A MODEL OF COLLABORATION IN IMPLEMENTING PROBLEM-BASED LEARNING (PBL) IN NURSING EDUCATION IN SOUTH AFRICA

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ABSTRACT

The purpose of the study was to develop a collaborative model of implementing Problem-Based Learning (PBL) in the nursing education context. The study was conducted in two phases, namely, exploration and description of the opinions of the nurse educators, nurse managers and preceptors regarding collaboration in PBL in nursing education and model development. In phase 1, a mixed methods design was used to explore and describe the opinions and views of participants regarding collaboration in implementing PBL in nursing education. Phase 2 consisted of concept analysis, concept classification and model development. The collaborative model was developed according to Chinn and Kramer. Both qualitative and quantitative data indicated: (1) the need for various types of collaboration; (2) benefits of collaboration to staff, students, organizations and health care users; (3) factors; and (4) barriers to successful collaboration in implementing PBL. The data from this process formed the basis for concept analysis and model development. The model for collaboration in implementation of PBL has six main elements: Higher Education; Nursing Education and Health Care Services (context), institutions initiating PBL, clinical services, colleges affiliated to PBL universities, students and health care users (recipients), Centres of Excellence in PBL (agents), effective implementation of PBL (terminus) collaboration (process) and commitment, communication, cooperation, trust and respect (dynamics).

Keywords: Collaboration, Implementation, Problem--Based Learning (PBL)

1. Introduction

Student-centred collaborations can be a functional reality in the delivery of quality higher educational experiences (Brown, 2009). The idea of implementing collaboration at both staff and institutional levels has far-reaching implications for the institution, departments, and students.

1.1 Collaboration in Nursing Education

Nurse leaders in academe and practice settings have a long history of collaborating with one another for the purposes of enhancing nursing education, care, and practice. (Kirschling & Erickson 2010). Collaboration is a crucial component of all aspects of the clinical school development, as it is through this on-going and continuous process that a common vision and common goals and realities are developed and maintained. However, according to Hall-Lord, Theander, and Athlin (2013) collaboration between universities and clinical placements has been highlighted as a weak point of the nursing education. After the transfer of nursing education to universities, the students’ time for learning in the clinical setting has decreased in many Western countries, as has the nurse lecturers’ supervision of students in direct patient care (Hall-Lorded al, 2013). This resulted in the lecturers’ role changing from supervising students in ‘hands on nursing’ to focussing more on nursing theory and research (Humphreys,
This warrants development of collaboration approaches in education the future health care workforce,

The benefits of implementing PBL reinforce the importance of the School of Nursing Sciences resolve of strengthening the North-West University resources base by developing a collaborative model with other Institutions of Higher Learning. For example, collaboration with Nursing Education Department is seen as one of the critical mechanisms for collaboration in the effective implementation of PBL in nursing education. The needed collaboration is influenced by both changes occurring in the health care system and limited availability of resources, namely financial and human.

Collaboration with key stakeholders, as well as Centres of Excellence in PBL and health care service providers, especially where students are placed for clinical learning, will enhance the mentoring and empowerment of the students and nurse educators as well as nurse managers and other preceptors in PBL. For this reason, development of a collaboration model for the implementation of PBL based on the nurse educators’, nurse managers’ and preceptors’ opinions is necessary. In a collaborative model, partners share knowledge, expertise and resources. Thus, nurse educators need not remain in isolation while learning to use PBL. Collaborative efforts and sharing of resources and success are mandatory in educating nurses for the 21st century (Medley & Horne, 2005)

1.2 Problem Based Learning (PBL)
Higher Education Institutions (HEIs) are mandated to improve undergraduate education, initiatives to target instructional methods, re-examine curricula, and apply innovative technologies to better engage students with content. PBL is regarded as the most innovative teaching learning modality conceived and implemented in medical and health sciences (Barrows & Tamblyn, 1980; Dolmans & Schimdt, 1994). Its effectiveness in enhancing application of knowledge, problem solving, collaborative, self-directed learning skills and high order thinking has been documented (Boud & Feletti, 1991; Koh, Khoo, Wong, Koh, 2008; Duch, Groh, & Allen, 2001; Albanese, 2000; Norman & Schmidt, 1992). In addition, Hung (2009) perceived reasoning process as another important element in PBL. The author further states that learning in PBL environment is not only fact collecting, but also engage the students in inquiry processes wherein critical and creative thinking skills are critical for the students to accomplish problem solving skills. A recent systematic review has suggested that the approach is suited to developing student performance in interpersonal and social domains whilst maintaining levels of knowledge, clinical skills and reasoning. This is attractive, particularly given the importance placed on these attributes in reviews of healthcare practice.

Given these benefits of PBL, the school of nursing sciences in North-West University (NWU), a historically under-resourced institution implemented PBL in 2002. On exploration of nursing students’ experiences and perceptions in 2008, the students voiced the need to strengthen PBL implementation by its integration into clinical practice settings. This was echoed external programme evaluation in 2008 wherein collaborative partnerships between academia and clinical practice for effective implementation of PBL was recommended (NWU, 2008). This prompted the need to develop a model of collaboration in implementing PBL in nursing education.

In addition to the university’s goals, major goals of most programmes including nursing education redesign were to better prepare undergraduates for their future work beyond the classroom as professionals in the workplace, critically think, analyze and solve complex real world problems; find, evaluate and use appropriate learning resources and evidence for best clinical practices; work cooperatively in teams and small groups; demonstrate effective verbal and written communication; and use content knowledge and intellectual skills to become life-long learners (SAQA, 2005)
PBL provides an environment for promoting these skills (Duch, Groh, & Allen, 2001; Rideout 2001). PBL is an educational approach that organizes curriculum and instruction around carefully crafted “ill-structured” problems. Students gather and apply knowledge from multiple disciplines in their quest for solutions. Guided by teachers acting as cognitive coaches, they develop critical thinking, problem solving, and collaborative skills as they identify problems, formulate hypotheses, conduct data searches, perform experiments, formulate solutions and determine the best "fit of solutions to the conditions of the problem” (Haith-Cooper, 2000). Problem-based learning enables students to embrace complexity, find relevance and joy in their learning, and enhance their capacity for creative and responsible real-world problem-solving (Haith-Cooper, 2000; Delva, Woodhouse, Hains, Birtwhistle, Knapper & Kirby, 2000).

2. Model development process
The process followed in this model development consisted of four phases, namely, empirical (explorative); theoretical (concept analysis), concept classification and model development phases.

2.1 Empirical phase
In the explorative phase an exploratory sequential design (Creswell & Clark 2014) was employed to collect data from nurse educators from three (n=3) out of five (n=5) universities in South Africa offering PBL in nursing education and three (n=3) hospitals in North West Province where PBL students are place for clinical learning.

This consisted of two stages namely qualitative exploration and description of nurse educators, nurse managers and preceptors’ opinions on collaboration and a descriptive survey of nurse educators, nurse managers and preceptors’ opinions on collaboration in implementation of PBL.

Ethical measures: Volunteers who fitted the criteria were recruited to participate and requested to give written consent after expectations of their participation were explained. Participation was voluntary. Ethical clearance was obtained from North-West University (Ethics number: NWU-00033-11-A9). Permission from North West provincial Department of Health, and authorities of participating hospitals and universities was obtained. The identities of the institutions and individuals were maintained confidential by use of codes, rather than names.

Quality measures: In qualitative research, the researcher works with truths that are socially situated. Thus measures for ensuring trustworthiness of the findings by Guba in (Krefting, 1991) were utilized.

2.2 Theoretical (concept analysis) phase
The adapted evolutionary view of concept analysis focuses on the clarification of the concept and its use, uncovering the attributes of the concept as a basis for further development (Rodgers & Knalf, 2000). This framework was used to clarify the critical attributes of collaboration, identify elements needed to be present (antecedents) for the concept to occur, distinguish the concept from the multitude of related terms, consequences and to assist in the development of a comprehensive understanding to facilitate the application of the concept in nursing education practice (Petri, 2011).

The search of various dictionaries, subject textbooks, was performed in the CINAHL, Medline, and PsycINFO databases. The articles were reviewed for trends that would reflect the current knowledge for collaboration as a concept. The search key terms were “collaboration”, “problem based learning”, and “nursing education”. The purpose of this concept analysis was to better understand and define collaboration as it relates to the implementation of PBL.
2.3 Concept classification
After concept analysis, then followed concept classification. Dickoff, James & Wiedenbach's (1968) Survey List was used in this study for concept classification. Table 1 displays the components of the survey according to Dickoff et al. (1968), and how this was applied in the study.

Table 1: Components of Survey list according to Dickoff et al., (1968)

<table>
<thead>
<tr>
<th>Agency</th>
<th>Who performs the activity?</th>
<th>In this study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient</td>
<td>Who is the recipient of the activity?</td>
<td>Institutions initiating PBL, clinical services; colleges affiliated to PBL universities, students and health care users.</td>
</tr>
<tr>
<td>Context</td>
<td>In what context is the activity performed?</td>
<td>Centers of Excellence in PBL.</td>
</tr>
<tr>
<td>Procedure</td>
<td>What is guiding procedure of the activity?</td>
<td>Collaboration.</td>
</tr>
<tr>
<td>Dynamics</td>
<td>What is the energy source of the activity?</td>
<td>Commitment, communication, cooperation, trust and respect.</td>
</tr>
<tr>
<td>Termins</td>
<td>What is the end point of the activity?</td>
<td>Effective implementation of PBL in nursing education.</td>
</tr>
</tbody>
</table>

The identified essential and related attributes were used to construct relationships described in the next section.

2.4 Relationship Statements
Relationships are linkages among and between the concepts (Chinn & Kramer, 2011). Relationships between concepts form the “skeleton of the theory” and “show how concepts hang together” (Walker & Avant, 1995). The relationships can be associational or casual and must be identified in order to organize the concepts into the model system. The relationship statements formulated for this model of collaboration in implementing PBL are given below:

- Collaboration in implementing PBL is influenced by the context wherein PBL in education is occurring, namely higher education, nursing education and clinical health care context. These boundaries represented these contexts.
- Successful collaboration in implementing PBL is dependent on dynamics such as commitment (Managerial, organizational and individual); communication (formal and informal); cooperation; respect and trust both at organizational and individual levels.
- Collaboration is an interactive, dynamic and beneficial process occurring in phases.
- This dynamic process of collaboration leads to effective PBL implementation.
- Students and health care users or consumers are at the core of this collaboration in implementing PBL as they are the ultimate recipients of PBL in nursing education. Having identified the benefits of PBL, the students and health care service consumers are also the ultimate beneficiaries of collaboration in implementing PBL in nursing education.
- Collaboration has a lot of spin-off benefits for the participating institutions and individuals.

2.5 Description of the model
Once the concepts have been defined and classified the relationship statements constructed, the description of a model to represent the theoretical concepts can be done. The model for collaboration in implementation of PBL has six main elements: Higher Education; Nursing Education and Health Care Services (Context), institutions initiating PBL, clinical services,
colleges affiliated to PBL Universities, students and health care users (recipients), Centre’s of Excellence in PBL (Agents), effective implementation of PBL(terminus) collaboration, (process) and commitment, communication, cooperation, trust and respect (dynamics). Figure 1 depicts a model of Collaboration in implementation of PBL in nursing education.

**Figure 1: Schematic Representations of a model of Collaboration in implementation of PBL in nursing education**

The symbolic meanings of the schematic presentation are as follows:-

1. The frames around the model represent the context in which collaboration will be taking place, namely, higher education, nursing education and clinical context.
2. The figure in the centre represents all what occurs in collaboration in implementing PBL.
3. The circle represents the agents and recipients of the activity (collaboration). The outer circle represent the agents, the middle and inner circle represent the recipients. The outer circular arrows represent the procedure or the process of collaboration which are cyclical and imply that if the objectives of collaboration are not achieved; the process should be repeated, starting with analysis.
4. The arrow from the process to the terminus indicates the direction of the process to the goal or end point.
5. The pointed arrows at the bottom indicate the dynamics that maintain or sustain the activity, namely commitment, communication, collegiality, trust and respect. These are critical forces that influence the process, agents and recipients, and goal or outcome of the process.

2.6 Model Overview
The model description is based on Chinn and Kramer’s (2011) method consists of the following components: Overview of the model, the purpose of the model, the structure consisting of assumptions on which the model is based, relation statements and the nature of the structure.

A schematic representation in Figure 1 depicts a model of collaboration for effective implementation of PBL. The model is based on the premise that collaboration is necessary and beneficial to all stakeholders in implementing PBL in nursing education (made apparent from the research). The data collected from the sequential exploratory mixed method study indicates that nurse educators in PBL universities, nurse managers and preceptors from clinical settings where PBL students are placed indicates the need and benefits for collaboration in implementing PBL in nursing education. Addition to this, is the fact that there is a great pressure of Nursing Education Institutions (NEI’s) by authorities to produce nurse graduates that are competent to: 1) Function effectively within a multidisciplinary team, organization and community; 2) solve problems appropriately using critical and lateral thinking; 3) communicate effectively; 4) collect, analyze and critically evaluate information; nd 5) explore educational and career opportunities and be lifelong learners.

PBL education institutions provide an environment for promoting achievement of these skills. To ensure that these skills do not remain visionary benchmarks, attempts should be made by educational institutions to operationalize them by embedding the outcomes in curricular activities. Thus the model of collaboration for effective implementation of PBL is deemed necessary.

The model propose the collaborative activities that occur through four sequential stages, namely; need analysis, planning and design; monitoring and evaluation. This four processes feed on each other and overlap. During the course of the processes, the collaborators will learn how to function more adequately on behavioural, cognitive and affective levels of collaboration.

2.7 Purpose of the model
This proposed model will be used as a frame of reference to facilitate the design of collaboration intervention to benefit the participants to effectively implement PBL in nursing education.

2.8 The structure of the model
The structure of the model gives overall form of the conceptual relationships within it (Chinn & Kramer, 2011). The structural form of a model aids in understanding the central relationships between concepts, their order of occurrence and how they interact. This model was based on the following elements: assumptions, concept definition, relation statements, and the nature of the structure.

2.9 Assumptions of the model
Assumptions are the accepted truths on which the model is based (Chinn & Kramer, 2011). They are closely related to relationship statements, but also reflect the values underlying the model, for this reason, it is important to make them explicit, so that they can be understood on their own terms, from the perspective of the model that the researcher intended. It will also enable critique of the model by those who hold different views. The assumptions underlying
the main concept (Collaboration) and other concepts used in the model are explained hereunder:-

- Collaborators in PBL implementation bring different skills, knowledge and talents.
- Participants in collaboration are driven by same goal, vision and mission, and this need to be carefully crafted to align the activities.
- Organizational climate and culture of the PBL institutions can influence the collaboration activities.
- Collaboration in implementing PBL is dynamic and brings up changes in the collaborative partners and their clientele, namely students and health care consumers.

2.10 Concepts definition

The identification and definition of the key related concept are here given to clarify the structure of the model. The concepts were identified through the process of concept analysis, opinions of the participants and were classified and clarified through six elements of Dickoff.et.al. (1968). These concept include:-

- Higher education, nursing education and clinical context (context/framework);
- Centres of Excellence in PBL (agent);
- Universities initiating PBL, other universities offering PBL in the region, affiliated colleges, clinical services, students and health care users/consumers (recipients);
- Collaboration process which is dynamic, transformational and beneficial consisting of need analysis, joint planning and design, execution/implementation and monitoring and evaluation (procedure);
- The outcome of collaboration which was effecting implementation of PBL (terminus) and;
- Dynamics or underlying powers of collaboration include commitment, communication, cooperation, respect and trust (dynamics).

Context: The higher education is the environment that is dynamic and multidimensional in which nursing education is located and regulated. Norms and standards in this context influence nursing education. The context is regulated by the following legislative frameworks

- National Qualification framework Act, 2008 (Act 67 of 2008) that has been developed to establish the South African Qualification Authority (SAQA) and to provide for Quality Councils which constitute higher Education and Training Quality Assurers (ETQA). (South Africa 2008).
- SAQA has set standards of the educational outcomes in the country, and also designed Critical Cross Field Outcome (CCFO) that form a foundation for description of more specific outcomes in all the learning outcomes

This context is made up of the following different discipline groups:

Nursing education is the context wherein PBL education occurs. This context consist regulatory body of SANC and legal framework which ensures the highest standards of nursing education and service delivery. Nursing education institutions such as PBL Universities and affiliated colleges are within this context. The Universities affiliated with specific colleges are charged with the responsibility to maintain nursing education standards as stipulated by SANC. Therefore, in collaboration in implementing PBL, creation of an environment conducive to effective implementation is to occur within the boundaries of Universities and the SANC
guidelines and regulations. One critical act that influences this context is the Nursing Act no. of 2005 (Act no.33 of 2005)

This act is very important aspect of the nursing education context because it regulates the nursing profession, and provides for matters related to nursing education and practice as well as South African Nursing Council (South Africa, 2005).

South African Nursing Council (SANC) is charged with accountability for setting standards of nursing care to the citizens of South Africa whilst the RSA Nursing Strategy 2008 gives guidance on the operations and activities regarding nurse training within this context. The National Nursing Strategy is renewed on five years basis and focuses on producing competent graduates and diplomats who are critical thinkers, and effective decision makers.

**Clinical Health Care:** As a context, clinical health care context is a dynamic multipurpose environment which provides opportunities for PBL students to integrate theoretical components into practices. It provides PBL students with meaningful and authentic learning opportunities and experiences. In this context multidisciplinary team members participate in education and training of PBL students in collaboration and this is to be created within the legal, moral, ethical and professional boundaries of health care services. The National Health Department obligates the Provincial and District health care services to participate in the training of nursing students as future health care human resources through the National Health Act 2003 (Act 67 of 2003). This context is regulated by various legislation frameworks as well as hospital policies and protocols.

**Agents:** Agents are collaborators who are expected to lead the collaboration through mentoring, development and capacity building in PBL activities. In this context, the agents are Centres of Excellence in PBL who have advanced knowledge, skills and expertise in PBL and collaboration.

**Recipients:** These are the following groupings that are to be monitored, developed and empowered on PBL, namely, Universities that are novices in PBL and affiliated colleges, other Universities offering PBL, clinical services, students and health care users. Within the University where PBL education is initiated is where intra-professional, inter-professional and inter-institutional collaboration occur.

**Dynamics:** Dynamics are the underlying powers and sources that initiate and maintain collaboration in implementing PBL, and include commitment, communication, cooperation, respect and trust.

**Process:** It is a dynamic, cyclical, interactive and beneficial process consisting of need analysis, planning and design, implementation and monitoring and evaluation.

**Effective implementation of PBL:** This is the ultimate outcome or end point of collaboration to facilitate effective PBL implementation which will benefit the nursing students and ultimately nursing education in nursing education.

3. Evaluation of the Model

The model was not evaluated in this project and will be done as post-doctoral study. The critical reflection of this model was done according to Chinn and Kramer (2011) to help to clarify how well it relates to theory, research or practice. These authors suggest ingredients for evaluation purposes are: clarity, simplicity, generality, and accessibility and importance (Chinn & Kramer, 2011).

The above five critical components that the researcher used to evaluate the model are discussed below:
Clarity: Semantic clarity and consistency were attained by using the same concept definitions in same order throughout the model description. Clarity of the model was attained through concept analysis and empiric data from the participants’ opinions. Attributes and connotation of collaboration were identified through Rodgers and Knaff’s Evolutionary Review (2000) and literature search.

Structural clarity was achieved through Dickoff et al (1968) survey list and the six elements were used as the basis for describing the model.

Simplicity refers to the complexity of structural components and the relationships between categories (Chinn & Kramer, 2011). The structure of the model is not too complex, in that it is easy to ascertain the relationships between the concepts and the intended outcomes of the model are also clearly indicated. The relationships between the concepts are clearly explained and straightforward.

Generality: The model was designed for the establishment of collaboration in implementing PBL for nursing education in nursing education institutions. However, it can also be applied for the development of collaborative initiatives in nursing education and practice. The model can be used in any educational situation where there is a need for collaboration with adaptation.

Accessibility: The model will be made available to nursing education institutions initiating and offering PBL and clinical settings where data was collected through workshops and research conducted by the researcher. The model will also be made accessible through publication in accredited journals and through presentation at seminars and workshops.

Importance: The importance of the model in nursing education relates to its practical value in the teaching arena. This model is deemed to be useful, since it aims to address current shortages of skills, expertise and talents in PBL. The model will also promote effective utilization of resources, namely, sharing of decision making processes, problem solving and accountability in nursing education or student issues.

4. Limitations of the Study
A limitation of this study is the restriction of the study to nursing education of pre-registration programme, which implies limited generalizations. The sample of nurse managers and preceptors was confined to the North-West Province hospitals and clinics where PBL students are placed for clinical learning as compared to nurse educators from three South African universities offering PBL. This was attributed to the fact that clinical services used by participating universities to place their PBL students were far apart and very costly to get the managers together in terms of finances and time. The empirical data from nurse managers and preceptors were from one province, and there the findings can only be transferable within the province. The model has not yet been tested.

5. Recommendations
Recommendations for Nursing Practice: Clinical practice provides realistic and humane opportunity for PBL students to integrate theory into practice. Clinical service personnel should work jointly in education and training the students from need identification to monitoring and evaluation of PBL programme. It is important that the accredited providers of practical component of PBL programme must be educated and trained on PBL and collaboration as well as what it entails since this has a significant implication for collaborative practice.
Effective collaboration with health care providers requires good relationships to be maintained between academia and health care facilities and formal agreements should be in place detailing the roles, responsibilities of the collaborators.

**Recommendations for Nursing Education:** The model should be made available to the North-West University Senate and South African Nursing Council who regulate nursing education within the institution and nursing profession respectively. The designed PBL programme, particularly its delivery mode should be included in the university year book and SANC programme document. These recommendations are made in light of the revision of the new professional qualifications in nursing education.

**Recommendations for Research:** Higher education, nursing education and clinical health care settings are very dynamic and are characterized by changes influenced by political, economic, cultural and social factors in South Africa and globally. As the components of the model will not change, the detailed description of the model will require revisions to embrace the significant changes.

Much has been documented on collaboration, but a great deal is not yet clearly understood and requires more research, such as: 1) Piloting the model and evaluating it; 2) collaboration in implementing PBL at different levels of operations; 3) cultural influences on collaboration; 4) criteria to assess effectiveness of collaboration; and 5) development of an evaluation instrument of the model.

6. **Conclusion**

Collaboration is a crucial component of all aspects of nursing education, as it is through this on-going and continuous process that a common vision and common goals and realities are developed and maintained. Student-centred collaborations can be a functional reality in the delivery of quality higher educational experiences. The idea of implementing collaboration at both staff and institutional levels has far-reaching implications for the institution, departments, and students.

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