ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 04, pp.49559-49565, April, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE EFFECTIVENESS OF PROBLEM BASED LEARNING: LITERATURE REVIEW

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ARTICLE INFO

Article History:
Received 16th January, 2017
Received in revised form
19th February, 2017
Accepted 22nd March, 2017
Published online 30th April, 2017

Key words:

Problem based learning,
Student-centered teaching approach,
Traditional teaching approach,
Non-Problem based learning,
Teacher-centered teaching approach.

ABSTRACT

In the modern health care environment, professional nurses are required to respond to dynamic, complicated situations that require skills in problem solving, professional knowledge, decision-making ability, and group collaboration. Problem based learning (PBL) is a constructive teaching method that has positive learning outcomes. Yet no study has thus far examined the critical components that makes PBL work. This literature review will outline the origin of PBL, the characteristics that make PBL work, the advantages of PBL, the theoretical underpinnings of PBL, and the limitations of PBL. We researched books and databases including Academic Search, ERIC, EBSCOHost, PsychINFO, PubMed, MEDLINE, and CINAHL. This review identifies the components that make PBL work. Incorporating these components in the practice of teaching will lead to better learning outcomes.

Citation: Homood A. Alharbi, 2017. "The effectiveness of problem based learning: Literature review", *International Journal of Current Research*, 9, (04), 49559-49565.

INTRODUCTION

Purpose of the Preliminary Integrative Review

The purpose of this preliminary integrative review is to determine the state of science in regard to PBL. The focus of this integrative review is to examine what we already know about this topic, what we do not know, and what we want to know. A summary of this review will be used to guide the study of this topic and write the first part of the proposal paper.

General Methods for Review Process

Search strategy and yield

We researched books and many databases including Academic Search, ERIC, EBSCOHost, PsychINFO, PubMed, MEDLINE, and CINAHL. PBL is a teaching method, thus, we used the Education databases as primary sources for this literature review. Through the university libraries, we chose the *social science* department, and then we chose the *Education database.* Form the provided list we chose, the *Action in teacher education journal* which contains studies from January 15, 1996 to the present time.

Through the *Education Full Text (H.W. Wilson) database,* we used different keywords. Before typing the keywords, we specified the date of publications from 2006 until 2016, English language, and adult population to limit the results to what was needed for this study. In addition, different databases were chosen through the *choose databases* option. All relevant databases to the research topic were chosen, for instance, the Academic Search Complete, MEDLINE with full Text, CINAHL plus with full Text, PsycINFO, ERIC, and Education Research Complete. Next, using the *Advanced Search* option, different keywords have been used such as problem based learning, student centered teaching approach, students centered learning approach, traditional teaching approach, Non problem based learning, and teacher- centered teaching approach. This resulted in more than 50 references.

Inclusion/Exclusion Criteria for Selected/Eligible Articles

The inclusion criteria include English language, articles from 2006 to 2016, the adult population, and peer reviewed articles. In addition, all articles in the problem based learning (PBL) and/or Non problem based learning (NPBL) were selected as relevant articles regardless of the major in which the study was conducted. The articles that we were unable to access the full text were excluded from the reference. Also, articles that discussed PBL in the online classes,studies that had been done

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in online courses, and poor quality articles that had (severe limitations) such as small sample size, were excluded.

Process and Procedures for Data Extraction and Management

During the literature review, the abstract of each article was reviewed to make a decision about the importance of the article to the study. If the article met the criteria, we used the citation option, and then we copied the citation to a word document called Draft that was saved in the PBL folder in the desktop. Next, in a few words, we gave comments about this article (such as has a valid and reliable measurement tool), then the pdf file saved in the PBL folder in the last name of the first author. Next, we exported the file to RefWorks account. We used many methods for data management, which includes: concept mapping, Microsoft Excel, and RefWorks software

Results/Findings of Integrative Review Process

Sample Characteristics (Articles Located and Selected for Review)

Only one study has examined PBL in the nursing setting in Saudi Arabia. However, the sample in this study consisted of females only. In addition, the sample selected only included one setting, the College of Health Science for Females, Ministry of Health in Riyadh. Only 30 students who were registered for Evidence Based Nursing Course were included in the study (Ali, & El Sebai, 2010). However, due to these significant limitations, this sample does not represent nursing students in the country.

The integrative literature review showed different sample characteristics that ranged from convenience samples (Yuan, et., 2011; Applin, et al., 2011, Ali,& El Sebai, 2010) to random samples (Gabr, & Mohamed, 2011; Dehkordi&Heydarnejad, 2008). The majority of the samples in the reviewed articles are students from second, third, and fourth year college students (Yuan et al, 2011; Gabr, & Mohamed, 2011, Ali, & El Sebai, 2010). One study examined the benefits of PBL on graduated nurses (Applin, et al., 2011). Most of the studies were done in medical settings.

Sample Designs and Methods (Summary and Critique)

Only one qualitative study (focus group) has been found, which studied the students' experiences in PBL 3 months after graduation (Rowan, McCourt, &Beake, 2009). The rest of the reviewed articles were quantitative studies, which were a mix of comparative descriptive design (Yuan, et al., 2011; Applin, et al., 2011; Barman, Jaafar, &Naing, 2006); randomized controlled designs (Gabr, & Mohamed, 2011; Choo, Rotgans, Yew, & Schmidt, 2011; Lin, Lu, Chung, & Yang, 2010; Dehkordi1 &Heydarnejad, 2008), and one quasi- experimental design (Ali, & El Sebai, 2010).

In the comparative descriptive designs, students in both PBL and NPBL are compared in regard to the difference in the learning outcomes in the two learning approaches. Most of the reviewed articles compared the two teaching approaches in different settings where each setting had either PBL or NPBL classrooms. In the randomized controlled trials (RCT) designs, studies were conducted in one setting that had both teaching methods implemented. Students were randomly assigned to both groups and the difference in the teaching outcomes was studied.

The only study that examined the benefits of PBL in the nursing setting in Saudi Arabia was Quasi- experimental design. This study had a lot of limitations that includes having no comparison group, and participants are female students only. Due to these limitations, this study does not represent the undergraduate nursing students in the country. So, we will conduct an RCT study to examine the benefits of PBL on the undergraduate nursing students in Saudi Arabia. This study will fill the gap in the PBL outcomes in the country in the nursing setting. There will be a comparison group which will be taught in NPBL approach, and the intervention group will be taught by the PBL teaching approach, and participants will be randomly assigned to each group.

Origin of Problem based learning

Problem based learning (PBL) started at the McMaster School of Medicine in Canada in 1965 (Barrows, 1988). A few years later, this approach underwent a massive revision by Dr. Howard Barrows, who refined both the teaching strategy and the process approach (Barrows, 1988). This teaching approach was originated for two reasons. The first aim of this teaching method was to help graduate medical students bridge the gap between theory and practice. The second aim was to prepare students to cope with the challenges that had been produced by the technologies (Wells, Warelow, & Jackson, 2009). Soon after its introduction, PBL was adopted in a number of medical schools, nursing and midwifery programs, and other health-related curricula in many countries worldwide (Applin, Williams, Day, &Buro, 2011; Dehkordi, &Heydarnejad, 2008).

Characteristics of PBL

PBL classrooms start by dividing students into small groups of six to eight students in each group (Bradshow& Lowenstein, 2011; Kamp, Dolmans, Berkel, & Schmidt, 2012). In their groups, students are presented with an authentic problem that do not have one correct answer (Lee, &Brysiewicz, 2009; Hmelo-Silver, 2004; Savin-Baden, & Major, 2004). Students generate hypotheses about possible solutions for their problem using previous knowledge (Lee &Brysiewicz, 2009). Next, students determine what information they need to collect to solve the problem (Hmelo-Silver, 2004). This step allows students to understand their knowledge deficiencies and to begin searching for more information. Hence, learning is student-driven, which allows them to engage in a self-directed learning process. The instructor works as a facilitator, guide, and coach, in contrast to the traditional teaching where the instructor assumes the role of knowledge transmitter. After collecting the needed information, students share their thoughts, construct their knowledge, and solve the problem (Hmelo-Silver, 2004).

PBL has been shown to enhance students learning. For instance, since the problem has no one correct answer, students use their critical thinking and clinical reasoning skills to come up with possible alternatives to solve this problem (Hmelo-Silver, & Barrows, 2008). Situational interest is triggered by the nature of the problem and works as motivating force that drives the learner to engage in self-directed learning (Schmidt, Rotgans& Yew, 2011; Savin-Baden, & Major, 2004). Students work on problems that increase student engagement in the

learning process and motivate students to learn (Allen, Donham, &Benhardt, 2011). As students continue their self-study, their knowledge is continuously modified and refined. Thus, students have the opportunity to build their own professional knowledge and help in the knowledge construction retention (Allen, Donham, &Benhardt, 2011; Klegeris&Hurren, 2011). In PBL, students reflect on their learning process at different stages during the process (Downing, Kwong, Chan, & Lam, 2009). For instance, at the beginning of problem-solving process, students relate their new knowledge to their pre-existing information. Next, students think about the appropriate resources they currently have and what they need. At the end, learners think about the strategies they used to solve the problem and reflect on these strategies by listing both the advantages and weaknesses of their learning strategies (Dowinget al., 2009). Hence, PBL enhance the meta-cognition process (Hoges, 2011; Kaddoura, 2011; Dowing et al., 2009; Klegeris&Hurren, 2011).

In their groups, students are also engaged in collaborative, group-centered work rather than competitive and individual-centered (Mi, 2011). Students gain the skills in teamwork and group collaboration activities (Hodges, 2011; Rakhudu, 2011). One of the PBL assumptions is that working in small groups helpsstudents distribute the cognitive load among the team and helps students solve problem in a group that would be difficult to solve it alone (Hmelo-Silver, 2004). PBL results from group collaboration and individual knowledge acquisition, which both contribute equally to the learning process (Meo, 2013; Schmidt, Rotgans,& Yew, 2011; Tayyeb, 2013).

Advantages of PBL

In the United States, Dolder and Alston (2012) conducted a longitudinal study to examine the effect of PBL over time. Sixty-seven students participated in the study over two years. The results showed that PBL enhances students' ability to solve case study problems.Applin et al. (2011) studied 121 graduated nurses in one Canadian Province regarding critical thinking and self-directed learning skills. Students who graduated from PBL and NPBL nursing programs received the survey six months after graduation. The results indicated that PBL graduates gained more skills in critical thinking and self-directed learning.Similarly, in Sweden, Staun, Bergström, and Wadensten (2010) studied staff member and student perceptions about the student's performance in the clinical settings. A total of 24 students and 41 staff members participated in this study. The results showed that both students and staff nurses view PBL as a helpful teaching approach in bridging the gap between theory and practice.

In Australia, Vittrup and Davey (2010) used a case study to examine the effectiveness of PBL; the results indicated that PBL improved knowledge acquisition and professional development in graduate nurses. InEgypt, Gabr and Mohamed (2011) conducted a randomized controlled trial (RCT) of 130 undergraduate nursing students to compare PBL with NPBL students. The results indicated that PBL students engaged in self-directed learning and gained more skills in solving problems. In Turkey, Ozturk, Muslu, and Dicle (2008) compared 52 fourth-year nursing students (PBL) with 95 fourth-year nursing students (NPBL). Results showed that PBL students gained significantly more critical thinking skills and engaged in self-directed learning than NPBL. Likewise,in Iran, Dehkordi and Heydarnejad (2008) conducted an RCT study to examine the attitudes toward learning in both PBL and NPBL; each group consisted of 20 second-year nursing students. The results showed that PBL students had more positive attitudes toward learning and were able to engage in lifelong learning.

In Saudi Arabia, at the beginning of this century, PBL started to spread among other health professions such as medicine, dentistry, and physiotherapy colleges (Khalil &Al Rukban, 2010). These authors outline that the majority of the medical colleges in Saudi Arabia are planning to change their curricula to PBL curricula, and newer medical colleges are adopting the PBL curricula (Khalid, 2008). This shift has shown great results in the learning outcomes. For instance, Al-Damegh and Baig (2005) compared PBL students with NPBL students in third-year medical students at the Medical School at King Saud University. The Medical School at King Saud University has two campuses, one campus is in Riyadh (where the teaching method is NPBL) and the other in Al-Qassim (PBL teaching method). The author compared the PBL with the NPBL approach in regard to solving problems and self-directed leaning skills in both teaching approaches.In the Riyadh campus, there were 138 students and there were 65 students in Al- Qassim campus. The results showed that 64% of PBL students were able to answer problem-solving questions correctly as opposed to 7.25% of the students at NPBL students. In addition, 86% of PBL engaged in self-directed learning compared to 20% in the NPBL class. In a nursing context in Saudi Arabia, Aliand El Sebai (2010) conducted a one-group pre-test and post-test design to examine the impact of PBL on nursing students' learning and their self- directed learning abilities. PBL was introduced in the Evidence-Based Nursing Course for one semester only. The results showed significant differences between the pre-test and post-test mean scores for this approach to learning.

Theoretical Framework Underpin PBL

Learning theories are fundamental to effective teaching and learning, and address different aspects of the learning process (Keating, 2011). Learning theories work as a theoretical framework that describe, explain, and predict how learning occurs (Bastable, Gramet, Jacobs, &Sopczyk, 2011). Learning theories can be categorized into four main areas: behaviorism, pedagogical, cognitivism, and constructivist learning theory. Behaviorist learning theory is based on the work of Skinner and Edward Thorndike, who studied how learning occurs (Savin-Baden & Major, 2004). Skinner (1904–1990) examined *operant conditioning*, claiming that all behaviors are learned and strengthened through reinforcement. Operant conditioning includes a reward that is meaningful to the learner. Thorndike addressed the importance of learning through feedback, since learning is always a trial-and-error process (McEwen & Wills, 2011). In addition, behaviorism outlines the importance of learner motivation during the learning process. While behaviorist theory seems contrary to PBL, many elements of this theory are consistent. For instance, feedback and learner motivation are important features of PBL. One of the problems of behaviorism is the notion that learning can be measured only through behavioral changes. Thus, the focus of this theory is on the outcome/behavior changes rather than the learning process. Pedagogical learning theory is a theory that views the learner as "immature" and in need of an outside person (teacher) to control the learning process (Bradshaw & Lowenstein, 2011). It is consistent with the idea of experts sharing their knowledge. According to the pedagogical learning theory, students are

motivated by competition for grades, and the consequences of failure (Bradshaw & Lowenstein, 2011). One of the strategies consistent with the pedagogical tradition is the Lecture Based Learning (LBL) approach. LBL is a structured teaching approach in which the teacher is responsible for both the content and delivery of the subject matter (Bradshaw & Lowenstein, 2011). Thus, the teacher/instructor is responsible for what is taught and how it is learned. Thus, students are dependent on their teachers for learning. The contents are usually delivered by PowerPoint presentations (didactic approach) where the students have less time to practice problem solving or reflect on their learning (Benner, 2010). The advantages of this teaching method include saving time, less frustration for students, and the ability to accommodate a large number of students in the classroom (Bradshaw & Lowenstein, 2011). However, in this approach, students rely on memorization instead of understanding the subject matter (Benner, 2010). In this teaching approach, students are passive and seldom have the opportunity to reflect on their learning or engage in self-directed learning (Benner, 2010).

In contrast to behaviorism and pedagogy, cognitive learning theory focuses on the importance of what goes on inside the learner (Savin-Baden & Major, 2004). Cognitive learning theory outlines the importance of the mental process rather than behavioral changes. The mental process of individual cognition includes perception, thought, memory, and ways of processing and structuring information (Bastable et al., 2011). Promoters of the cognitive tradition view learning as an active process in which individuals perceive information, interpret it based on what is already known, and then construct it into a new form that is understandable and meaningful (Bastable et al., 2011; Savin-Baden & Major, 2004). Cognitive learning theory includes a number of sub-theories: information processing, social cognition theory, and constructivist learning theory.

The root of constructivist learning theory (CLT) begins with John Dewey's perception of learning (Dewey, 1997). According to Dewey, learning is an active process that requires learners to use sensory input and build meaning out of it (Dewey, 1997). Further developed by Jean Piaget (1896–1980) in Switzerland in 1972, constructivist learning theory describes both what "knowing" is and how one comes to know (Evans, 1973). Piaget was interested in the areas of biology, philosophy, and child developmental (Evans, 1973). As a biologist, Piaget was interested in how an organism adapts to its environment (Evans, 1973). As a child psychologist, Piaget was interested in "how we come to know." Piaget proposed four development stages (Evans, 1973). In the first stage, the "Sensorimotor Period" from birth to two years of age, a child's cognitive system is limited to the motor reflexes. In the next stage, the "Pre-Operational Period," from two to six or seven years, children start using mental imagery and language. In the third, the "Concrete Operational Stage," from six or seven to 11 or 12 years, children are capable of thinking at concrete level but not at abstract level. In the final, "Formal Operational Stage," from the age of 11 or 12 through adulthood, people are capable of thinking logically and at an abstract level (Evans, 1973). According to Piaget, learners discover knowledge as they interact with people and the environment (Evans, 1973). Rather than learning by discovery as recommended by Piaget, the Russian psychologist Lev Vygotsky advocated clear, well-designed instruction that is carefully structured to advance each learner's thinking and learning (Vygotsky, 1980). While he agreed with Piaget about the biological bases for learning, Vygotsky emphasized the importance of social and cultural experience in the learning process. However, he rejected the notion of universal stages of children's development described by Piaget. According to Vygotsky, the fundamental learning system of one child may not be identical to that of another (Vygotsky, 1980). He rejected the notion of "shared knowledge," in which an expert learner (such as a teacher) can share his knowledge with a less advanced learner (e.g., a student). Past experience is fundamental to the learning process (Vygotsky, 1980). The ontological assumption of constructivist theory rejects the naïve belief that what a teacher perceives can be ready-made for students to adopt. Constructivists consider that knowledge is not absolute but rather is constructed and built upon by learners using their previous knowledge (Savin-Baden & Major, 2004). Knowledge is constructed and not given. Each person constructs his or her own individual knowledge base and it is impossible to fully transfer the knowledge constructed by one person into the mind of another.

The epistemological assumption of constructivist theory is that knowledge does not exist outside a person's mind (Fosnot, 2005). Thus, constructivists embrace the subjective assumption of truth. In addition, Von Glasersfeld (1995) rejected the idea of "shared knowledge" and "shared meaning" (Fosnot, 2005). Since each individual constructs his/her own knowledge and meaning, no one can argue whether two people have produced the same understanding. Teachers who base their practice on a constructivist approach reject the notion that meaning can be passed on to learners via symbols and transmissions (Savin-Baden & Major, 2004). Learners would not copy their teachers' understanding but construct their own understanding. Constructivists suggest that students perceive their environment in ways that could be different from those intended by their educators (Savin-Baden & Major, 2004). In the context of education, environment includes curricula, textbooks, given tasks, other students, and the teachers. Thus, the role of the teachers is not to dispense knowledge but to provide students with opportunities to build their own.

Constructivists value collaborative learning, which facilitates students' ability to construct their own knowledge (Fontes&Neto, 2011; Mi, 2011). Knowledge occurs when learners interact with the environment. Thus, knowledge is achieved as students negotiate social situations and evaluate their individual understanding. Learning takes place through three learning processes: assimilation, accommodation, and construction (Savin-Baden & Major, 2004). Assimilation occurs when an individual interacts with an object or event in a way that is consistent with what they already know. Accommodation is achieved when a learner modifies their existing knowledge in response to new knowledge. Construction occurs when the learner reflects on and links his/her existing knowledge with the new knowledge and constructs their own knowledge base. Thus, learners need certain knowledge, experience, or practice in order to construct new knowledge. An assumption of this theory is that learners are more likely to remember knowledge if they discover it on their own. Thus, the teacher's role is as a facilitator or coach, to motivate students and enhance learning (Benner, 2010; Fontes&Neto, 2011; Mi, 2011). Constructivists view learners as "mature" individuals who are responsible for their own learning. There are four assumptions:

- Meaningful learning is achieved through reflection and integration.

- Knowledge is constructed, not given.
- Learners' previous knowledge is the foundation of the learning process.
- Learning is an active process.

Many teaching methods fall under the umbrella of this theory including Problem based learning (Hmelo-Silver, 2004; Loyens, Rikers, & Schmidt, 2008; Schmidt et al., 2009). In Problem based learning (PBL), students work collaboratively in small groups to solve a given problem. Teachers work as facilitators or coaches to enhance learning. Students construct knowledge for themselves, make comparisons with their peers' knowledge, and refine their understanding. Thus, PBL is more consistent with constructivist learning theory than behaviorist learning theory.

Policy for Nursing Education

In February 2010, there was a forum about the challenges and future of nursing education by the Institute of Medicine (IOM) and the Robert Wood Johnson Foundation. Teaching methods that may have the greatest impact on learning outcomes were discussed(IOM, 2010). This forum outlined many recommendations about the future of nursing education. The main goal of these recommendations was to improve the link between theory and practice. For instance, Recommendation 6 spoke to ensuring that nurses engage in lifelong learning. The PBL teaching method has been shown to improve nursing students' self- directed learning skills. Thus, graduated nurses will be responsible for updating their own professional and personal knowledge. In a Carnegie National Nursing Education Study, Benner and colleagues discovered that many current educational practices do not promote critical thinking and clinical judgment (Benner, 2010). Benner (2010) called for radical curriculum reform in nursing education through student-centered teaching and learning approaches as the way to prepare graduate nurses. Benner (2010) stated that "The educators in nursing science need to improve the teaching methods to ensure that all graduates are safe and effective clinicians, as well as lifelong learners who develop clinical knowledge" (p13).

In this study, Benner and colleagues (2010) also reported that many students complained about the amount of information given in the class via PowerPoint presentations, where the students' role was to sit, watch the slides go one after the other, and agree with everything that teachers were saying. A few hours later, students were not able to recall most of the information given in the lectures. Benner (2010) postulated that by mentioning that when lecturers rely on memorization only, students will not retain the entire concept because they did not understand it. Students also reported that their classroom teachers lecture without examples of what they might see in clinical settings. Benner (2010) concluded the study by stating that "the research team was struck by the variability and even poor quality of teaching in classrooms" (p.65). Thus, the author recommended teachers to work as coaches or facilitators and create an optimal learning environment that enhance learning outcomes. Hence, PBL maybe a teaching method that satisfies this call.

Limitations of PBL

Challenges related to PBL as a teaching method. Not all of the implementations of PBL have been successful in eastern countries such as China, Korea, South Africa, and Macao (Huang, 2005; Hwang, &Jang, 2005; Rakhudu, 2011; Yuan, Kunaviktikul, Klunkin, & Williams, 2011). In Korea, Hwang and Jang (2005) found that students expressed their frustration with not being able to readily understand the essential content of the course using the PBL method. In Macao, half of the students indicated that PBL was stressful due to the minimal guidance from the teacher, which made students less confident about their learning process. In addition, students perceived PBL as a time-consuming process that increased their workload, because students in PBL are required to search for the information by themselves where in NPBL students rely on the information given in the class without extra work to search for the information and (Yuan et al., 2011).

Non-PBL Challenges

There are many challenges for implementing PBL that are not related to the teaching method per se, but to other factors such as faculty attitudes toward PBL, leadership, the culture, and infrastructures needed for PBL. For instance, the faculty attitudes toward PBL can play a role in weakening this teaching approach. Lim (2012) found that some PBL opponents believe that the only way to teach is through direct transmission of information by someone who is an expert in the content. Other instructors perceive PBL as time consuming for teachers because of the workload (Ribeiro, 2011). In addition, PBL opponents worry about the course content coverage (Ribeiro, 2011). Lee, Yoo, and You (2009), in a mixed method study, conducted at aUniversity in South Korea, examined why professors are not embracing any type of constructivist learning approach (PBL, Team Based Learning, or Case Study Learning). The qualitative part of the study started with six faculty members, then an instrument was developed to measure the phenomenon. Then, 86 faculty members were given the questionnaire. The results showed that most of the teachers believed that there is no need to change their lecture-based instruction since both the teachers and the students were satisfied with the current teaching method. Some teachers argued that PBL preventedthem from sharing their knowledge and experience with the students (Rakhudu, 2011), made their role passive (Raftery, Clyne, O' Nell, Ward, & Coyne, 2010), and caused the worry that not all students would be active participants in the group (Chiang, Champan, & Elder, 2010).

The leadership role in facilitating PBL includes funding staff to attend classes about PBL, recognizing teachers who embrace PBL, facilitating rooms equipped with computers, and approval and enforcement of this approach (Ribeiro, 2011). Lim (2012) notes that a large part of the resistance towards PBL is natural resistance against change, as it comes frequently from teachers who spent an entire career teaching in the traditional teaching method. Hence, leadership encouragement could solve this issue. Educating faculty on this approach is crucial tothe staff embracing it. For example, Lee, Yoo, and You (2009) found that most of the teachers who were not using PBL were not familiar with the terminology "constructivism teaching methods" (p. 50). Culture plays a role in succeeding or failing this approach. For instance, Huang (2005) noted that the Chinese culture emphasizes respect for knowledge and wisdom. Students respect their teachers and those who provide them with knowledge (Huang, 2005). In PBL, the students had difficulty in debating a subject with their lecturers. One of the students commented "I feel more secure and confident to learn new knowledge by the Chinese style of learning, because I

know exactly what I have to learn." (Huang, 2005, p.39). These attitudes do not enhance the PBL approach where students are encouraged to ask and challenge the teachers as a way of critical thinking practice. In order for PBL to work, initial infrastructures should be in a place. For instance, adequate resources such as library access and computer labs should be available (Rakhude, 2011). Lim (2012) found that when student numbers increase without recruitment of more tutors, the size of PBL groups would inevitably increase beyond the typical recommended maximum of 8 to 10 students, making PBL difficult to work as intended.

Conclusion

PBL has been shown to have many positive learning outcomes. It fosters crucial skills for graduated nurses to provide the optimal nursing care. These skills include critical thinking, clinical reasoning, group collaboration, problem solving, professional knowledge construction,self-directed learning, and student motivation to learn. However, in order for PBL to work as intended, critical components of this approach should be ensured. For instance, thorough preparation for the faculty members, strong support for the administration that includes facilitating library access, equipped computer labs, and supporting faculty during the transition phases from NPBL to PBL curricula. The group size should be within the recommended number since large student samples makes it difficult for a PBL class to succeed. Embracing PBL without sufficient preparation could harm the learning process since both teacher and students struggle to cope with teaching approach. PBL showed positive learning outcomes in many countries worldwide, which shows this teaching method can be applicable in different setting if the curriculum reform was well planned and implemented. This literature review examined the impact of PBL on the learning process to show the applicability of this approach in different settings.

Acknowledgements

The authors are thankful to the Deanship of Scientific Research, College of Nursing
Research Center at King Saud University for funding this research

Conflict of Interest Disclosure

The author declares that there is no conflict of interest regarding the publication of this paper.

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