jones etc. 2002; Barrow et al. 2002; Mok et al. 2002; Pang et al. 2002) according to which PBL supports the learning of students, especially those preparing for working life. In evaluating PBL learning this study offered a teacher's point of view, which supplements the general view.

The thought that it is not wise to bind the teachers' pedagogical options at the curriculum level was a central feature of the results. Earlier studies (Dean 2001) also support this observation. It is justified to assume that if plans are made to respond to the different kinds of student needs, teachers must change their strategy and ensure everyone in the classroom can participate.

According to the results, the teachers wanted the support of the administration in ensuring supervision of the work as well as sufficient resources. This is justified because one cannot suppose that teachers would plan a reform and the necessary teaching without the support of the administration. Many studies, according to Wolff & Rideout (2001), show that not only the teachers

but also the administration of the school needs to be trained for the PBL reform. A lack of understanding on the part of the administration about the conditions of the reform may undermine it or may make its implementation more difficult.

The results of the study can be called critical and problem-based for a reason: this was what the study sought. The results speak on PBL's behalf: at least the teachers have internalised the problem as a starting point for developing their own work. There were plenty of subjects and requests for development. It is still open whether this will have a transfer effect on the directing and teaching of students.

The massive number of the students and teachers taking part in the reform were identified as central problems as well the rigidity that was built into the implementation of the reform. The international literature does not bring up the problem of scale except on the level of the tutor groups (Levin 2001; Mettetal 2001). This is understandable, because most studies concentrate on experiments lasting under a term. According to the literature (Savin-Baden 2000; Savin-Baden & Major 2004; Haw 2006) the PBL model which has been implemented in PIRAMK is very rare.

According to the results, the teachers do not want to lose the good things which the PBL reform has brought. They are ready to dismantle the rigidity of the implementation and will not miss it. In summary it can be said that the teachers interviewed are looking to develop nursing education along the lines of an "active learning" approach (Haw 2006) which would allow new pedagogical innovations by trusting their pedagogical experience.

Research challenges

The research results raised several study challenges. The perceived problem between PBL and the philosophy of nursing requires careful consideration. Also in the results of this study there were allusions to economic questions; it would therefore be justifiable to clarify what PBL costs. One reason traditional teaching has conquered the world is because of the excellent relation between the cost and benefits. It is therefore rare that reforms are followed in the long-term. Follow-up of this reform at the end of the decade was justified in order to find the answers to such questions as how it went, and whether the logic and learning in nursing is different for example from a subject like physiotherapy or medicine. The PBL idea of dispelling subject divisions (Poikela S. 2003) was adopted without criticism in the planning phase. The international PBL literature, dominated by medical research, supports the view that each subject does not have its own logic, but all learning should be similar.

Sources

Amos E. & White MJ. 1998. Teaching tools: Problem-Based Learning. *Nurse Educator 23* (2) 11–14.

Barker CM. 2000a. Problem-based learning for nursing: Integrating lessons from other disciplines with nursing experiences. *Journal of Professional Nursing 16*, 258–266.

Barker CM. 2000b. Using problem-based learning to redesign nursing administration masters programs. *Journal of Nursing Administration 30*, 41–47.

Barrow EJ, Lyte G & Butterworth T. 2002. An evaluation of problem-based learning in a nursing theory and practice module. *Nurse Education in Practice 2*, 55–62.

Biley FC & Smith KL 1999. Following the forsaken: a procedural description of a problem-based learning program in a school of nursing studies. *Nursing & Health Sciences 1*, 93–102.

Butler R, Inman D & Lobb D. 2005. Problem-based learning and the medical school: another case of emperor's new clothes? *Advanced Physiology Education 29*, 194–196.

Celia LM & Gordon PR. 2001. Using problem-based learning to promote critical thinking in an orientation program for novice nurses. *Journal for Nurses in Staff Development 17* (1) 12–17.

Dean CD. 2001. They expect teachers to do that? Helping Teachers explore and take ownership of their profession. Kirjassa BB. Levin (ed.) *Energizing teacher education and professional development with problem-based learning.* Virginia; ASCD, 8–23.

Dochy F, Segers M Van den Bossche & Gijbels D. 2003. Effects of problem-based learning: a meta-analysis. *Learning and Instructions 13*, 533–568.

Dolmas D, Gijselaers W, Moust J, Grave W, Wolfhagen I & Van der Vleuten C. 2002. Trends in research on the tutor on problem-based learning:conclusions and implications for educational practice and research. *Medical Teacher 24* (2) 173–180.

Dolmans DHJM, Wolfhagen IHAP, van derVleuten GPM & Wijnen WHFW. 2001. Solving problems with group work in problem-based learning: hold on to the philosophy. *Medical Education 35*, 884–889.

Haith-Cooper M. 2000. Problem-based learning within health professional education. What is the role of the lecturer? A review of literature. *Nurse Education Today 20*, 267–272.

Haith-Cooper M. 2003. An exploration of tutors's experiences of facilitating problem-based learning. Part 2 – implications for the facilitation of problem-based learning. *Nurse Education Today 23*, 65–75.

Haw MA. 2006. Learning theories applied to nursing curriculum development. Kirjassa SB. Keating (ed) *Curriculum development and evaluation in nursing.* Philadelphia; Lippincott Williams & Wilkins, 49–60.

Jones A, McArdle PJ & O'Neill P. 2002. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Medical Education 36*, 16–25.

Kelly M. & Cantillon P. 2003. What the educators are saying. *British Medical Journal 327* (7428) 1393.

Levin BB. 2001. The charter school and problem-based learning. Kirjassa BB. Levin (ed.) *Energizing teacher education and professional development with problem-based learning.* Virginia; ASCD, 73–86

Maufette Y, Kandlbinder P & Soucisse A. 2004. The problem in problem-based learning is the problems: but do they motivate students? Kirjassa M Savin-Baden & Wilkie K. (eds) *Challenging research in problem-based learning.* Berkshire; SHRE and Open University Press, 11–25

Mettetal G. 2001. Classroom action research as problem-based learning, Kirjassa BB. Levin (ed.) *Energizing teacher education and professional development with problem-based learning.* Virginia; ASCD, 108–120

Mok E, Lee WM & Wong FK. 2002. The issue of death and dying: employing problem-based learning in nursing education. *Nurse Education Today 22*, 319–329.

Neville AJ. 1999. The problem-based learning tutor: teacher? Facilitator? Evaluator? *Medical Teacher 21* (4) 393–401.

Newman M. 2005. *A pilot systematic review and meta-analysis on the effectiveness of problem based learning.* C2, Middlesex University, TLRP & ESRC.

Pang S, Wong T, Dorcas A Lai C, Lee R, Lee W, Mok E & Wong F. 2002. Evaluation the use of developmental action inquiry in constructing a problem-based learning curriculum for pre-registration nursing education in Hong Kong: a student perspective. *Journal of Advanced Nursing 40* (2) 230–241.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen*. (Akateeminen väitöskirja) Tampere; Tampere University Press.

Pierce JW. & Lange HG. 2001. Providing structure for analyzing authentic problems. Kirjassa BB. Levin (ed.) *Energizing teacher education and professional development with problem-based learning.* Virginia; ASCD, 38–55.

Rideout E. & Caprio B. 2001. The problem-based learning model of nursing education. Kirjassa E. Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 21–49.

Savin-Baden M. 2000a. *Problem-based learning in higher education: untold stories.* London; SHRE and Open University Press.

Savin-Baden M. 2003. *Facilitating problem-based learning. Illuminating perspectives.* Berkshire; SHRE and Open University Press.

Savin-Baden M & Major CH. 2004. *Foundations of problem-based learning.* Berkshire; SHRE and Open University Press.

Schmidt HG & Moust JHC. 2000. Factors affecting small-group tutorial learning: A review of Re-search. Teoksessa DH Evensen & C Hmelo (eds) *Problem-Based Learning. A research perspective on learning interaction.* New Jersey; Lawrence Erlbaum Associates, 19–52.

Walker J, Bailey S, Brasell-Brian R & Gould S. 2001. Evaluating a problem-based learning course; an action research study. *Contemporary Nurse 10*, 30–38.

White MJ, Amos E & Kouzekanani K. 1999. Problem-based learning: An outcomes study. *Nurse Educator 24* (2) 33–36.

Wolff AC & Rideout E. 2001. The faculty role in problem-based learning. Kirjassa E. Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 193–213.

Part IV
Students Learning?

Jouni Tuomi & Anna-Mari Äimälä

13 How Clinical Practice Supervisors See The Students' Skills

Introduction

The aim of this study was to compare two different kinds of curriculum implementation, one using traditional teaching methods and the other using problem-based learning, and to examine the learning outcomes for graduating midwifery and public health nursing students as evaluated by their clinical practice supervisors. The research aimed to identify whether there was a difference in the skill levels of the midwifery and public health nursing students pursuing the two different kinds of curriculum.

Research methods and materials

For this study the researchers designed a 10-point evaluation form based on national recommendations for knowledge required by nursing students, as well as the skill descriptors outlined in PIRAMK's curriculum. The form focused on the following competencies: 1. ethical and value judgement skills, 2. theoretical skills, 3. clinical skills, 4. teaching and supervising skills, 5. health promotion skills, 6. cooperation skills, 7. research and development skills, 8. directing skills, 9. multicultural nursing skills, 10. social skills.

On the form the students' abilities were evaluated numerically (0 = Below beginner's level, 5 = Excellent, 6 = I don't know). The scale used for grading the students was a standard absolute evaluation scale in which the last grade (I don't know) could be left out when calculating the averages. The evaluation of the students was implemented according to the so-called delayed evaluation principle and was carried out between two weeks and six months after graduation. The evaluation given in this research did not affect the students' clinical practice assessments, their other grades or their graduation.

Each supervisor was sent an evaluation form for their own student together with a response envelope. Public health nurses sent in the completed forms by post while midwives the used the hospital's internal mail. Group 1, which consisted of students following the traditional curriculum, were issued with 57 evaluation forms and of these 54 were returned (response rate 95%). In Group 2, comprising students studying according to PBL, 39 evaluation forms were issued and 33 returned (response rate 85%). The total response rate was 91%. The data was tested using the SPSS 14.0 programme. Because the data did not fulfill all the criteria for parametric testing it was analysed using the Mann-Whitney test.

Results

The results show that for the PBL-taught students the averages for the skill areas defined in

the research were neither better nor worse than among the students following the traditional curriculum result. This result is in line with research of Uys et al. (2004a) which found no difference between these two groups. Uys et al. (2004a) was concerned with the evaluation of nurses' practical skills but in two other studies (Gwele et al. 2003; Uys et al. 2004b) the results are connected to more clearly defined areas: problem solving skills (Uys et al. 2004b) and promoting health and lifelong learning (Gwele et al. 2003). These form an integral part of nursing education. Pfeil (2003), in turn, targeted one particular study module, paediatric nursing. Generally, comparisons are difficult even with Uys et al.'s (2004a) results, except for the conclusion, because all four studies are qualitative in nature.

In the results it is worth noting that the average for all skill areas were quite high (around 3.75) in both groups. In this sense the question of whether the graduating students know their subject can be answered: they have the relevant knowledge and they still do. According to the supervisors, students' ethical and value judgement skills were especially impressive. The results also reveal the fact that for both groups the skills areas in which they are stronger or weaker are the same despite the teaching strategy.

Generally, the students regarded clinical skills as one of the most important skill areas. In terms of grading, however, this area was located somewhere in the middle range of the skills. Certainly there are many targets to be improved in the teaching of these skills but as long as these ten skill areas are compared on a scale there will always be those at the bottom. It might be be more useful to focus on the differences between the best and the worst averages, as well as on how this difference could be minimized. In Group 1 (traditional curriculum) the difference is about 0.88 and it Group 2 (PBL curriculum) is about 0.97. In this sense, the differences have slightly grown with the move to PBL.

From a broader perspective, the results reveal that with PBL the students' skills are more polarised than before. The relative proportion of higher and lower grades has increased. Does this suggest that students who enjoy PBL-style learning benefit significantly? Meanwhile, the skills of those students who are uncomfortable PBL and do not wish to study in that way decline even further making them underachievers.

The results also indicate that in a small group students learn better. This is nothing new, but from the PBL perspective it is challenging to note that a small PBL group in other words 12 students which was divided in half during the tutorials, did not achieve better results than large groups or traditionally taught groups. Why is this? According to PBL theory and international PBL studies (Arpanantikul et al. 2006), the results should have been better or could it be that these averages are already so good that there is little room for improvement? There is certainly room for closer examination of learning problematics connected with small groups

What was worrying in the supervisors' evaluation was that in the case of one student the supervisor would have awarded them 0.7 which was below the lowest pass grade. The same student would have then received 2 fail grades, one of which would have been for clinical practice. With

hindsight, there is good reason to ask how this could happen?

To summarise, PBL learning supposedly produces public health nurses and midwives who are at least as skilful as those taught with the traditional curriculum. However, if not enough attention is directed towards student counselling and motivating there will be many students who have sufficient knowledge but at a minimal level.

Sources

Arpanantikul M, Thanooruk R & Chanpuelksa P. 2006. Self-directed learning readiness, critical thinking skill and self esteem in nursing students studying through problem based learning. Thai *Journal of Nursing Research 10* (1) 59–72 (abstr.).

Barrow EJ, Lyte G & Butterworth T. 2002. An evaluation of problem-based learning in a nursing theory and practice module. *Nurse Education in Practice 2*, 55–62.

Beers GW. 2005. The effect of teaching method on objective test scores: Problem-based learning versus lecture. *Journal of Nursing Education 44* (7) 305309.

Biley FC & Smith KL. 1999. Following the forsaken: a procedural description of a problem-based learning program in a school of nursing studies. *Nursing & Health Sciences 1*, 93–102.

Chaves JF, Barker CM, Chaves JA & Fisher ML. 2006. Self, peer and tutor assessment of MSN competencies using the PBL-Evalutor. *Journal of Nursing Education 45* (1) 25–31.

Gwele Ns, McInerney PA, van Rhyn L, Uys LR & Tanga T. 2003. Selected outcomes of community-oriented, problem-based nursing programmes in South Africa. *Curationis: South African Journal of Nursing 26* (3) 21–31.

Hwang SY & Kim MJ. 2006. NA comparison of problem-based learning and lecture-based learning in an adult health nursing course. *Nurse Education Today 26* (4) 315–321.

Kemppi A-M & Tuomi J. 2004. Opettajan huoli – ongelmaperustainen oppiminen hoitotyön opettajan kokemana. *Ammattikasvatuksen Aikakauskirja 6* (4) 50–57.

Mok E, Lee WM & Wong FK. 2002. The issue of death and dying: employing problem-based learning in nursing education. *Nurse Education Today 22*, 319–329.

Pang S, Wong T, Dorcas A Lai C, Lee R, Lee W, Mok E & Wong F. 2002. Evaluation the use of developmental action inquiry in constructing a problem-based learning curriculum for pre-registration nursing education in Hong Kong: a student perspective. *Journal of Advanced Nursing 40* (2) 230–241.

Pfeil M. 2003. Assessing the clinical skills performance of nursing students. *Journal of Child Health Care 7* (3) 191–206.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen.* (Akateeminen väitöskirja) Tampere; University Press.

Poskiparta M, Liimatainen L & Sjogren A. 2003. Students' and teachers' expiriences of a problem-based learning method in health promotion in a Finnish polytechnic. *Health Education Journal 62* (1) 73–88.

Rideout E & Caprio B. 2001. The problem-based learning model of nursing education. Kirjassa E Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 21–49.

Tivari A, Chan S, Wong E, Wong D, Chui C, Wong A & Patil N. 2006. Ethe effect of problem-based learning on students' approaches to learning in the contex of clinical nursing education. *Nurse Education Today 26* (5) 430–438.

Uys LR, Gwele NS, McInerney P, van Rhyn L & Tanga T. 2004a. The competence of nursing graduates from problem-based programs in South Africa. *Journal of Nursing Education 43* (8) 352–360.

Uys LR, van Rhyn L, Gwele NS, McInerney P, & Tanga T. 2004b. Problem-solving competency of nursing graduates. *Journal of Advanced Nursing 48* (5), 500–509.

Woods S. 2006. Views of the effectiveness of problem-based learning. *Nursing Times 102* (21) 34–38.

Päivi Karttunen

14 What Was Learned During Nursing Education Based On PBL?

Background and purpose of the study

Students' ideas about how to interpret study-related tasks and situations play a key role in the educational process. Similarly, student satisfaction has a strong impact on the learning results (Espeland & Indrehus. The purpose of this study was to assess what the nursing students have learned during their PBL-based training.

Research data and methods

A structured questionnaire was used to elicit responses about the kind of information or clinically-related knowledge the students regarded as important in the nursing profession. Later, the same students were asked to what extent they felt they had learned about these matters.

The Tixel programme was used in the analysis of the data and focused on the average and dispersion numbers. The statistical differences between the separate measurement times of the variables were tested using the Tixel programme.

Results

In students' assessment of the knowledge they regarded as important (14 areas) there were a number of statistically significant changes during the study: "Knowledge of the patient's medical care" ($p = 0.02228^*$), "Factors affecting the patient's own situation in life" ($p=0.00278^{**}$), "Factors relating to the patient's own wishes and habits" ($p = 0.00298^{**}$), "Social factors affecting the patient's care" ($p = 0.03936^*$), "The significance of microbiology and aseptics" ($p = 0.00472^{**}$), and "The significance of knowledge about nursing science" ($p = 0.04661^*$).

The difference between the importance of the subject and what students felt they had learned was indicated by a gap, which varied, depending on the subject, from +0.25 to -0.61. During the final stage of their training students considered knowledge about patients' illnesses and diseases to be the most important subject. Here, the gap between the significance of the subject and what students felt they had learned was -0.5. However, the biggest gaps were apparent concerning factors affecting the patient's situation in life and anatomy and physiology (-0.61). Furthermore, there were considerable gaps regarding the patient's own wishes and habits, and knowledge of the patient's illnesses and diseases.

The students attached great importance to issues of know-how which were related to the patient's care and, here too, the expectations with regard to the teaching were the highest. The size of the gap reveals the difference between expectations and how significant students found the sub-

ject. At its widest, the difference was -0.76, which concerned learning about the wholeness of the patient's care.

Examination of the results

When the results of the problem-based learning are examined in the light of the students' own experiences, it seems that the best results in terms of learning to learn, independent study, and information seeking were achieved in the areas students considered important.

The significance of nursing knowledge and how it is learned during the educational process, which is also dealt with in other Finnish studies (Heikkilä 2005 Juvonen 2001), is treated here only briefly. According to the results of this study, students appreciate information about the patient's illnesses and diseases, an observation confirmed by Manninen (1998). Similarly, the students of PIRAMK considered the promotion of the patient's health and knowledge which is related to directing the patient important from the point of view of their own performance, objectives that the PIRAMK nurse training programme also emphasises.

The gap between what the students considered important and what they felt they had learned was at its widest with the practice of patient care. When matters related to practical know-how are examined in more detail, it seems the gaps between the importance attached to them and what students felt they had learned increase. This applies to managing patient care holistically, to solving patient's problems in clinical practice and to using theory in practical nursing. Resolving prob-

lems in patient care is central to the nurse's work. The students who had graduated from PIRAMK also considered it important but felt that it was the area of know-how listed on the questionnaire they had learned least well. The learning of decision-making skills has also been emphasised in other Finnish studies which show that students consider practical situations to be the best place to learn decision-making. The ability to perceive a patient's overall situation is seen as demanding and it is difficult (see Juvonen 2001) to highlight essential matters from the wide amount of information available to the student.

Sources

Di Vito Thomas P. 2005. Nursing students stories on learning – how to think like a nurse. *Nurse Educator 30* (3), 133–136.

Dochy F, Segers M, Van den Bossche P & Gijbels D. 2003. Effects of problem-based learning: a meta-analysis. *Learning and Instruction 13*, 533–568.

Espeland V & Indrehus O. 2003. Evaluation of students´satisfaction with nursing education in Norway. *Journal of Advanced Nursing 42* (3), 226–236.

Heikkilä A. 2005. *Ammattikorkeakoulusta valmistuneiden hoitotyön opiskelijoiden tutkitun tiedon käyttö.* Turun yliopisto. Väitöskirja.

Juvonen S. 2001. *Hoitotyön päätöksenteko: päätöksenteon opetus ja sairaanhoitaja- ja terveydenhoitajaopiskelijoiden päätöksenteko.* Turku: Turun yliopiston julkaisuja C, 175.

Karttunen P. 1999. *Tietoa hoitotyön toimintaan: sairaanhoidon opiskelijoiden käsityksiä tiedosta ja tiedon suhteista toimintaan.* Acta Universitatis Tamperensis 651. Akateeminen väitöskirja. Tampereen yliopisto.

Pirkanmaan ammattikorkeakoulu *Opinto-opas 2002–2003.* Tampere.

Manninen E. 1998. Changes in nursing students' perceptions of nursing as they progress through their education. *Journal of Advanced Nursing 27* (2), 390–398.

Tanner C. 2005. What we have learned about critical thinking in nursing. *Journal of Nursing Education 44* (2), 47–48.

Toni Niittymäki, Jouni Tuomi & Anna-Mari Äimälä

15 What The Grades Say

Introduction

When PIRAMK moved to problem-based learning, it was believed that it would not only help resolve the practical problems in educating nurses, but also improve student motivation and thus facilitate their learning. This, it was thought, would also be seen in their study attainments.

This report examines the effect the transition to problem-base learning had on students' study success.

The research questions were:

1. Is there a difference in grades between students who have graduated from the traditional curriculum compared with those who have studied under PBL?
2. Does the student's earlier education have an effect on the success of their studies, depending on whether they pursue a traditional curriculum or a PBL curriculum?
3. How well have the midwifery and public health nurse students succeeded before and after the PBL reform?

Research data and analysis of the data

The data was gathered from the attainment register of PIRAMK. The grades achieved by graduates for their student theses and for their professional studies were used as the basis of the study. The evaluation used a five-point scale 1–5, in which grade 5 stands for excellent.

The study focused on the three last groups to begin their nursing education with a traditional curriculum (1999 –2001) and the first three groups (2002–2004) to begin with a PBL curriculum (2002–2004). A total of 310 students graduated from the traditional curriculum and 280 from PBL. Furthermore, the success of the midwifery students and the students of public-health nursing were examined separately for the last course implemented according to the traditional curriculum (2001; midwifery students n= 15 / public-health nursing students n= 20) and for the first class to follow the PBL curriculum (2002; midwifery students n=15 / public health nursing n= 16) in relation to the grades for the thesis and for professional studies.

The large amount of data (both variables > 100) were analysed using the T-test for independent measurement. If the second variable was less than 40, both the T-test for independent measurement as well as the Mann-Whitney test were used in the analysis. If both variables were less than 40, the analysis was carried out with the Mann-Whitney test only.

Results

There were differences between nursing students'

grades depending on whether they had completed their studies with the traditional or with the PBL curriculum (see Table 1). The averages for students' grades had declined after PBL reform. For the theses the difference was statistically highly significant, while for the professional studies the difference was statistically significant.

The statistics offered by earlier studies show a decline in the average grades of both comprehensive school and upper secondary school quotas with the PBL reform. In all cases the averages of students who had been accepted from the upper secondary school quota were better than the averages of students who had been accepted from the comprehensive school quota. The averages for professional studies were fairly similar, but with PBL reform the difference between the separate quotas increased a little. With the thesis the differences between the quotas before and after PBL reform were statistically significant, with the difference increasing after the reform. Also within the comprehensive school quota the margin of the average proved to be statistically significant. Within the upper secondary school quota the reform meant a highly significant weakening of the average.

The situation of the midwifery and public health nursing students appeared to differ from that of the nursing students. The averages for midwifery and public health nursing students remained much the same for professional studies. For the thesis the midwifery students' average rose while the average of the public health nursing students weakened a little. However, these changes were not statistically significant.

Evaluation of results

As a starting point it is worth noting that the average grade for a thesis (3.97) and the average for vocational studies (3.51) before PBL reform were quite good. The question arises as to whether it is possible to dramatically improve the grade average, especially that of the thesis, and still retain the original grade scale? Nevertheless, in this study the significant weakening of grades was surprising.

On the basis of their grades the nursing students who have studied according to the PBL curriculum have done more poorly than those who followed the traditional curriculum. For the thesis the decline is highly significant statistically. It is

	Traditional curriculum		PBL curriculum		
	M (Sd)	n	M (Sd)	n	p
Thesis	3.97 (0.941)	310	3.64 (0.947)	280	0.000
Professional studies	3.51 (0.617)	309	3.35 (0.574)	280	0.001

Table 1. The study success of the nursing students as grade averages

worth noting that the resources for the teachers supervising the theses declined during the period of this study. Resources were scaled back after 2002, so had no impact on the supervision of the theses written by midwifery and public health nursing students. The average for the thesis rose for the midwifery students, and for the public health nursing students the decrease in the average grade was less than for the nursing students. On the other hand, the nursing students' average fell as early as 2002 to a level where it remained for the two following years.

For the professional studies the trend towards lower grades is statistically significant. It may be that this change is less the result of PBL reform and more to do with the fact that PBL teachers know their students better; they are more fully aware of who knows what and who does not. (Tuomi & Äimälä 2008c; 2008D). Consequently, the declining grades are probably explained by the improved precision of the evaluation rather than by the change in the learning method. The grades that have gone down may be a more realistic reflection of students' skills that earlier grades were.

The change which has taken place in the grades can be explained by external factors. A considerable weakening of the skills may have taken place but it is not necessarily explained by the change in teaching method; rather, year by year, students have less time to study because of regular working commitments. It is also possible that the diminished resources available to teachers has had an effect on the grades of the thesis, at least where less successful students are concerned, although the study cannot show this directly. According to the results of this study, and also those of Tuomi and Äimälä's (2008b) research, it appears that small group sizes explain good results more than the PBL curriculum.

Sources

Tuomi J & Äimä A-M. 2008a. *Opiskelijoiden näkemyksiä ongelmaperustaisen oppimisen kehit-tämiseksi.* (Tässä kirjassa)
Abstract in English: *The students' view on how to develop problem-based learning* (See Contents)

Tuomi J & Äimälä A-M. 2008b. *Osaako ne edes mitään? Harjoittelun ohjaajien näkökulma opiskeli-joiden osaamiseen.* (Tässä kirjassa,)
Abstract in English: *How clinical practice supervisors see the students' skills* (See Contents)

Tuomi J. & Äimälä A-M. 2008c. *Vuoden kokemuksella sanoisin, että…* (Tässä kirjassa)
Abstract in English: *With the experience of one year I would say that…* (See Contens)

Tuomi J. & Äimälä A-M. 2008d. *Paluuta entiseen ei ole, mutta …* (Tässä kirjassa)
Abstract in English: *There is no returning to the old style, but…* (See Contents)

Part V
Students' Experiences And Views On Problem-Based Learning

Päivi Karttunen

16 The Advantages And Drawbacks Of Problem-Based Learning From The Students' Point Of View

Background and purpose of the study

Among other things, the way in which students experience their studying affects how meaningful they find that learning (Marienau & Fiddler 2002). This also influences learning strategies and learning outcomes (Espeland & Inrehus 2003) as well as enthusiasm and satisfaction with one's own learning (Carey & Whittaker 2002; Williams

2004; Pastirik 2006.) The purpose of this study was to find out what students see as the advantages and drawbacks of problem-based learning after three and half a years of experience.

The implementation of the study

In December 2005, 63 students who had gradu-

Factors connected with the implementation of PBL	The routine of the PBL pattern	3
	Bad starting points	3
	Problems tutorials	7
	Problems with tutorial tasks	2
	Problems with tutor groups	5
	Small number of exams and controls	2
	More emphasis in practical work	2
Factors connected with the students' own work	Too much responsibility of one's own learning	14
	Too much work	6
Factors causing uncertainty	Too little contact teaching	23
	Uncertainty about one's own learning	9
	Difficulty to learn anatomy and physiology	5
	Difficulty to learn languages	1
	Being a test group	1
	The quality of teaching suffers	1
	Mentioned together	84

Table 1. The drawbacks of problem-based learning

ated from Pirkanmaa Polytechnic responded to an open inquiry about the advantages and drawbacks of problem-based learning. The data was then subjected to a content analysis.

Results

All those who had participated in the inquiry found some element they regarded as beneficial in PBL. After three and half years of study, four interviewees did not record any drawbacks and one interviewee stated that it was not a problem to study according to PBL. Table 1 lists the drawbacks students cited with regard to problem-based learning while Table 2 (next page) describes the advantages.

The examination of results

In examining the results it was clear that that the experiences of the PIRAMK students reflect similar themes to earlier studies.

The learning of skills for independent working and information acquisition are considered one of the most significant advantages, although the ability to seek relevant information does not necessarily guarantee the ability to use it in practical work. Working to solve certain problems also helps to understand phenomena from both a theoretical and a practical perspective and from the different points of view brought up by the group. This, in turn, is essential in the integration of a theory and practice (Pang et al. 2002 and Pastirik 2006).

The development of one's own skills	Developing skills in seeking information	32
	Develping independent working skills	20
	Discussion and thinking help understanding	20
	Improves group work skills	15
	Improves communication skills	11
	Improves (critical) thinking	10
	Improves the sense of responsibility	8
	Knowledge and skills are combined	7
	Improves problem-solving skills	6
	Improves skills in getting and giving feedback	2
	Improves being active	2
	Develops diversity	1
	Develops patience	1
Advantages connected to the working method	Makes it possible to have individual choices (eg. timetables)	3
	Changing tutor groups	1
	Small number of lectures	1
	A lot of free time	1
	Mentioned together	141

Table 2. The advantages of problem-based learning

As might be expected, students also highlight the skill of working in groups as an advantage of problem-based learning, although this form of working was not necessarily regarded as unproblematic. This focus on factors related to the group process is also evident in earlier studies (Biley & Smith 1999). It would also be important to study how this skill is carried over into the clinical practice (Barrow, Lyte and Butterworth 2002).

The large amount of work and the lack of the time were cited as factors causing uncertainty, a view reflected in earlier studies (Pang et al. 2002; Rowan McCourt & Beake 2007). The wide range of knowledge which is related to the learning and the evaluation, and also its relevance were a problem for some students, a finding that once again parallels earlier research (Solom & Finch 1998; Biley & Smith 1999; Barrow, Lyte & Butterworth 2002). The uncertainty students felt about the depth, scope and methodology of their own learning may also be connected to their phase of development as knowledge seekers, according to Belenky (1976). On the basis of Biley & Smith's (1999) research results, the uncertainty of the students may also be due to the fact that the focus in problem-based learning is more on the process than on the contents to be learned.

As in the Biley & Smith (1999) study, the PI-RAMK students also wanted more control over their learning, a wish that was clearly reflected in the statements given about the teaching of theory and the lack of contact teaching.

On the basis of this evaluation study, attention should be directed to developing the implementation of problem-based learning in such a way that students can gain support for their own learning and, in doing so, feel a sense of confidence that they have learned appropriate knowledge. In developing the model of problem-based learning, it is also important to take the different learning skills of the students and the different styles of knowing into consideration. Choices in learning methods can also be used to increase students' confidence in their own knowledge (Eyres 1993; Brown et al. 2003). It would also support those students who need more affirmation regarding their ideas and their phase of development. Working in tutorial groups is an essential part of the students' learning process from the point of view of meaningful learning. For this reason, attention needs to be directed towards this part of the studies and to the different dimensions of teamwork which are related to it.

Sources

Barker C. 2000. Problem-based learning for nursing: integrating lessons from other disciplines with nursing experiences. *Journal of Professional Nursing 16* (5), 258–266.

Barrow E, Lyte G & Butterworth T. 2002. An evaluation of problem based learning in a nursing theory and practice module. *Nurse Education in Practice 2*, 55–62.

Belenky M, Mcvicker Clincy B, Goldberger N & Tarule J M. 1986. *Women´s ways of knowing. The development of Self, Voice, and Mind.* New York: Basic Books. Inc., Publishers.

Biley FC & Smith K L. 1999. Making sense of problem-based learning: the perceptions and experiences of undergraduate nursing students. *Journal of Advances Nursing 30* (5), 1205–1212.

Brown B, O´Mara L, Hunsberger M, Love B, Black M, Caprio B, Crooks D & Noesgaard C. 2003. Professional confidence in baccalaureate nursing students. *Nurse Education in Practice 3*, 163–170.

Carey L & Whittaker K A. 2002. Experiences of problem-based learning: issues for community specialist practitioner students. *Nurse Education Today 22*, 661–668.

Espeland V & Inrehus O. 2003. Evaluation of student satisfaction with nursing education in Norway. *Journal of Advanced Nursing 42* (3), 226–236.

Eyres S J. 1993. Women´s Ways of Knowing and Teaching RN Students. Kirjassa N L Diekelmann & M L Rather. 1993. *Transforming Nursing Education: Dialogue on Debate.* New York: National League for Nursing Press, 211–230.

Hmelo-Silver 2004. Problem-based learning: What and how do students learn. *Educational Psychology Review 16* (3), 235–236.

Horne M, Woodhead K, Morgan L, Smithies L, Megson D & Lyte G. 2007. Using enquiry in learning: from vision to reality in higher education. *Nurse Education Today 27*, 103–112.

Marrienau C & Fiddler M. 2003. Bringing students' experience to the learning process. *About Campus 7* (5), 13–19.

Pang SMC, Wong TKS, Dorcas A, Lai GKY, Lee RLT, Lee W, Mok ESB & Wong FKY. 2002. Evaluating the use of development action inquiry in constructing a problem-based learning curriculum for pre-registration nursing education in Hong Kong: a student perspective. *Journal of Advanced Nursing 40* (2), 230–241.

Pastirik PJ. 2006. Using problem-based learning in a large classroom. *Nurse Education in Practice 6*, 261–267.

Rowan C, McCourt C & Beake S. 2008. Problem based learning in midwifery – The students´ perspective. *Nurse Education Today 28*, 93–99.

Rowan C, McCourt C, Bick D & Beake S. 2007. Problem based learning in midwifery – The teachers perspective. *Nurse Education Today 27*, 131–138.

Solomon P & Finch E. 1998. A Qualitative study identifying stressors associated with adapting to problem-based learning. *Teaching and Learning Medicine 10* (2), 58–64.

Williams B. 2004. Self direction in a problem base learning program. *Nurse Education Today 24*, 277–285.

Jouni Tuomi & Anna-Mari Äimälä

17 The Students' Views On How To Develop Problem-Based Learning

Introduction

The giving of feedback or the evaluation of learning is not a popular research subject. The ability to give feedback about teaching and learning is somehow considered self-evident and unproblematic. Because teaching and learning do not necessarily have a causal relationship and because learning may also take place unconsciously, it is justifiable to ask how successfully one can evaluate learning through the use of feedback. While it is not possible to claim that students are unable to evaluate their learning, such an ability should not be taken as self-evident. (Moilanen Nikkola & Räihä 2008.)

Data acquisition

At the beginning of the autumn term, in the sixth year of the PIRAMK's PBL reform (2007), an information and discussion forum concerning PBL and its potential was arranged for all students and teachers. The objective of the event was to develop students' learning strategies and to support them in developing PBL. After the occasion the teachers gathered the students in classes to continue the discussion and to put together a written summary of the students' views.

Student feedback

In general students were concerned about the learning process: what went well, what went badly and what required development. In the feedback the work of the tutor group and work related to the tutor group were seen central features of PBL.

Good: learning in the tutor group, the small size of the tutor group (6-8 persons), the dynamics of the tutor group (good chemistry between participants, motivation, discussion, the different points of view etc.), the versatility of the learning (the learning tasks, the relation to the lectures etc.) and tutors who make the learning possible.

Bad: the large size of the tutor group (as many as 14–15 persons), the dynamics of the tutor group (bad chemistry, heterogeneous students, uncommunicativeness etc. in the group), tutor meetings (the stiffness of the sessions, the precise structure etc.), the huge amount of self-study, the actions of the tutor (stiff, not knowing what is coming etc.) and inadequate support services (lack of materials in the library).

To be developed: the size of the tutor group (a maximum of 8 persons), tutorials (the schedules, realisation, contents, evaluation etc.), the operation of the tutor (control and supervision, uniform working patterns etc.) and the whole cycle (adding lectures, separate tasks for separate groups etc.) and "What about ending it completely…?"

Assessment of the student feedback as a development tool

It was a pity that not all the teachers were interested in gathering feedback about the students' experiences or in hearing their development proposals. The most positive aspect of the feedback was the fact that the students looked at PBL's problems, advantages and potential for development. It can be said that most of the students' comments do not describe the learning itself but the conditions of the learning and the learning environment. From the point of view of learning theories it is not sensible to examine learning as a phenomenon without taking into account the surrounding world. Making learning possible or obstructing it is always connected to the conditions in which learning takes place and to the environment. One purpose of PBL is to create an environment which makes learning possible, and in this sense, the students' views about PBL are in accordance with the thinking behind it.

The feedback also revealed the fact the students strongly perceive PBL through the tutor group meetings. The feedback gathered from the physiotherapy students of PIRAMK tells a similar story (Lähteenmäki 2006). According to the PBL model, independent study, the study circle, the two-part tutorial session and the expert lectures should form the whole of the learning experience. According to the PBL outlook, the tutorials are not the primary place of the learning. However, the student feedback suggests that the PBL cycle as a tool for learning has not been sufficiently pieced together. Also the fact remains that in practice very little studying is achieved in study groups and the tutorials are perceived as primary learning situations. It is justifiable to ask whether the evaluation tools which have been used do in fact direct students towards this kind of thinking because the teacher clearly does evaluate behaviour and speech in the tutor meetings (Minkkinen & Äimälä 2008; Perttilä & Äimälä 2008.)

The feedback was group-specific, but there were also comments which could be individualised. In such cases the students' views in favour or against PBL revealed their own learning style. Some reacted to the change to PBL as a challenge or a way of diversifying their own ways of learning. In their answers students' revealed their own ideas about the nature of knowledge and the skills needed in future work. These views also influenced the way they evaluated their education. For example, there was the fear that the comfortable discussions of tutor group meetings were wrenching time away from getting the actual information needed for the profession, in other words from lectures and working practices. This feedback suggests that some students trust their own ideas about knowledge and skills rather than those of the teachers. At the same time, it was clear that other students trusted the professional skill of the teachers.

On the basis of the feedback it appears that the students shared many of the same concerns as the teachers when it comes to PBL Students also pinpointed many similar elements which they felt prevented and promoted learning. Furthermore, on the question of PBL development, once again, similar ideas were put forward by both students and teachers. (Tuomi & Äimälä 2008a; 2008B.)

Sources

Armstrong J. 1998. Are student ratings of instruction useful? *American Psychologist 53* (11) 1223–1224.

Clouder L. 1998. Getting the 'right answers': Student evaluation as a reflection of intellectual development? *Teaching in Higher Education 3* (2) 185–196.

Friedrich J. 1998. Teaching evaluations; concerns for psychologist? *American Psychologist 53* (11) 1226–1227.

Lähteenmäki M-L. 2006. *Asiantuntijuuden kehittyminen ongelmaperustaisessa fysioterapiakoulutuksessa.* (Akateeminen väitöskirja) Acta Universitatis Temperensis 1197. Tampere University, Tampere.

Moilanen P, N**ikkola T & Räihä P.** 2008. Opiskelijapalautteen käyttökelpoisuus yliopisto-opetuksen kehittämisessä. *Aikuiskasvatus 28* (1) 15–24.

Perttilä M & Äimälä A-M. 2008. *Ongelmaperustainen oppiminen vuoden 2007 jälkeen hoitotyön ja ensihoidon koulutusohjelmassa.* (Tässä kirjassa)
Abstract in English: *Problem-based learning after 2007 in the training of nursing and emergency care* (See Contents)

Tuomi J. & Sarajärvi A. 2002. *Laadullinen tutkimus ja sisällönanalyysi.* Helsinki; Tammi.

Tuomi J. & Äimälä A-M. 2008a. *Vuoden kokemuksella sanoisin, että…* (Tässä kirjassa)
Abstract in English: *With the experience of one year I would say that…* (See Contens)

Tuomi J. & Äimälä A-M. 2008b. *Paluuta entiseen ei ole, mutta …* (Tässä kirjassa)
Abstract in English: *There is no returning to the old style, but… (*See Contents)

Äimälä A-M. 2008. *Ongelmaperustaisen oppimisen toteutus Pirkanmaan ammattikorkeakoulun hoitotyön koulutuksessa vuosina 2002–2006.* (Tässä kirjassa)
Abstract in English: Minkkinen L & Äimälä A-M. *Implementing problem-based learning in nursing education at PIRAMK* (See Contents)

Part VI
Problem-Based Learning
In The Nursing Programme 2008

Marjatta Perttilä & Anna-Mari Äimälä

18 Problem-Based Learning After 2007 In The Training Programmes Of Nursing And Emergency Care

Orientation of the students

In the spring of 2007 senior lecturers Marjatta Perttilä and Anna-Mari Äimälä were assigned the task of drawing up a new orientation guide for the students of problem-based learning. The earlier guide had been widely criticised as difficult, non-motivating, even frightening. The orientation was to take place in three stages. During the first stage all new students were to receive a one-page outline of problem-based learning. This was to ensure that every student confirming their course of study would know what kind of learning environment they were entering.

The second stage was to take place on the first day of studies when a five-page manual would be given to the students: A summary of the guide to problem based-learning (PBL). This guide contains a brief description of what PBL is, what happens in the PBL learning environment, the stages of the PBL cycle, and the student roles in the tutorials, as well as an explanation of the evaluation process. With this guide the student would attend an educational science lesson in which problem based learning was introduced in a practical way. Here any questions would be answered and the students would become acquainted with the electronic guide, which can be found on the Moodle e-learning platform. In the same week the first tutorial might take place in which students would get to know the practices with the help of the manual. This would also be the occasion on which the common rules of the group are agreed on.

The name of the written manual is "A summary of the guide to problem-based learning". A fuller version of the guide to the problem-based learning can be found in electronic format on the Moodle platform where a PBL network course has been drawn up. The web course represents the third stage of the induction process. The first web course was designed for the needs of Ikaalinens' business and of tourism services cluster by senior teacher Maija Kärnä. In autumn 2007 the course was edited with Sari Mettiäinen's assistance into a form suitable for nursing education. Care was taken to ensure that the concepts referred to in the manual were in line with the web course. The web course, which progresses in 10 steps, contains text, images, video clips, tasks and tests. It includes nine subjects to be studied (Table 1).

The contents of the web course are required learning but this is not supervised in any way. If working does not proceed smoothly in the tutorials, the tutor may request students to study the matter in Moodle. The electronic guide has been especially necessary for new students joining the

- What is problem-based learning?
- Why study according to PBL?
- What are the differences between PBL and traditional lectures?
- How does study take place in a PBL environment?
- How does the group work?
- What are the tutorial roles?
- How is the evaluation done?
- What is critical conversation?
- How do I study efficiently?

Table 1. Subject areas to be studied on the web course

group during the term. Figure 1 shows the students' orientation to problem-based learning.

Working in tutorials during the academic year 2007–2008

The progress of tutorials has remained, in principle, similar to the way they operated at the beginning of the reform. In the tutorials small groups proceed to work through the eight stages (Figure 2). These groups, which comprise 10–12 students, assemble once a week. A chairman, a secretary, an observer and a scribe are chosen for every session and the roles are usually fixed for one cycle. The secretary takes a memorandum for the session, which is then saved into the group's own file

on the Moodle platform. The sources that have been used in the sessions are also recorded in this folder. During the interval between the sessions the members of the group are able to send each other hints or comments via the Moodle platform. During the initial stage the students are always requested to participate in study groups that take place in the intervals between sessions. Sometimes the learning task is still the focus in these study groups if the subject has been unfamiliar and the learning tasks have not taken a clear form during the first session.

The first session of the tutorial aims to proceed to Stage 5 in which the students draw up a learning task for themselves. Then comes the stage of independent information acquisition and study. After a week the small group assembles again, the
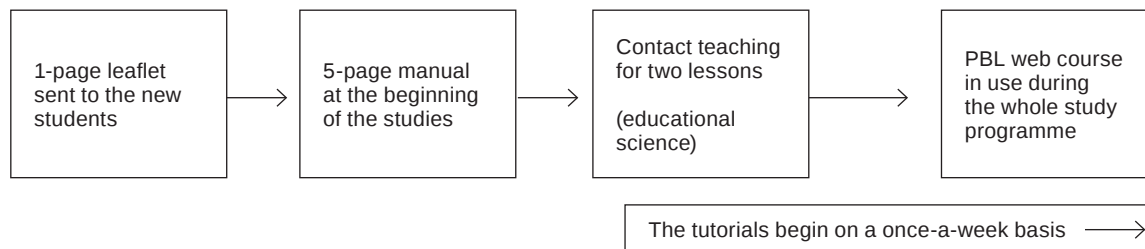

Figure 1. Orientation of the student in problem-based learning

learning task is discussed and a solution to the open questions is sought in the light of the newly acquired information. An attempt is also made to conceptualise and crystallise the ideas into a mind map, a table or a figure. Finally the learning results and group work are reflected on together.

The tutorial sessions supplement the expert lectures (about 8 hours per study credit) and the
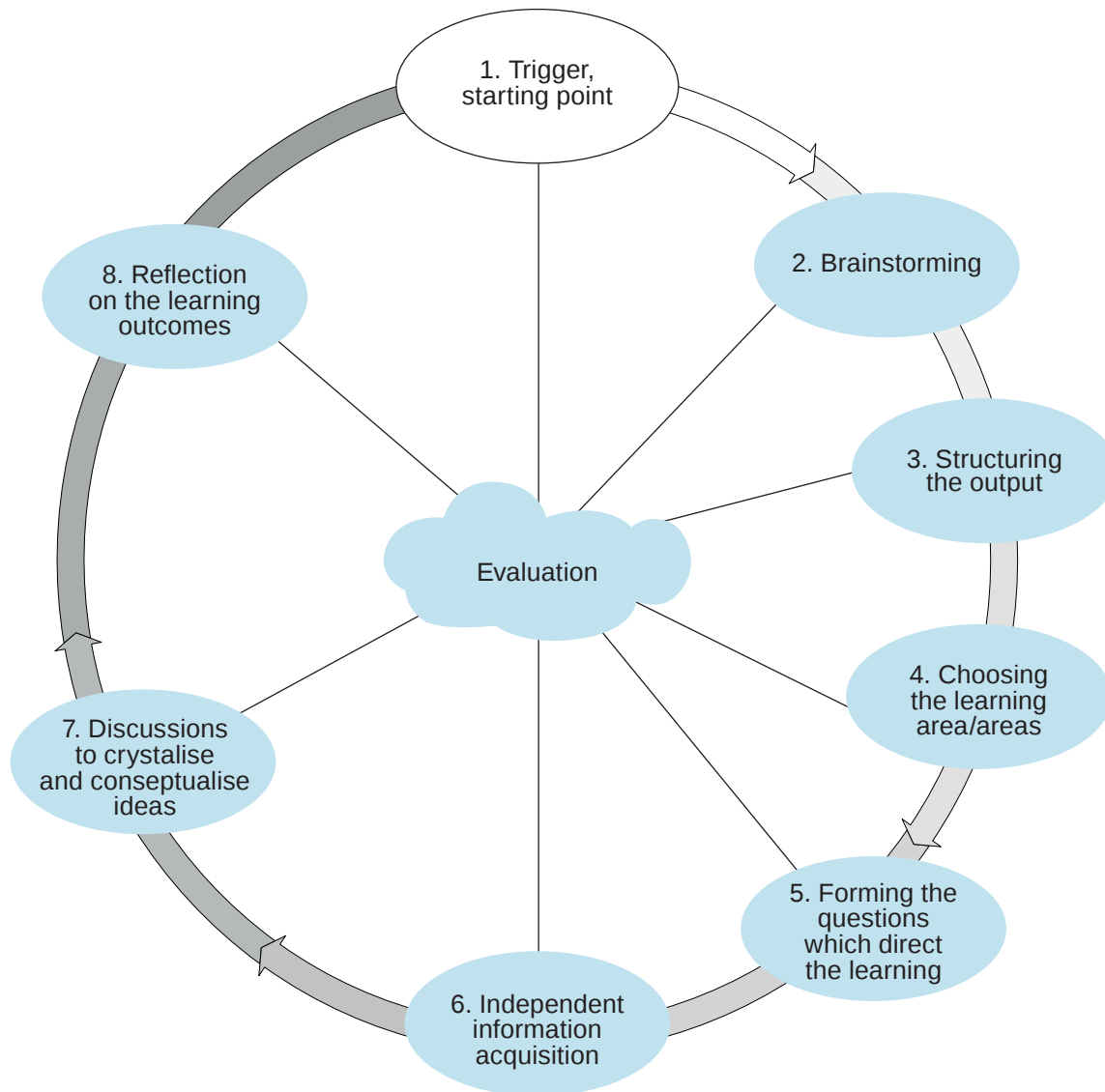

Figure 2. The working stages of a tutorial in 2007

study module-specific seminars and practical classroom teaching. The clinical practice which promotes professional skills is considered as part of the study module.

Whatever is assessed is learned

The objective of nursing education is to learn both knowledge and skills. The evaluation methods are therefore varied and include self-assessment, peer review, process evaluation and a final evaluation. The focus of the assessment changes according to the area being learned. Evaluation during problem-based learning is directed towards:

1. the problem-solving process and the skills this requires;
2. independent study and information acquisition;
3. the group process.

With the move to problem-based learning, evaluation was regarded as highly problematic. Every year, in an attempt to achieve versatility and fairness, the evaluation system was adjusted on the basis of feedback and experience. From the very beginning, the tutorial sessions were a target of evaluation. From 2002–2005 student performance in tutorial work could raise or lower grades received from the examination. However, from 2006–2008 tutorial work was assessed with its own grades.

During academic year 2007–2008 each tutorial ended in an evaluation. The observer, who is the first to speak, offers feedback on the working of the group during the separate stages and possibly also feedback on individual students. After the observer's comments the group assesses its working and finally the teacher gives feedback to the group. The teacher's feedback may also include challenges for the following session. These challenges can apply for example to the use of sources and the level of the discussion.

During the initial stage, when a study module commences three forms are given to the students to help with the process of the self-assessment: the "Dartboard" form, the self-assessment form for the module and summary of individual learning form which uses a quadrant layout. The evaluation criteria are included on the forms.

The "dartboard" was developed with the aim of increasing students' understanding of the significance of the different stages of the cycle in deepening learning. In the stage requiring independent acquisition of information there is a constant pull towards diversity. Too often, students arrive at tutorials with a pile of print-outs fresh from computer, thanks to the workings of Google. With the help of the "dartboard", students are able to assess their own working using 21 dimensions. Used after each tutorial, the dartboard allows students to see which area or areas require further development.

With the self-assessment form students estimate their problem-solving skills, their operation within the group, their ability to handle information, and their actions as a chairperson, secretary and observer. On the basis of individual grades for each area they draw up a total grade for themselves. Furthermore, the form includes space to note what factors and situations have promoted learning and what have been an obstacle to it in the study module. With the help of the quadrant

the students assess the strengths of their tutorial work, areas for further development, understanding of the learning contents and how they show these skills.

The student returns the self-assessment form to the teacher after the study module has ended and this is followed by a personal discussion. Since the autumn of 2006, the tutorials in PIRAMK have been graded with numbers based on teacher's notes, the student's self-assessment and peer review. The observers have continuously offered peer review throughout the module, but in the last session one more round of evaluation can be offered, in which feedback is given to the person seated next to the speaker and then to the whole group. An individual student is told why they were important to the group and what they contributed to the working of the group. Those giving feedback also need the courage to give negative feedback at this stage if, for example, a student has disturbed the working of the group or their approach to the work has been passive. Usually the student's self-assessment and the teacher's evaluation parallel one another but, when there are differences, the teacher can appeal to the grade criteria. The teacher also refers to the accumulated Moodle documents to help with the evaluation process.

Between the teachers there has been discussion about whether it is sensible to evaluate PBL work with grades or whether it would be better to use a pass/fail system. However, a pass performance requires an active presence in the sessions, participation in the roles of the sessions or completion of a substitute task if a student has missed a session because of an illness. There also needs to be a general discussion about the target of the evaluation: is it the group work or the substance itself?

Future pedagogical developments

PBL was adopted in the autumn of 2002 as a method of teaching the degree in nursing at PIRAMK. Now the curriculum has been once again revised on the basis of six years of feedback. The curriculum offers a project module of three credits for students who began their studies in autumn 2008 which allows them to respond to the demands of working life and study according to a project format. Inflexible PBL implementation has prevented quick responses to the needs of working life and to developments in R&D. Theoretical studies of project work are available to students once they start working in the project they have chosen.

The tutorials will still remain a key part of the teaching. During the first term they will closely follow the cycle of problem-based learning but they may be diversely implemented as the studies proceed. For example, the sessions which are related to mental health often take the form of a dialogue which is difficult to fit into the format of the cycle. Also the seminar stage has been used for study visits or for participating in an organised event (for example, the exhibition of aids and appliances). The challenge for the future is to remain sensitive to the requests and challenges which come from the surrounding environment; it is essential that educational developments reflect those taking place in society and working life. The development of the tutorial group also needs to continue and solutions are required which al-

low variation and prevent sessions from becoming repetitive and dull.

Problem-based learning suits some students, while others would welcome the opportunity to pursue an alternative mode of study. Students are most critical at the end of the first PBL year, although graduating students better understand the skills they have gained from their PBL studies. In feedback given after her first year, one public health nursing student expresses her faith in problem-based learning as follows:

I've noticed that during this training I have got more courage and self-confidence. I dare to give my own opinions and my thoughts even in a bigger group. I believe that this is a result of the tutorial sessions. That's when one learns to think aloud about things in a big group and it has given me more confidence and courage.

Jouni Tuomi

19 Problem–Based Learning And The End Of The Pedagogics?

Introduction

By the spring of 2008, problem-based learning had directed the curriculum and the implementation of nursing as well as emergency care training programmes at the PIRAMK for six years. The longer the experience of PBL, the more questions and confusion have emerged on the subject, especially about the PBL implementation at PI-RAMK. Much of the confusion about problem-based learning can be summarised in three broad questions: a so-called everyday question, an epistemological question and a pedagogical question. Taken together, these questions give rise to a kind of pedagogical wondering.

An everyday question: why does everything seem to succeed in the physiotherapy training?

This question has arisen from the discussions and experiences of the teachers of physiotherapy education. Here PBL teaching and the learning seems to have gone either well or extremely well. (Poikela p 2003; Lähteenmäki 2007.) The positive experiences enjoyed by the first stages of PBL in physiotherapy education inspired the adoption of the model into the nursing and emergency care programmes, and the physiotherapy teachers were used initially to tutor other teachers. What could explain the differences in the experiences of the physiotherapy teachers and the nursing teachers when the method was so similar?

Several attempts have been made to find explanations. One explanation may be that the individuals who direct physiotherapy and nursing education are temperamentally different types of people who perceive the progress of the learning, according to different teaching methods, as meaningful in different ways. The second explanation may be connected to the fact that physiotherapy and the nursing have a very different logic regarding the subject. Are there field-specific methods or are some methods more suitable when it comes to learning a science or vocational skills? Should one return to professional didactic questions instead of general learning? The third explanation may probably be connected to the so-called Dunbar number (150 persons). From the point of view of Dunbar's number there are clear differences between nursing education and physiotherapy education. In physiotherapy education there are less than 150 students and less than 10 teachers inside the programme at any one time, whereas in the nursing and emergency care programmes there are about 800 – 900 students and about 65 teachers. The physiotherapy programme forms an ideal group size for individuals to work in and influence.

The epistemological question: does constructivism direct nursing education?

The different PBL applications are connected by a cognitive and experiential foundation but, according to Robinson (1993), the educational and philosophical starting point of PBL has varied over the decades. He points out the empiristic, the interpretative and the critical starting points for PBL. So historically PBL's starting point covers the main philosophical trends of the 1900s. As we move into the 2000s, studies (Baker 2000a; Schmidt & Moust 2000) quite summarily refer to constructivism as the philosophical background of PBL.

It is very difficult to understand education in nursing and emergency care from the point of view of constructional epistemology which might lead one to conclude that the thought constructions produced by students would not be evaluated on the basis of how they correspond to reality and how they know this knowledge and whether they have the skills to use it. In the evaluation it is not a question of the "right" or "wrong" way to think, but the success of the ideas in the real world. For example, the question of the right injection or vaccination technique is not based on a value judgment or an individual thinker's ideas but on evidence based on the best existing information.

Epistemology, and constructivism especially, do not deal with ethical questions. Yet, according to current thinking, it is impossible to examine nursing education without ethical questions, not merely in relation to the patient but also in relation to the student. This raises the question of whether education in nursing can be justified if it is guided by a method in which students are simply tools to further one another's learning?

The pedagogical question: does PBL signify the end of the pedagogics?

The third question has arisen from the lack of contradictions in the PBL literature. With PBL, learning and education as well as their conditions and meanings are explained as a single non-conflicting entity. The PBL literature has, at its heart, the aim overcoming all the conflicts which are related to learning. The background of the idea hides the fact that the PBL cycle is thought of as a form of scientific teaching which corresponds to the stages of the study process. The promise is that with PBL we have achieved a situation in which the conflicts of learning have been cleared up. The promise is based on the fact that in PBL the starting point is the method and the study environment has already been determined. On the other hand, there is no longer any need for the development of learning methods because PBL contains all that is essential, in other words, the shape of scientific teaching. So are we at a moment of truth in which the history of the learning and pedagogics has finally come to an end?

The study by Moust et al. (2005) reveals how PBL has fairly rapidly sunk into the same kinds of problems and oversights as the traditional teaching that PBL scorns. From the narrow point of view offered by the PBL methodology, this can only be explained by assuming that those responsible for implementing PBL – the teachers – are incompetent.

A more general conclusion is that pedagogical study has not yet ended and that teachers have a task, among others, of alerting students to the significance of education and related matters, and of maintaining the significance of the matters to be studied.

The return of pedagogics

A common view in the articles of this study is that the implementation of problem-based learning in the training programmes of nursing and emergency care at PIRAMK should be developed. The problem is where to begin? Do we start the development on the premise that teachers should have a better command of PBL? Or should the curriculum be the starting point? Or do we need to look at the pedagogical underpinnings of the education? Based on these articles PBL has plenty to offer but there are problems too. Even though it is clear that the teaching method cannot be rigidly uniform throughout the whole education process, this is no reason to reject PBL. The reasons which led the nursing and the emergency care programmes to adopt PBL can probably be summed up as a need to develop the education offered by the institute. The central objective of the development was to break the power of school-style learning and support the growth of active learning.

Based on the articles of this book and on the three previous questions the best way to develop education in PIRAMK is to move away from operating with one massive group of students and to divide them instead among the training programmes of nursing and emergency care. This

makes it possible to have administratively smaller units and to carry out metaphysical and epistemological analysis of the teaching of nursing and emergency care. This, in turn, would allow teachers a perspective on their own teaching, and enable them to develop the education they offer from a pedagogical point of view. In addition, a future-orientated student analysis could elicit new educational demands from the students' point of view.

It is possible that PBL operates well, even outstandingly, in some study modules, but the education as a whole must be more broadly guided in the direction of active learning and towards an approach that examines learning methodologically. However, it is worth noting that while the methods of active learning have been given many kinds of names, it is not so important to name a teaching or learning method, as to operate in the direction of the contents of the education and of the attributes which direct it. From a pedagogical viewpoint this means that the teacher is primarily the pedagogical expert of their own teaching. The fact that teachers discuss pedagogical and methodological solutions with their colleagues and students does not take away responsibility for resolving difficulties. The fundamental question of the teaching is how the student perceives himself in his own learning – whether in nursing or emergency care – according to the objectives of that education. Ultimately it is a question of how the teacher, together with a student, is able to create connections between the learning contents and the student's world to make the learning significant.

Finally

With some astonishment the question is asked: "How did it turn out like this?" Pedagogics and didactics are familiar to every teacher right from the start of teacher training. Active learning and activating teaching methods are not new ideas. Even in the early 1990s, when PBL was launched in Finland, active teaching methods were being discussed (Lonka & Lonka 1991; Nikkanen & Hoppu 1994). PIRAMK's various early experiments with PBL (Minkkinen & Äimälä 2008) show a respect for versatility and learning and it is clear that the ideas from early 1990s were not unknown to the PBL pioneers of the institute. So why did the method gain power over the principle?

Poikela (1998) in reference to an Australian strategy model argues that the tight scenario cycle model is necessary because a move into a new learning culture requires a clear model for structuring the learning process. Perhaps PIRAMK's nursing and emergency care programmes are now at the same stage as the Australians were ten years ago. The cycle has been quicker because there are considerably more studies regarding its implementation than the Australians had in the 1980s when their first experiments had their tenth anniversary. The second and more critical question is how one can justify a tightly controlled method-based approach that directs the entire curriculum and then reject the pedagogics? Nearly every PBL study describes results based on one course, one subject, one module or from a maximum of one term. These results are used simultaneously as source materials for new studies and as a sign of PBL's vitality. It is also known that the different hybrid models are the most used solutions when PBL is under discussion.

According to the studies in this book it would seem that good students learn in spite of the method but they are no longer as good as they were. At the same time weaker students have become more and more marginalised. In the PBL model being implemented there are hardly any methods to motivate students if the PBL as a cycle does not motivate them or the student does not understand the sense of the problem being examined. A useful aid is the pedagogical methods and perspectives of traditional teaching. In this sense the PBL that has been carried out in the training programmes of nursing and emergency care owes a debt to the skills developed by traditional teaching. It will be interesting to follow the direction of development, but the rigid implementation of PBL seems to have reached the end of the road in the training programmes of nursing and emergency care at the Pirkanmaa Polytechnic.

Sources

Albenese MA & Mitchell S. 1993. Problem-based learning: a review of literature on its outcomes and implantation issues. *Academic Medicine 1* (68) 52–81.

Barker CM. 2000a. Problem-based learning for nursing: Integrating lessons from other disciplines with nursing experiences. *Journal of Professional Nursing 16*, 258–266.

Barker CM. 2000b. Using problem-based learning to redesign nursing administration masters programs. *Journal of Nursing Administration 30*, 41–47.

Burns I & Glen S. 2000. A new model for a new context? Kirjassa S Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 1–10.

Engeström Y. 1983. *Oppimistoiminta ja opetustyö.* Tutkijaliiton julkaisusarja 24. Helsinki

Engeström Y, Hakkarainen P & Hedegaard M. 1984. On the methodological basis of research in teaching and learning. Teoksessa Hedegaard M, Engetsröm Y & Hakkarainen P. (eds.) *Learning and teaching on a scientific basis.* Aarhus Universitet, Psykologisk Institut, 119–189.

Eriksson K. 1981. *Vårdprocessen – en utgångspunkt för läroplanstänkande inom vårdutbildningen. Utvecklandet av en vårdprocessmodell samt ett läroplanstänkande utgående från vårdprocessen.* (Doktorsavhandling) Helsingfors Univeritet, Pedagogiska institutionen nr. 94.

Eriksson K.1986. *Hoito-opin didaktiikka.* SHKS. Helsinki.

Eriksson K. 1988. *Hoito tieteenä* SHKS, Helsinki.

Haith-Cooper M. 2000. Problem-based learning within health professional education. What is the role of the lecturer? A review of literature. *Nurse Education Today 20*, 267–272.

Kansanen P. 2004. *Opetuksen käsitemaailma.* Jyväskylä; PS-kustannus.

Kemppi A-M & Tuomi J. 2004. Opettajan huoli – ongelmaperustainen oppiminen hoitotyön opettajan kokemana. *Ammattikasvatuksen Aikakauskirja 6* (4) 50–57.

Lonka K & Lonka I (toim.) 1991. *Aktivoiva opetus.* Tampere; Kirjayhtymä.

Lähteenmäki M-L. 2007. *Asiantuntijuuden kehittyminen ongelmaperustaisessa fysioterapeuttikoulutuksessa.* Acta Universitatis Temrensis 1197 (Akateeminen väitöskirja). Tampereen yliopisto.

Miettinen R. 1990. *Koulun muuttamisen mahdollisuudesta. Analyysi opetustyön kehityksestä ja ristiriidoista.* Helsinki; Gaudeamus

Miettinen R. 1993. *Oppitunnista oppimistoimintaan.* Gaudeamus. Helsinki

Minkkinen L. 2008. *PBL hoitotyön opetuksessa aikuissovellutuksessa vuodesta 1996.* (Tässä kirjassa, luku 2)

Moust JHC, Berkel HJM & Schmidt HG. 2005. Signs of erosion: Reflections on three decades of problem-based learning at Mastricht University. *Higher Education 50*, 665–683.

Neville AJ. 1999. The problem-based learning tutor: teacher? Facilitator? Evaluator? *Medical Teacher 21* (4) 393–401.

Niiniluoto I. 1999. *Critical scientific realism.* Oxford; Caledon Press.

Phenix PH. 1964. *Realms of meanings. A philosophy of the curruculum for general education.* New York; McGraw-Hill.

Poikela S. 2003. *Ongelmaperustainen pedagogiikka ja tutorin osaaminen.* (Akateeminen väitöskirja) Tampere; University Press.

Poikela E & Nummenmaa A-R. 2002. Ongelmaperustainen oppiminen tiedon ja osaamisen tuottamisen strategiana. Teoksessa E. Poikela (toim.) *Ongelmaperustainen pedagogiikka, teoriaa ja käytäntöä*. Tampere; Tampereen yliopistopaino, 33–52.

Puolimatka T. 2002. *Opetuksen teoria. Konstruktivismista realismiin.* Helsinki; Tammi.

Raunio K. 1999. *Positivismi ja ihmistiede.* Helsinki; Gaudeamus.

Rideout E & Caprio B. 2001. The problem-based learning model of nursing education. Kirjassa E Rideout (ed) *Transforming nursing education through problem-based learning.* London; Jones & Bartlett Publ., 21–49.

Robinson V. 1993. *Problem-based methodology. Research for the improvement of practice.* Oxford; Pergamon Press.

Schmidt HG & Moust JHC. 2000. Factors affecting small-group tutorial learning: A review of Research. Teoksessa DH Evensen & C Hmelo (eds) *Problem-Based Learning. A research perspective on learning interaction.* New Jersey; Lawrence Erlbaum Associates, 19–52.

Tuomi J. 2007. *Tutki ja lue. Johdatus tieteellisen tekstin ymmärtämiseen.* Helsinki; Tammi

Tuomi J & Äimälä A-M. 2008a. *Paluuta entiseen ei ole, mutta … (*Tässä kirjassa)
Abstract in English: *There is no returning to the old style, but…* (See Contents)

Tuomi J & Äimälä A-M. 2008b. *Opettajien kokemuksia ongelmaperustaisesta oppimisesta – tutkimuksen tausta ja metodinen toteuttaminen.* (Tässä kirjassa)
Abstract in English: *Teachers' experiences of problem-based learning: Background to the study and methodological implementation* (See Contents)

Tuomi J. & Äimälä A-M. 2008c. *Opiskelijoiden näkemyksiä ongelmaperustaisen oppimisen kehittämi*seksi. (Tässä kirjassa)
Abstract in English: *The students' views on how to develop problem-based learning* (See Contents)

Young R. 1989. *A critical theory of education; Habermas and our children's future.* Hertforsdshire; Harvester Wheatsheaf.

Vernon DTA & Blake RL. 1993. Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine 7* (68) 550–563.

Wilkie K. 2000. The nature of problem-based learning. Kirjassa S Glen & K Wilkie (eds) *Problem-Based Learning in nursing. A new model for a new context?* New York; Palgrave, 11–36.

Äimälä A-M. 2008. *Ongelma perusteisen oppimisen toteutus Pirkanmaan ammattikorkeakoulun hoitotyön koulutuksessa vuosina 2002–2006.* (Tässä kirjassa)
Abstract in English: Minkkinen L & Äimälä A-M. *Implementing problem-based learning in nursing education at PIRAMK 2002–2006* (See Contents)

Authors:

Karttunen Päivi, Vice Principal, Ph.D.

Niittymäki Toni, Planning Officer, M.Soc.Sc

Perttilä Marjatta, Senior Lecturer, M.Sc, Licentiate of Education

Roto Helinä, Lecturer, M.Sc, Licentiate of Education

Stenfors Paula, Principal Lecturer, Ph.D.

Tuomi Jouni, Principal Lecturer, Ph.D.

Äimälä Anna-Mari, Senior Lecturer, M.Sc.

www.tamk.fi