Nursing education must keep up with the rapidly changing medical landscape to support the competences of nurses in the areas of critical thinking, problem solving, and creativity. Problem-based learning (PBL) provides an appropriate strategy for nursing education innovation. Nursing curricula based on PBL remain in the growing stage in Taiwan. Kaohsiung Medical University introduced PBL into nursing education in 2002. The critical events in the process included: (1) nurturing key tutors; (2) using PBL teaching methods in an elective course—Oncology Nursing, and designing a new elective course—Symposiums Regarding Clinical Cases; (3) holding conferences inside and outside the school to promote PBL teaching methods; (4) linking e-learning and PBL teaching methods; (5) conducting PBL research; (6) establishing a committee of PBL, objective structured clinical examination, and teaching material review for the College of Nursing; and (7) setting up a required course—Nursing Ethics. We now have 12 key tutors in the College of Nursing. We have also completed two studies to evaluate the ability of students and to explore the experience of tutors. From our studies, we know that PBL can increase learner abilities in self-directed learning, critical thinking, and PBL performance. The approach helps students to cope with the changing medical landscape. Furthermore, tutors and teachers develop adequate PBL teaching skills. Based on the experience above, we believe that we are on the right path in terms of continuing tutor development, gradually increasing the number of PBL courses, and undertaking further research to promote PBL methods in Taiwan.

**Key Words:** experience, nursing education, problem-based learning

THE EXPERIENCE OF PBL IN NURSING EDUCATION AT KMU

We intended to include PBL in nursing education at KMU gradually because the sudden change attempted in the 1980s proved unsuccessful. Therefore, from 2002 to 2009, we undertook several tasks related to PBL in nursing education at KMU, including the following: (1) nurturing key tutors of PBL teaching methods; (2) using PBL teaching methods in an elective course—Oncology Nursing, and designing a new elective course—Symposiums Regarding Clinical Cases; (3) holding conferences inside and outside the school to promote PBL teaching methods; (4) linking e-learning with PBL teaching methods; (5) conducting PBL research; (6) establishing a committee of PBL, objective structured clinical examination (OSCE), and teaching material review for the School of Nursing; and (7) setting up a new required course—Nursing Ethics.

Nurturing the key tutors
We adopted four major strategies for nurturing the key tutors. First, together with other faculty members from Taiwan (five from National Yang-Ming University School of Nursing and three from Fu Jen Catholic University School of Nursing), we visited McMaster University School of Nursing in 2002 to attend a summer PBL course designed for nursing faculty that lasted 4 weeks. We studied approximately seven credit hours of PBL issues, such as “Implementing Curriculum Change: From Principles to Application”, “The Conceptual Shift: Moving Towards PBL”, “Student-centered Learning: The Foundation of PBL”, “Developing Problems for PBL: A Conceptual Framework”, “Assessing Student Learning in PBL: Some Principles”, and “Learning Activities and Evaluation Strategies: Discussion and Feedback”. Next, we designed and implemented a 68-hour informal program of faculty development (Table) for 10 nursing faculty members with different specialties who were to be the key tutors at our school. We had regular 2-hour meetings each week for 1 year to read PBL-related articles or discuss the related issues.

To observe small group learning and teaching, former Dean Dr Wang and five of the key tutors revisited McMaster University. In addition, in 2004, the first author and five other colleagues visited Samford University in the United States to study different kinds of PBL teaching models, including additional PBL in small group learning as part of a big class.

Using PBL teaching methods in an elective course—“Oncology Nursing”—and designing a new elective course—“Symposiums Regarding Clinical Cases”
To improve the traditional teaching model, the key tutors had several meetings to discuss which course would be suitable as the first PBL teaching classes. Next, we decided to institute PBL in two elective courses—“Oncology Nursing” and “Symposiums Regarding Clinical Cases”. In addition, one of the key tutors would be in charge of these courses while the other key tutors would act as facilitators for small group teaching. Senior instructor Tseng was in charge of Oncology Nursing and the first author was in charge of Symposia Regarding Clinical Cases. During the course of Symposia Regarding Clinical Cases, we provided two lectures, “Introduction to PBL” and “Concept-mapping”, to help students understand PBL and how to apply it. The students were further subdivided into several small groups. Each group comprised 8–12 students and was guided by two tutors to discuss two to three cases each.

At this stage, the key tutors had a 2-hour meeting every week to discuss and share their experiences of these two courses. We hoped to develop an effective
model of PBL teaching and to allow for index application throughout the College of Nursing at KMU.

Holding conferences inside and outside the school to promote PBL teaching methods
To foster the key tutors’ development and advance other disciplines, we held conferences inside and outside the school to promote the PBL teaching methods. We invited international leaders in the field to make presentations. Professor Lee of McMaster University discussed “How to apply PBL to nursing education” and “Analysis of the characteristics of graduates and strength for the PBL education model”. In 2004, we invited Dr Michele Drummond-Yang and Dr Sheryl Boblin, also of McMaster University, to hold a conference on PBL in Southern Taiwan. In addition to our own conferences, we encouraged our faculty to attend other national or international conferences, such as the Third Asia-Pacific Conference on PBL in Health Sciences, to gain a comprehensive view of PBL methods worldwide.

Linking e-learning and PBL teaching methods
We employed two assistants to build an e-learning website to assist in PBL teaching (http://pbl.nurse.kmu.edu.tw/) (Figure). We also set up a resource database for PBL. This website is updated by computer experts from KMU.

Conducting related research
To evaluate the performance of students and the experience of key tutors, we completed two studies with grants from the National Science Council (NSC92-2516-S-037-003 and NSC-92-2516-S-037-004). These studies were “Assessment of Student Performance in a Problem-based Learning Nursing Curriculum: A Pre-experimental Study” for students and “Perception and Impact of Nursing Faculty in Applying Problem-Based Learning Method” for tutors (unpublished data).

Assessment of student performance in a PBL nursing curriculum: a pre-experimental study
This study was completed in 2005 and was published as “Effectiveness of Applying Problem-based Learning to a Nursing Course on Symposiums Regarding Clinical Cases” in the Journal of Health Science [3]. This study described the design of a new elective PBL nursing course and evaluated critical thinking, self-directed learning, independent study, group interaction, reasoning skills, and active participation of participating students using a quasi-experimental study with a two-group pretest–posttest design. Thirty nursing students who had taken the elective nursing course “Symposium Regarding Clinical Cases” were assigned to the experimental group. The control group comprised another 30 randomly selected students from

Figure. Example website for problem-based learning in nursing education at Kaohsiung Medical University.
the same class who had not taken this course. The results showed that nursing students who had taken the PBL course had statistically significantly higher scores in the *Critical Thinking Scale* compared with those who had not taken the course. Students in the experimental group also had higher scores in the *Self-directed Learning Scale* and *Student Performance in PBL Tutorial Sessions Questionnaire*, although these differences were not statistically significant. Therefore, these results show that PBL can increase learner abilities in self-directed learning, critical thinking, independent study, group interaction, reasoning skills, and active participation.

The findings of this study encouraged us to conclude that PBL offers an effective learning strategy for our students. The students are therefore trained to cope with the changing medical landscape and the demands of medical circumstances.

**Perceptions and impact of nursing faculty in applying the PBL method**

PBL can foster the abilities of critical thinking and life-long learning in students. However, it is a challenge for nursing faculties and students, because this method focuses on the integration of course contents and emphasizes small group interactions. The teacher is the key in changing the curriculum. To understand the barriers to and outcomes of a new teaching-learning method, this study explored the perceptions and impact of nursing faculty in applying PBL to the Bachelor and Master’s nursing programs using a qualitative research design. The sample subjects consisted of 18 nursing faculties that had been involved in at least one PBL course at one of three universities, which have promoted the use of PBL. Data collection methods included self-report and one-to-one in-depth interviews. The tape-recorded content of interviews was transcribed. All data were analyzed by content analysis.

The findings, in terms of the perceptions on PBL teaching, included the following:
1. In the process of using PBL, teachers also learned about active learning and teamwork. In addition, they also found that their ability to organize and express themselves increased;
2. Learning PBL through lectures is not enough. In the process of facilitating small group activities, all teachers need to attend teaching conferences to share their experiences and learn from each other;
3. Teachers must give up the role of the authority figure and learn to interact with students as partners in learning.

The findings in terms of the positive effects of PBL teaching included the following:
1. Student interest in learning and participation increased;
2. The teacher’s preparation time for lectures decreased;
3. The teachers’ job satisfaction increased.

The findings in terms of the barriers to PBL teaching included the following:
1. The cost of small group teaching was higher than lectures, including the numbers of teachers, the teaching hours, and the need to increase the number of classrooms for small group teaching;
2. The change in the teacher’s role from authority figure to that of a partner in learning is a difficult concept for teachers and students;
3. Teachers’ satisfaction regarding teaching load and payment decreased;
4. Knowledge is gained from lectures more rapidly and more accurately than discussion or self-learning.

Overall, all nursing faculties expressed their willingness to promote PBL. With peer support and feedback from students, they expect to improve PBL teaching and make it more suitable for Taiwanese nursing education.

**Establishing a committee of PBL, OSCE and teaching material review**

In 2006, we established a committee responsible for PBL, OSCE and teaching material review. This had six committee members who were from the College of Nursing, with Dr Chin as the chairperson. One of the committee’s tasks is to promote PBL. We plan to promote PBL in the clinical nursing practicum because the total number of PBL courses in the College of Nursing cannot be increased in a short time, and our clinical nursing practicum is based on small group learning methods.

**Setting up another required course: Nursing Ethics**

Because of the costs of time and energy, most students oppose PBL courses. The number of students in PBL courses was small, despite the positive learning experience. In 2007, we introduced a required course—Nursing Ethics—which was appropriate for PBL.
In this course, students not only increased their participation and interest in learning, but also showed their abilities in terms of critical thinking and creativity.

CONCLUSION

At the College of Nursing at KMU, we have promoted PBL gradually over 6 years through key tutor training, two elective courses, and one required course. Now, we have 12 key tutors in the College of Nursing. We have also completed two studies to evaluate the ability of students and to better understand the experience of tutors. From our findings, we know that PBL can increase learner abilities with regard to self-directed learning, critical thinking, and PBL performance. PBL helps students cope with the changing medical landscape and ensures that tutors/teachers have adequate PBL teaching skills. Based on the conservative strategy, we believe that we are on the right path. We will continue to foster tutor development while increasing PBL courses gradually and conducting appropriate research. We would like to thank former Dean Dr Wang and all of the key tutors—without them, this PBL project would not have been possible.

REFERENCES

高雄醫學大學之問題導向學習的護理教學經驗

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為因應快速變遷的醫療環境，護理教育須加強護理人員的批判性思考、問題解決及創意思維等能力。問題導向學習 (problem-based learning, PBL) 即為護理教育改革的重要策略之一，而台灣以 PBL 為基礎的護理課程仍處於成長發展的階段。高雄醫學大學於 2002 年開始實行 PBL 於護理的教學，重要的里程碑包括：(1) 培養 PBL 教學之種子教師；(2) 運用 PBL 於一門現有的選修課程「腫瘤護理」，並開設另一門選修課程「案例分析」；(3) 舉辦校內外研討會推展 PBL 教學法；(4) 結合網路與 PBL 教學；(5) 進行 PBL 的相關研究；(6) 於護理學院設立 PBL、OSCE 及教材審查推動小組；(7) 開設必修課程「護理倫理」。迄今，護理學院已有 12 位種子教師；我們也完成了「評估學生能力」和「探討種子教師經驗」的兩項 PBL 研究；我們的研究發現，PBL 可增進學生的自我導向學習、批判性思考及團隊學習。此種課程發展方式可幫助學生因應瞬息萬變的醫療環境，且有助於教師獲得適當的 PBL 教學技巧。基於以上的經驗，更確認我們護理學院的方針與持續種子教師培養的任務，未來也將逐步增加 PBL 的相關課程及從事進一步的研究，以推動台灣護理的 PBL 教學。

關鍵詞：經驗，護理教育，問題導向學習

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