Inter and intra professional collaboration in the implementation of Problem-Based Learning in nursing education: lesson for South Africa

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Abstract: Purpose: This review examines various examples of collaboration in PBL implementation, particularly between academic and practice entities. **Methods**: The updated integrative review (IR) approach according to Whitemore and Knalf (2005) was utilized to guide this search and understand the extent to which PBL is collaboratively implemented in nursing education for pre-registration programme. **Findings:** Collaboration emerged as a consistent theme – whether between academics and practitioners in the supervision and guidance of nursing students, between faculty members and real patients in facilitating PBL group tutorial sessions, between inter-professional students in PBL learning, or between nurses of different specialties in developing PBL scenarios.
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1.Introduction

Nursing educators worldwide are charged with the task of preparing a nurse workforce that is responsive to dynamic population changes that are increasing in complexity. Problem-based learning (PBL) as a pedagogical approach that has been proposed as a solution to address the challenge of producing nurses that are critical thinkers, life-long learners, and more equipped to handle the challenges of their ailing communities (Rideout, 1994). The approach arose from critiques of predominantly lecture-based courses taught in medical schools in the 1950s and 1960s. It was argued that such methods of teaching lacked relevance to future physician practice in that it did not encourage teamwork, inquiry skills, problem-solving and critical thinking skills, nor was it effective in linking theory of practice (Tavakol & Reicherter, 2003). The World Health Organization echoed such concerns, especially from the standpoint of rapid technologic and information growth: "The explosion of scientific information makes traditional curricula increasingly irrelevant, because they are based on what is known today, to the exclusion of how to learn what will be known tomorrow" (Kantrowitz, et al., 1987; WHO, 1993 in Tavakol & Reicherter, 2003). The development of PBL began at medical schools at Case Western University in the United States in the 1950s and at McMaster University in Canada in 1965 (Tavakol & Reicherter, 2003).

While there are many variations to PBL implementation, there are shared elements and core components that work together to foster integration of knowledge from a variety of disciplines. Students are given a carefully crafted, ill-defined problem scenario (much like the type that would be encountered in the practice setting), and engage in an analytic process of progressive inquiry by initiating and developing appropriate hypotheses (Biley & Smith, 1998). The teacher's role shifts from that of a content expert to that of a facilitator of group learning process and provider of guidance in eliciting critical learning objectives. Working in groups, students integrate their previous knowledge and then explore the various aspects of the problem scenario using formal and informal resources (Biley & Smith, 1998). They subsequently bring their findings back to the larger group, which solidifies and stimulates further learning. As students become life-long learners, the process strengthens important skills such as: critical thinking, teamwork, self-direction, communication, and problem solving (Biley & Smith, 1998).

Nursing education literature is rich with case studies and evaluations of PBL implementation experiences, suggesting that this student-centered approach has increasingly established a strong place in nursing. The effective implementation of PBL is crucial to ensuring the successful integration of theory and practice for students. This depends on well-crafted problem scenarios, trained facilitators, supportive guidance, translation of classroom learning into the practice setting, and available resources (human, fiscal, informational, and infrastructural) to support all of these endeavors. When compared with traditional lecture-based approaches, PBL has been seen as a resource-intensive endeavor because it requires: a much lower teacher-to-student ratio, a strong capacity in crafting problem scenarios, adept facilitation skills, adequate infrastructural support for students' self-directed

learning process (including library resources, internet connectivity, and in some cases even simulation / skills labs or standardized patients), and appropriate student assessment methods.

At North West University's Mafikeng Campus (NWU-MC) in South Africa (a historically disadvantaged university), nurse educators have implemented PBL for third- and fourth-year nursing students since 2002. In a qualitative study conducted in 2008 exploring the experiences of nursing students regarding PBL (Rakhudu 2008) and Internal and External programme evaluation of PBL in 2008 (NWU 2008), NWU-MC students voiced their desire to have improved integration of PBL insights in the clinical practice setting. This has prompted an examination of the nursing education PBL literature around the topics of collaboration and better integration of theory and practice.

This literature review examines various examples of collaboration in PBL implementation, particularly between academic and practice entities.

Framework.

The updated integrative review (IR) approach according to Whitemore and Knalf (2005) was utilized to guide this search. Integrated review is described as a specific type of literature review that summarizes past theoretical and empirical literature to provide a more comprehensive understanding of a phenomenon (Whitemore and Knalf (2005). The overall goals of IR framework include defining of concepts, reviewing of theories, reviewing of evidence, and analyzing methodological issues. For this publication, the aim was to search for evidence for best practice in collaboration in implementing problem based learning in nursing education.

2. Methods

This review focused broadly on exemplars of collaboration in PBL implementation in nursing. Articles included in the review adhered to the following inclusion criteria:

1) Problem-based learning (PBL) as a teaching method or central focus

2) The study demonstrated some level of collaboration between distinct entities

3) Participants were students, clinicians, and/or educators – all nursing-related

4) The study was published in the last 12 years (since 1999)

5) The study was available in English

Initially, a broad search of published studies was conducted using PUBMED, CINAHL , and MEDLINE.. The following search words "problem-based learning", "collaboration", "nursing education" and related terms were used in this search. The searches identified 114 citations. Other papers were located from the reference sections of these articles and by searching recent electronic or paper. These results were then scanned to eliminate articles that only described isolated PBL implementation experiences or that offered commentary or critique on methodology and research related to PBL. While initially the focus of the search was on the education of nursing students, it was decided that including other entities of collaboration might provide more insight on the topic. This process yielded a total of 19 articles spanning 1999 to 2010. These included 1 systematic review of PBL utilization in clinical teaching and 18 other articles describing collaborations of varying configurations and aims.

3. Results and Discussion

1. **PBL in the clinical setting.**

The only systematic review found in this search (Williams & Beatti, 2008) investigated the use of PBL by clinicians as a method of clinical teaching in undergraduate health professional programs. Authors sought to answer the following questions: 1) What is the clinician's understanding of the term PBL?; 2) Is PBL utilized or applied as a strategy for teaching in the clinical setting?;and 3) What facilitates or impedes the implementation of PBL in the clinical setting? (Williams & Beatti, 2008). Five qualitative studies spanning 7 years (1998-2005) were found to meet inclusion criteria, though only one of these studies focused exclusively on nursing education. This systematic review confirmed that PBL is indeed used as a teaching strategy in the clinical setting. Although the studies were heterogeneous in nature, a common theme was that application of PBL in the clinical setting was heavily influenced by clinician perceptions of PBL in relation to knowledge, preparation, and understanding of the teaching approach. Specifically, a lack of understanding of the basic PBL principles interfered with the teaching process, which led clinicians to revert to more traditional teacher-centered methods, thus undermining the more student-centered facilitation of critical thinking (Williams & Beatti, 2008). A number of barriers to PBL implementation in the clinical setting were noted, namely: poor understanding of PBL on the part of clinicians, irregular communication between clinicians and lecturers, unclear role perception, high staff turnover, lack of coordination between clinical experiences and PBL content, lack of PBL training/preparation for clinical teachers, lack of support of students in the clinical setting, time management, and competing demands of patient and clinical environment (Williams & Beatti, 2008). Authors also noted a number of proposed solutions to address some of these barriers, including: regular and focused

communication between the lecturer and clinician; appointment of a clinical teaching associate to create a student/faculty/expert nurse triad in the clinical setting; matching clinical experiences and PBL tutorials; providing PBL training to all teachers and clinicians; and gravitating toward a process of "supported participation" rather than self-directed learning in the clinical setting to facilitate PBL (Williams & Beatti, 2008). They further concluded that more research is needed to identify best practices in PBL implementation in the clinical setting. O'Neill, Willis, and Jones (2002) investigated the student experience in linking PBL and clinical experiences at the University of Manchester in the United Kingdom. At this particular university, a PBL approach was introduced in 1994 through an integrated course throughout students' clinical clerkships. Third- and fourth-year students were asked to respond to an open-ended question on the end-of-module course evaluation. Data from these questionnaires and from six focus groups were analyzed by theme. Authors found that students used a process of elaboration to link their learning from PBL into the clinical setting. This was accomplished through two main ways: encountering an appropriate patient (outside the PBL group), bringing their experiences back to the PBL group for discussion (inside the PBL group). The process was facilitated by the following factors: proper match between the clinical clerkship and the PBL case content, the role of the tutor in the facilitation process, and the self-directed initiatives of the student.

***2.* PBL collaboration for the clinical education of nursing students.**

Seven of the 19 articles in this review described exemplars of PBL collaboration with the aim of clinical education of pre-registration nursing students. Examples involved nursing institutions and health service organizations in Europe (Finland, Brussels, Sweden), Australia (New South Wales), the United States (Washington DC), and Canada (Ontario). Nursing students were at the center of all of these exemplars, and two articles described inter-professional collaborative learning with other health professions students (physiotherapy, medical and nursing students in Goelen et al., 2006; medicine, occupational therapy, physical therapy, social work, and nursing students in Solomon et al., 2003).

Ääri et al. (2008) describe a collaborative partnership between Turku University of Applied Sciences and Turku Health Care Department in Finland. At this institution, PBL had been implemented in nursing education since 2004, and it was necessary to enhance the students' clinical learning. Authors decided to pilot an initiative where tutorial PBL small group sessions would be carried out in the long-term care practice portion of the curriculum (this was the students' first clinical experience). Clinical mentors of the nursing students were initially given a 20-hr mentor's training which covered the basics of PBL and evidence-based nursing. One PBL cycle consisting of two 2-hr tutorial sessions (each group consisting of 8-9 students) was carried out during the four-week clinical practice and held near the practice wards.

During these sessions, clinical mentors (registered nurses) and university faculty worked together as tutors to promote student learning. A self-reported pre- and post-test questionnaire was administered to the students before and after the clinical practice experience. Results of the questionnaire showed that that there were significant differences in PBL learning skills as well as in interactions with old patients before and after the intervention. Other notable results were a high level of student satisfaction and increases in both "own attitude towards long-term care" and "interest in work in long-term care." Authors concluded that this intervention was a positive one for all parties involved and pointed to collaboration between teacher and clinical mentor as an important factor in creating the best possible clinical practice learning environment for nursing students. They also suggested a number of practical considerations for other seeking to implement PBL tutorials in clinical, namely that: 1) the scenario must be fruitful and current for both students' learning goals and for clinical practice; 2) there must be adequate space for small group work and information-seeking activities (e.g. internet) near the ward; 3) the teacher must arrange the tutorial group work schedule in collaboration with the mentors; 4) the nurse administration of clinical practice must be involved and must see it as professional development for clinical nurses as well; 5) teacher and mentors of clinical practice must be capable of collaboration; and finally 6) the journal / notes of the tutorials that indicate the process and outcome of the small group work can be very informative to other nursing staff of the ward (Ääri et al., 2008).

Another collaborative teaching effort, described in Curtis (2007), took place in Australia and focused on mental health nursing. Mental health professionals in New South Wales, Australia were concerned that they were having difficulty recruiting newly-graduated nurses to their specialized area of nursing, citing the perceived lack of preparation by the tertiary sector, students' prejudices and anxieties about mental illness, perceived lack of support during clinical placement, and the quality of the clinical placement itself. The need to address these issues brought about collaboration between academics at the

University of Wollongong (UOW) and clinicians in the local Area Health Service. Collaborators decided to focus their efforts on the intensive clinical workshops designed to prepare 2nd- and 3rd-year bachelor of nursing students for entry into their 4-wk mental health clinical placements. Consultation with clinicians about student competency during mental health clinical placements revealed that students not only took too much time to adjust to the mental health clinical environment, but also that they needed more skill development prior to clinical placement. It was decided to adopt a combination PBL / role-play approach to these pre-clinical workshops, organized across a 2-wk period.

The 2-day workshops were co-facilitated by a mental health clinical nurse consultant working in an emergency department and an academic with a background in mental health, alcohol, and other drug nursing; both were experienced facilitators. In consultation with other mental health clinicians, the facilitators developed the problem scenarios and compiled supporting documentation that addressed a variety of mental health conditions as well as practice issues that come into play in the mental health setting (legal issues, ethical issues, dual diagnoses, etc.). The "consumers/clients/patients" in the role-plays were played by experienced clinicians and caregivers who were coached and debriefed by the facilitators. Students working in small groups were able to practice their interview skills in the first phase of the PBL process and were given feedback. In addition, they were given an introduction to their clinical placement sites and were able to ask any questions they had. When the clinicians left, the students were assigned to formulate and write up a mental status assessment based on the information obtained during the scenario.

They were also asked to identify gaps in their knowledge and learning objectives and then seek information overnight in order to formulate a nursing care plan for the next day. They were then asked to write an initial nursing report and present their consumer/client/patient to another group of students during a mock staff shift handover. Evaluations were collected from students at three time points: immediately after the workshop, after their mental health clinical placements, and for a selected number of students who were known to have chosen a career in mental health nursing upon graduation. The workshops were consistently rated highly, and were said to be very useful in increasing student confidence and knowledge preparation prior to the clinical placement. Responses after the clinical placements confirmed the usefulness of the workshop in preparing students for "what to expect." Clinicians who were surveyed found the workshop experience to be valuable because they allowed them to contribute to the students' learning and showcase the mental health nursing field. The recent graduates who chose mental health nursing also corroborated the usefulness of the workshops in inspiring them to pursue mental health. The author concluded that this collaborative teaching approach was a successful intervention in bridging the gaps between institutes of learning and of professional practice, and pointed out that there was a 5-fold increase in new graduates choosing to begin their career in mental health in the two years since introducing the workshops.

Three other studies (Holaday & Buckley, 2008; Ehrenberg & Häggblom, 2007; Staun et al., 2009) described strategies that made use of PBL principles in the clinical learning environment as a way to bridge theoretical knowledge to the practice setting. All involved collaborations between academics and clinical nurse preceptors / supervisors in order to support student learning in accordance with the PBL principles of self-directed learning, reflection, and critical thinking.

In Holaday and Buckley (2008), nurse faculty at Trinity University in Washington DC, the Catholic University of America in Washington DC, and George Mason University in Fairfax, VA decided to work together to come up with an educational strategy that effectively addressed their challenges of faculty shortages, larger class sizes, competition for clinical sites, and limited educational resources. The model they developed has the following tenets: 1) students construct their own learning objectives for their clinical experiences based on individual learning needs and guidance from course objectives while clinical faculty help monitor their knowledge gained and modify the objectives as needed (through an ongoing clinical log); 2) the learning experience is completely embedded in the clinical setting where actual patient case situations encountered by students are used; and 3) guided by clinical preceptors, students choose an actual patient case encountered during their clinical experience, follow categorical guidelines, and develop written case situations that are then used for PBL tutorials. Clinical experience and tutorials occur concurrently, and students are assessed on their participation and progress in both domains. Although outcome data of this model is still forthcoming, authors note that it has been a rewarding and ongoing collaboration of nurse educators committed to teaching excellence.

Two examples from Sweden (Ehrenberg & Häggblom, 2007; Staun et al., 2009) highlight similar collaborative strategies in linking PBL with clinical education. In Staun et al. (2009), educators and clinicians employ the use of "patient-centered training in student-dedicated treatment rooms,"

where the nursing student (alone or in pairs) take responsibility for patients placed in a student-dedicated room, performing all nursing care with the guidance and support of supervising clinical staff. The students followed the same patients for several days (rather than on their supervisors), and a logbook was kept to guide communication, assessment, and joint reflection between student, clinical supervisor, and lecturer. This approach was found to be highly satisfactory by most participants – both for staff and for students, with students feeling that their time in clinical education had been used efficiently. The process of supported student reflection was cited as an important strategy to bridge the theory-practice gap (Staun et al., 2009). Ehrenberg and Häggblom (2007) described a similar guided reflection strategy to enhance clinical education. This intervention had the objective of improving nursing students' integrated learning during clinical education, ability to actively search for knowledge, reflect critically, and improve the clinical learning environment. Central tenants in this intervention were: 1) PBL as an educational method; 2) guided reflection; and 3) a supervision model supporting nurse preceptors. Nurse preceptors were supported by training in PBL, reflection, and techniques for literature search in nursing research. Each student was assigned to a nurse who was his/her personal preceptor during the whole 11-week clinical placement. This nurse preceptor supervised the student in the clinical environment and supported his/her self-directed learning. An additional part of this intervention involved a head nurse preceptor who was responsible for a small group of students from different clinical units. In collaboration with the clinical lecturer, this head preceptor arranged weekly meetings with the group of students to discuss problems and issues from the clinical field. Every other week, students were to bring patient scenarios from their units, which formed the basis for integration of theoretical and practice knowledge. The clinical lecturer held a joint appointment at the university and at the hospital, supported the head preceptor, the personal preceptors, as well as the students through the entire process and oversaw assessment processes. Students and staff perceived the utilization of PBL principles in this supervisory model to be positive overall. Authors emphasized the need for strong collaboration between health care clinics and the university as well as adequate training and support of all parties involved, especially in the central tenants of PBL. They concluded that when integrated into the clinical setting, PBL can engage students in authentic situations and prepare them for their professional careers by training them to be life-long learners.

The two remaining articles that describe exemplars of PBL collaboration with the aim of clinical education of pre-registration nursing students focus on inter-professional collaborative learning with other health professions students. Goelen et al. (2006) described inter-professional learning with undergraduate physiotherapy (3rd year), medical (2nd year), and nursing students (3rd year) in Brussels, Belgium, while Solomon et al. (2003) described inter-professional learning with undergraduate medicine, occupational therapy, physical therapy, social work, and nursing students in Ontario, Canada. Both used real patients to enhance the PBL process.

In Goelen et al. (2006), the educational module consisted of 5 2-hr seminars given at 2-wk intervals during 10 consecutive weeks, with a total of 177 students divided into control groups of 8 single-profession students and intervention groups of 8 students evenly distributed from 3 professions – nursing, medical and physiotherapy. The triggers for PBL were a stable Parkinson's patient interviewed by the students in the 2nd seminar, and a recent stroke patient interviewed in the 4th seminar. In the first seminar, was an introductory orientation seminar where students familiarized themselves with each other and prepared for the patient interview process in the next seminar. The 3rd ad 5th seminars were dedicated to student presentations of their work on the educational goals derived from seminars 2 and 4. Pre- and post-module evaluations were conducted using the Luecht et al. (1990) Interdisciplinary Education Perception Scale (IEPS) to assess student attitudes toward inter-professional cooperation in relation to this particular intervention (Goelen et al., 2006). In the intervention groups, authors found a significant improvement in overall attitudes of male students, as well as in attitudes pertaining to competency and autonomy of individuals in one's own profession. No significant improvements were found in the control groups, and authors found no adverse effects of the use of real patients in the educational module – in fact the patients valued the opportunity to contribute to teaching and brought more complexity, empathy, and humanity to the educational experience for students. Authors concluded that the inter-professional PBL module using real patients had the potential to improve attitudes pertaining to inter-professional collaboration and could have important implications in their ultimate future practice in health care.

Solomon et al. (2003) describes a similar incorporation of real patients in inter-professional PBL education. In this initiative, 10 senior-level students representing 5 professions (medicine, occupational therapy, physical therapy, nursing, and social work) were recruited to participate in an 8-week course on rehabilitation issues in HIV at

McMaster University. Two tutorial groups of 5 each met weekly for 2 hours per session. Two experienced tutors interested in HIV (one a physician and the other an occupational therapist) from the Faculty of Health Sciences at McMaster University were recruited to participate as facilitators. In addition, two persons with HIV-AIDS (PHAs) who were experienced educators were asked to participate as resource tutors and were given training in PBL and basic facilitation skills. Their role was to provide insight from the perspectives of a PHA and prompt students to consider various aspects of the problem. Students were required to keep a weekly journal and participated in semi-structured qualitative interviews within two weeks of the conclusion of the course. A broad theme that emerged from both the journals and the interviews was that students saw many benefits of the involvement of PHAs in the tutorial process – they provided a perspective on the lived experience and a context for learning, challenged assumptions and values, and acted as knowledge resources to guide students in their self-directed learning. Some students worried about offending the PHA tutors, but were able to work through these anxieties as the course progressed. Authors concluded that the involvement of PHAs in small-group PBL settings was perceived positively by students and created a more relevant learning text while addressing some of the issues of stigma in health professional students.

3. PBL collaboration for the training and professional development of clinical nurses. Another seven of the 19 articles in this review described exemplars of PBL collaboration with the aim of strengthening the capacity of clinical nurses. Price & Price (2002) uses examples from midwifery and gives an informative review of helpful frameworks that can be used in maximizing the clinical practice environment as a learning opportunity for students and clinical nursing staff alike. Celia & Gordon (2001) describe a PBL effort at a hospital in Philadelphia, USA used to train novice nurses as they enter the acute healthcare setting. Five other studies (Badeau 2010, Blackford & Street, 1999; Kim et al., 2007; Matthews-Smith et al., 2001; and Williams et al., 2002) describe examples of PBL being used for the training and professional development of clinical nurses in various settings around different topics (cardio-pulmonary, ethical decision-making, communication and cultural diversity, and geriatrics). All of these articles illustrate fruitful collaboration between academic institutions and practice institutions to further professional development of nurses.

Price & Price (2002) point out that PBL is traditionally implemented in the classroom setting, where issues of patient safety and competing demands on time are not a primary concern. The previous section of this review examined a number of examples where these issues were circumvented through strong collaboration between academics and clinicians committed to enhancing nursing student learning.

They argued that in order for PBL to be implemented effectively in the clinical environment, the approach must be adapted to bridge the learning differences between the two contexts. For example, the clinical supervisor takes on a modified facilitator role and must be mindful of problems and learning issues that are thematic and apply to more than one client so that short patient stays does not disrupt learning.

Authors emphasize the difference between the clinical supervisor role and that of the classroom PBL facilitator. Because of the demands of the practice environment, the clinical supervisor cannot afford to adopt an entirely nondirective role. S/he must continually assess the practitioner / learner's comfort level and competence in the practice environment. When using patients as foci of learning, inquiries must be handled discretely so that patients do not perceive that the student learner is unprofessional or incompetent. As an example, casting the parent as an expert to his/her child's disease process is much more helpful than asking naïve questions about what the parent might assume the student nurse should already know about the child's care. Echoing other studies, Price & Price agree that the process of reflection (on the part of both the supervisor and the learner) is an invaluable tool in promoting learning in the clinical setting. They further conclude that having a structured experience, framework-guided training, an appropriately tailored clinical supervisor role, and consistent monitoring and evaluation of group process are keys to successful adaptation of PBL in the professional development of staff and student learners alike (Price & Price, 2002).

Celia & Gordon (2001) was the only study in this review that described a PBL experienced used to train and orient novice nurses to the acute setting. This initiative, which took place at the Hahneman University Hospital in Philadelphia, USA (an acute tertiary-care teaching facility), represented a collaboration between the hospital's Staff Education and Training Department, the Staff Development Instructor, and Director of Nurse Recruitment and Retention, as well as the Medical College of Pennsylvania / Hahnemann University School of Nursing (which offered the program for graduate credit) (Celia & Gordon, 2001). Funding for the program was provided in the form of salaries for the new nurses as well as a flat rate of pay to cover

training and participation for the nurses serving as trainers. The curriculum was designed to give novice nurses a comprehensive overview of acute and chronic health problems and patient management issues, while developing expertise in resources-seeking, clinical reasoning, self-directed learning skills. Thirteen PBL cases were developed, and novice nurse groups (14 in the first class and 12 in the second class divided into 2 groups) met on 2 non-consecutive days over a 6-wk period. Instructors and clinical nurse specialists reviewed the PBL cases for accuracy, realism, and clinical relevance, and a PBL consultant helped with the actual construction of the cases. Each PBL case was completed over an 8hr period with a 3-4hr sessions devoted to researching learning issues. A summative assessment was used in which learners were given a similar PBL scenario to complete in a week's time, and evaluated orally in a 45-minute session on his/her ability to think critically. Orientation to the clinical unit, supervised clinical practice, as well as skills labs were incorporated as other aspects of this comprehensive orientation program. Post-course surveys showed that participants strongly agreed that the PBL format was useful as a learning tool for novice nurses transitioning into acute care. Novice nurses expressed the desire to have PBL as a regular part of their clinical education and would have preferred to have PBL in their undergraduate curricula. Nurses also noted that they could relate the PBL cases to patients they were seeing in the clinical units. Authors concluded that this PBL-based orientation program aimed at preparing novice nurses for tertiary care successfully supported novice nurses through the transition into acute care delivery. Preceptors and supervisors noted improved self-direction and critical thinking skills of program graduates (Celia & Gordon, 2001).

A number of other articles described PBL as a useful tool in nursing staff professional development. In Kim et a., (2007), a collaborative effort between nursing faculties in a university and clinical nursing leaders in an affiliated hospital in Seoul, Korea resulted in a pilot PBL program for continuing education of nurses. Two PBL packages in cardio-pulmonary nursing were developed and piloted in collaboration with nurse faculty after the need for PBL education was identified at a workshop involving the two stakeholders. The scenario development team consisted of 4 head nurses and 3 nurse faculty members who were experts in cardio-pulmonary nursing. The implementation consisted of 6 weekly 3-hr sessions with 45 nurses not previously exposed to PBL, divided into 5 groups according to their clinical backgrounds. Upon evaluation, participants noted a number of perceived advantages of PBL, including: self-motivation, active attitude, enhanced self-confidence and presentation skills, comprehensive approach, use of evidence-based practice, cooperative learning, and self-reflection. They also noted the following disadvantages: time-consuming, lack of direction, different learning outputs depending on abilities of group members. Based on these findings, the authors concluded that PBL is strongly recommended as a continuing education approach if tailored to the learning needs of clinical nurses. Additionally, the collaborative development of the program with school researchers and hospital nurses was seen as a positive educational strategy for evidence-based research and practice (Kim et al., 2007).

Two other articles (Williams et al, 2002 and Badeau 2010) described similarly successful outcomes from using PBL as a strategy for professional development of nursing staff. Williams et al. (2002) described PBL at the New Mexico Veterans Administration (VA) Health Care System as a strategy to enhance the ethical decision-making of nursing staff. Eighteen primary care nursing staff (10 registered nurses, 5 licensed practical nurses, 1 nursing assistant and 2 health technicians) volunteered to participate in this pilot study, facilitated by a nurse manager. The PBL case used was adapted with permission from a case used in one of the nursing courses at the University of Phoenix. The pre- and post- test evaluations found that participants shared knowledge and demonstrated improved scores in decision-making and critical thinking skills. The authors further concluded that PBL is an appropriate learning and teaching strategy for ambulatory care nurses, and noted an increased awareness of ethical issues in the clinical environment (Williams, et al., 2002). In Badeau (2010), an initiative headed by the vice president of nursing and the director of innovation and knowledge at Joseph Brant Memorial Hospital (a Southern Ontario community hospital in Canada) and funded by the Nursing Secretariat (through the Ministry of Health and Long Term Care in Ontario) gave rise to a PBL professional development program for nurses. The program provided nurses the opportunity to spend time away from their regular responsibilities and further their education. The PBL program took place on site and occurred once every week during a regularly scheduled 11.25-hr day shift for a 6-wk period, with groups of no more than 8 participants. McMaster University School of Nursing was also requested to assist in the planning and development of the PBL opportunity for nurses and to serve as PBL group facilitators. The program planning committee consisted of a clinicians and educators who assessed organizational learning needs,

identified desired outcomes, developed program objectives, developed participation criteria, selected program participants, assigned PBL groups, assigned facilitators, selected program topics, and developed problem scenarios, learning packages, and evaluation forms. Anecdotal evidence suggests positive outcomes related to the professional development of nurses, including: self-reported improvement in communication, conflict-management, research, and critical thinking skills. Authors further conclude that evidence-based nursing can be operationalized through PBL approaches to professional development of nursing practice (Badeau, 2010).

Two additional articles that used PBL in the professional development of nurses were guided by the assessment of specific nursing educational needs. In the case of Blackford & Street (1999), the PBL initiative arose out of an assessment of nursing issues in caring for children and families of non-English speaking background (NESB). The issues of communication and cultural differences were increasingly impacting nursing care at the Royal Children's Hospital in Melbourne, Australia. Twenty-six nurses from clinical areas with high NESB client intake participated in the initial research into nursing educational needs. Six of these nurses (2 clinical educators, 1 unit manager, and 3 experienced nurses, all from different units) the participated in the follow-up collaborative effort to develop clinical-derived PBL packages that were subsequently piloted and incorporated into graduate nursing curricula, and into day-long / 2 half-day in-service education workshops in clinical areas. The nurses involved in this effort expressed enthusiasm of the PBL approach in the hospital setting in promoting learned across clinical areas, and their collaboration set the stage for further education on nursing units (Blackford & Street, 1999). In Matthews-Smith et al., (2001), collaboration between the Scotland National Board of Nursing, Midwifery, and Health Visiting and the University of Glasgow gave rise to a training and educational needs assessment around geriatric issues. Focus groups and individual interviews with nurses caring for older adults (22 hospital nurses, 15 nursing home nurses, 14 home care nurses), and group discussions with older adults formed the basis for the needs assessment. The assessment yielded rich information that formed the basis of a 9-scenario PBL module around various content, skills, and process areas deemed to enhance geriatric nursing care. The final educational module was embedded in the research findings from the needs analysis and consultation with the clinical areas. The authors offer this framework as an exemplary approach to: being attentive to diverse needs of nurse adult learners, promoting deeper approaches to learning, and enhancing critical thinking skills (Matthews-Smith et al., 2001).

4. **Collaboration to enhance the PBL process.**

The final three articles in this review focus on studies that highlight examples of collaboration to enhance the PBL process itself. Niemer et al. (2010) outlines a collaborative process for PBL scenario, while Carrega & Byrne (2010) describes the use of PBL to teach clinical education skills, and Conway et al. (2002) highlights challenges of PBL implementation across nursing cultures.

It is often acknowledged that a fruitful PBL learning experience is highly dependent on the quality of the PBL scenario itself (Roberts & Ousey, 2004; Duch, n.d.; White, 2005). The effective PBL scenario must first engage students' interest, motivate further self-directed learning, and relate to the real world (Duch n.d. in Niemer et al., 2010). It must require students to make decisions or judgments based on facts, information, logic, or rationalization; further, it must be open-ended (not limited to one correct answer), connected to previously-learned knowledge, and embody controversial issues that will elicit diverse opinions (Duch n.d. in Niemer et al., 2010). Based on these principles, Niemer and colleagues put together a 10-member PBL scenario development team consisting of 2 pediatric, 2 obstetrics / newborn, 3 medical-surgical, 2 psychiatric, and 1 skills / simulation nurse faculty at Northern Kentucky University in Kentucky, USA. Through a series of 3 6-hour workshops, participants worked together to develop a set of PBL scenarios that were clinically relevant, amenable to theoretical analysis and problem-solving by nursing students. The first workshop focused on orienting participants to PBL and solicitation of appropriate actual patient care experiences. The second workshop took these patient care experiences to a theoretical level appropriate for students. The third and final workshop focused on peer review and finalization of the PBL scenarios. At the end of this time-consuming, yet creative process, 10 PBL scenarios and templates for implementation were developed. Authors noted positive evaluation from students in the eventual course that used these PBL scenarios.

Carrega & Byrne (2010) provide an example of PBL as a teaching strategy to enhance the skills of experienced nurses in a nursing education Master's program. At a Southeastern University in Georgia, USA, a PBL assignment was used to better prepare future nurse educators / clinical faculty. Masters level students were in the 2nd of a 4-semester program and were given an assignment involving PBL scenarios that described clinical learning situations of pre-registration nursing students. By having the graduate students create a teaching plan for each PBL

scenario, the assignment provided a way to assess their creativity and problem-solving abilities in helping facilitate the learning of a hypothetical future student. Despite the need for further research into the effectiveness and long-term knowledge acquisition, the authors concluded that PBL can be used as a strategy to better prepare future nurse educators for clinical teaching, and perhaps in their guidance of students' self-directed learning and critical thinking skills in the clinical environment (Carrega & Byrne, 2010).

The final article in this literature review focuses on broader issues of cross-cultural implementation of PBL (Conway et al., 2002). This article explains a collaborative effort between the University of New South Wales, nursing faculty at the University of Newcastle, and the Australian Federal Government (AusAID) to help enhance nursing education in the Maldives at the Maldivian Institute of Health Sciences. The Australian PBL curriculum was delivered offshore with University of Newcastle faculty of nursing staff visiting the Maldives for 1- to 6-wk teaching visits. Through the PBL implementation process, it was very apparent that there were significant differences between the Australian and Maldivian understandings and practices in nursing. In addition, there were remarkable differences between beliefs and attitudes about illness and health care practices in the capital (Male) and in the smaller islands of the Maldives. There were religious, political, language, and cultural concerns that impacted on the PBL content. Authors cited that the implementation success was only possible because of close collaboration with the community of health-care providers in the Maldives, continuous communication, mutual understanding, sharing information reciprocally, and being creative, innovative, and flexible. Authors concluded that PBL has the potential to be a powerful tool for changing cultures and caution nurse educators to ensure that such program delivery is culturally relevant rather than conflicting with the cultural values and realities of nursing practice in the host culture. Programs must be designed in alignment with cultural and contextual circumstances so that learner capacity may be strengthened effectively (Conway et al., 2002).

Collaboration as a common theme and lessons

The present review has summarized 19 peer-reviewed articles that examine the uses of PBL as an approach to further nursing education. Collaboration emerged as a consistent theme – whether between academics and practitioners in the supervision and guidance of nursing students, between faculty members and real patients in facilitating PBL group tutorial sessions, between inter-professional students in PBL learning, or between nurses of different specialties in developing PBL scenarios. In many of the studies, PBL was cited as an effective approach to bridging the gap between theory, practice, and research and enhancing important skills necessary for nurses to take better care of their patients – students were able to better integrate their classroom learning in the clinical setting through reflection, experienced nurses were able to enhance their practice through professional development opportunities, and PBL modules were seen as a way to respond to research-derived learning needs of professional nurses. Conway et al. (2002) emphasized a final lesson of being mindful of cultural and contextual relevance when implementing PBL.

4. Conclusion, recommendations and Implications for the South African context

These articles shed light on a number of implications for the resource-limited South African context (particularly at NWU-MC). It is clear from the literature that collaboration can take many forms, but a central aim unites all of efforts. The central aim or motivation for collaboration can range anywhere from the need to develop effective PBL scenarios (as in Niemer et al., 2010), to the need to transition novice nurses into practice in a tertiary care setting (as in Celia & Gordon, 2001), to the need to better prepare students for the mental health nursing clinical placement (as in Curtis, 2007), to the need to address learning needs of nurses caring for geriatric patients (Matthews-Smith et al., 2001), to the need to better integrate classroom learning and clinical learning for nursing students (as in Ääri et al., 2008; Holaday & Buckley, 2008; Ehrenberg & Häggblom, 2007; and Staun et al., 2009), to the need to enhance inter-professional attitudes (as in Goelen et al., 2006). In order for NWU-MC to develop an effective model for collaboration centered on PBL, it must decide on its central collaborative aim. This will drive whether or not NWU-MC decides to focus its efforts on nursing students, practicing clinical nurses, or on enhancing existing PBL processes. This central aim will depend on available financial and infrastructural resources, institutional priorities and mandates, availability and willingness of prospective stakeholders, and current human resource capacity.

As NWU-MC moves toward collaboration in PBL, it may be helpful to develop research efforts to identify important PBL stakeholders (especially those at the managerial level) as well as priority educational needs facing the nursing profession as a whole (similar to those undertaken in Matthews-Smith, 2001 and in Blackford & Street, 1999). As NWU-MC moves forward in collaboration, it must keep in mind the cross-cultural lessons from Conway et al. (2002) especially since the PBL approach is a

new system of teaching and learning for this rural context. Furthermore, NWU-MC must keep in mind the differences between classroom learning and clinical learning (as outlined in Price & Price, 2002). Ultimately, to ensure success, special attention must be paid to the training of all collaborating parties in PBL, piloting new interventions before scale-up, and careful evaluation of interventions.

The nursing education literature is rich with numerous examples of PBL implementation. The use of this pedagogical strategy in the clinical setting among collaborative partners is still relatively new because of inherent challenges of bridging the theory-practice-research gap and the demands that the clinical setting poses. This examination of the literature has provided a number of tangible exemplars for collaborative implementation of PBL involving nursing students, nursing educators, nurse managers, clinicians, and researchers. As NWU-MC in South Africa gravitates toward a more collaborative approach to the implementation of PBL, lessons learned from these exemplars can provide much guidance and insight.

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