Using problem-based learning in a large classroom

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Summary Although PBL (problem-based learning) has gained increasing acceptance as an alternative to teacher-centered methods in nursing education, there are challenges to implementing this method in conventional course-based curriculums due to lack of additional faculty tutors to facilitate and monitor small group process. Little is known in nursing education regarding the effectiveness of teaching PBL in large group settings. [Woods, D. 1996. Problem-based Learning for Large Classes in Chemical Engineering. In: Wilkerson, L., Gijsaers, W. (Eds.), Bringing Problem-based Learning to Higher Education: Theory And Practice. Jossey-Bass, San Francisco, pp. 91–99] suggests that there are significant challenges related to student acceptance of the method, monitoring small group process and evaluating the quality of students’ work. This paper will provide a description of the process and outcome of using PBL in a second year Baccalaureate nursing course using both classroom and on-line learning technology. Findings from a student survey will be included to highlight the strengths and challenges of using PBL in a large group setting with one faculty tutor. Implications for using PBL in this format will be provided.

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PBL (problem-based learning) is recognized by nurse educators as an effective alternative to traditional, teacher-centered methods (Alavi, 1995; Amos and White, 1998; Rideout and Carpio, 2001). PBL requires students to work in small groups to identify and resolve clinical problems through a combination of small group process and self-directed learning. Faculty are facilitators or ”tutors” that assist the small group to identify their learning needs and critically appraise the applicability of new information to a given clinical case scenario (Barrows and Tamblyn, 1980; Woods, 1996). Authors contend that this approach is more effective in preparing students for the reality of the clinical setting compared to conventional teaching methods (Barrows, 1985; Creedy et al., 1992; Frost, 1996). In addition, PBL is thought to foster critical thinking attributes (Cooke and Moyle, 2002), problem-solving skills (Andrews and...
Jones, 1996), group communication skills (Cooke and Moyle, 2002), and a commitment to life-long learning (Deretchin and Contant, 1999).

To date, the majority of literature in nursing education describes the use of PBL in a small group format with one faculty tutor. Authors contend that a small group of 8–12 students with one faculty tutor is preferred as it allows for closer assessment and evaluation of the group process (Benson et al., 2001). For faculty teaching in a traditional course-based curriculum PBL is challenging due to inadequate numbers of faculty tutors to monitor and evaluate small group process. Allen et al. (1996) suggest that large group PBL can be accomplished by one “floating facilitator” among several small groups. In this model, the faculty tutor spends 5–10 min with each small group combined with periodic large group discussions during the PBL process. The limitation of using this approach relate to faculty acceptance of the method, monitoring and evaluating small group process, and monitoring the quality of the students’ work (Woods, 1996).

In nursing education, there are few descriptions and/or evaluations of the use of PBL in a large classroom with one faculty tutor. The purpose of this paper is to describe both the process and outcome of using PBL in a large second year nursing class with one faculty tutor and on-line learning technology. A description of the course and the specific steps of the PBL process with a large group will be described. Themes arising from a student survey and faculty feedback will be incorporated to highlight the strengths and challenges of using PBL in a large class. Implications for the use of PBL using a large group approach will be discussed.

Course description

The purpose of the 12 week course was to provide students with an understanding of childbearing and childrearing families. Five PBL learning scenario were developed to encompass the prenatal, antenatal, postpartum and childrearing experience. Each learning scenario took two weeks to complete. Forty-two second year nursing students were divided into six groups containing seven members in each group. The students and tutor met in a class once a week for three hours during the two weeks and communicated via course website postings.

The students participating in the course had no prior experience with PBL although many had worked in a small group format prior to this experience. To prepare the students for using PBL an orientation guide was developed and distributed to the students three weeks before the course. This guide contained important information related to the process of PBL, role expectations of the tutor and students, readings on effective group process and selected references regarding PBL. Prior to the course, the coordinator met with the students to review the PBL process and answer any questions the students might have. Due to the number of PBL groups, a course website was developed to facilitate correspondence within and between the small groups and tutor. The website contained information on the course scenarios, PBL, group postings, links to scenario resources and study notes for examination purposes.

Orientating students to PBL

The first two classes were focused on understanding the process of PBL and determining the skills and strategies needed for both small group and large group interaction. To orient students toward the various differences in traditional and PBL learning, they were asked to talk about what kinds of group behaviors that would be important to a successful PBL experience. Small groups were asked to develop group guidelines to assist them with the small group process during the course. Following this activity, the large class met to share commonalities and differences. This process was helpful as students could modify or create group rules that they did not consider in their initial small group discussion. In addition, the class generated a list of rules to guide large group interaction (i.e., sharing material in a creative manner, maximizing student input and interaction). Group rules were posted on the course website and were used after each scenario to evaluate both small and large group progress.

Stages of the problem-based learning process

PBL is a process involving several steps. First, students are presented with a problem that is often ill-defined and complex (Alexander et al., 2005). Students identify learning issues and possible sources of information. Next, students engage in independent study by gathering and analyzing essential scenario information. When the students meet with the small group they critically discuss the essential application of the information to the scenario. Following completion of the scenario, students critically reflect on both the content learned and the process (Rideout and Carpio, 2001). The steps of PBL were modified to incorporate multiple
groups with one faculty tutor. The specific process of PBL for this course is outlined below.

**Small group brainstorming**

In this course, each small group was provided with the same scenario and was asked to follow the PBL process. Members were asked to assign a recorder and leader for the group. In the brainstorming phase, the tutor circulated among the small groups of students to observe group process and ask questions to stimulate thinking. The tutor also assisted the students to focus their discussion on the scenario to keep within the allotted time frame. Because the tutor could not be present for lengthy periods of time with each group, the group leader was given a list of probing questions related to the scenario. The group leader was asked to use these questions if there was difficulty generating hypotheses and/or learning issues. The group was asked to have one person record their learning needs and questions for sharing with the large group.

**Large group brainstorming and synthesis**

Each small group presented their learning needs and issues to the large class. During this time, the teacher documented the ideas on a whiteboard. Shared learning issues were clustered as each group presented. During this time, the group was asked to justify the inclusion of topics so that only essential “need to know” information would be included. The tutor also asked the group critical questions to ensure a clear understanding of the depth and scope of the information to be collected for self-directed learning. Upon completion of the large group brainstorming session, a synthesis of the overall learning needs of the class was generated. The “learning map” included approximately eight to 8–12 topics for further study. Each small group was responsible for researching one to two topics for the next class. In the first PBL case, for example, one group explored nutrition and exercise during pregnancy, while another group explored physiologic changes of early pregnancy. After this process, the small groups met to further divide the workload among the members of their group and consider possible resources to assist them with their topics. The learning map and designated topics were posted on the course website.

**Engaging in self-directed study**

Each student was responsible for retrieving and organizing their information for the next class. Group members were expected to communicate via the course website discussion page and were given deadlines for posting individual work. One person in the group was designated to organize the material into a format for sharing with the large class (i.e., PowerPoint slides, handouts, etc). Prior to the scheduled class, the students were expected to post their scenario information on the website to allow the other class members to review and critique the content and applicability to the scenario. During this time, the tutor monitored the group process (i.e., frequency of postings and punctuality) and the quality of individual contributions to the scenario.

**Sharing findings with the large group**

Small groups presented their findings to the large group in various formats. It was expected that students demonstrate creativity in their information sharing techniques and to encourage dialogue among the group. It was also expected that the other groups challenge the students by asking questions about the credibility of their information sources and the applicability to the scenario. Students chose various methods for information sharing, such as PowerPoint, role-play and audiovisual. Each student within the small group participated in the presentation of the information. During this time, the tutor ensured that students stayed within the time frame and facilitated the large group discussion regarding the applicability of the information to the scenario.

**Evaluating small and large group process**

Upon completion of the scenario, the small groups met to consider the goals of the scenario and the degree to which they were achieved. During this time, the tutor circulated among the groups, assisting them to focus on what worked well and areas for improvement. Groups were encouraged to identify any conflicts or issues arising within the group. If any major issues arose, students were expected to meet with the tutor outside of class time. After the small group discussion, the large group met to talk about the learning goals for the scenario and to evaluate the overall learning. Following the class, the scenario notes from each small group were compiled by the tutor and posted on the course website for studying purposes. Each group was expected to provide a written small group evaluation at the end of each scenario. At the end of the course, grades were given for individual contributions to the
PBL process based on on-line contributions, and a combination of self and peer evaluation.

**Outcomes of using PBL with a large group**

Upon completion of the course, 22 students agreed to participate in an on-line survey consisting of six open-ended questions related to the perceived benefits and challenges of using PBL. Prior to the study, ethical approval was granted through a University ethics review board. Content analysis was conducted by the author to identify common themes in the survey data. The outcomes of the analysis indicated that PBL was useful in incorporating multiple perspectives and resources, developing small and large communication skills, transferring knowledge to the clinical setting and developing autonomy and responsibility for own learning.

**Appreciating multiple perspectives and resources**

Many of the students reported that through sharing with the large class they gained an appreciation for the diversity of learning resources available. Due to the large number of small groups and the division of the workload, the students were expected to provide a wide range of credible resources to address their topic. This process greatly enhanced the quality of the work compared to dividing the work among seven group members. One student commented:

I enjoyed researching the topics for this course. Because each person only had a small portion to research, you had a really good background of information with many different resources to back up the findings. I felt that the information that we brought back to the large group was thorough and credible.

The incorporation of multiple perspectives and resources within the PBL experience was deemed particularly useful during the beginning brainstorming session. Bringing the small groups together as one large group allowed students to consider different ways of viewing the scenario data. The end result of the brainstorming was a more comprehensive and detailed list of hypotheses and learning needs for the given scenario that reflected the group as a whole. One student commented:

It allows everyone to participate in different ways and learn to assume different roles. I found that you consider things from different perspectives that you might not have considered before hearing others opinions.

Although students enjoyed the variety of resources and perspectives in small and large group PBL a small number of students reported difficulty with managing the depth and scope of information provided by their peers and would have preferred a mix of structured lectures and problem-based learning. Another identified issue related to the limitations of researching a small portion of the scenario versus the complete scenario within the small group. A few students believed that they would have retained more information with the latter approach.

**Enhanced autonomy and responsibility**

The majority of students felt that PBL enhanced their sense of autonomy and responsibility for their own learning. Given the larger numbers of small groups, students had minimal face-to-face time with the tutor and had to be more independent with their learning. This seemed to develop a sense of empowerment in the learners. One student commented:

We are going to face many situations where we don’t know the answer. It has made me more independent. If I need information I am more inclined to take responsibility for my own learning whereas before I would refer to my notes or ask the professor. I learned the importance of being accountable and meeting deadlines because we were not only responsible for ourselves but for the whole class.

Although the majority of students indicated that they felt skeptical and uneasy with the PBL process in the beginning, they reported that they became more confident in their own learning abilities through self-directed learning and the small group process.

**Improved small and large group communication skills**

The majority of the students conveyed a positive attitude toward both small and large group approaches. They believed that the approach enhanced their ability to communicate within groups and retain information. With the small group work, they valued the interactive nature and the team spirit fostered through this approach. Students also felt that they developed a sense of accountability and responsibility to their peers in both the small and large group. As one student commented:
I believe that in using problem-based, we learned to work as a group and respect the strengths of one another. I also think that we can help each other with our weaknesses. It can sometimes be hard to get everyone together to put our part of PBL together, however, as nurses we are going to have to find time to work together and get the job done. So in a way, that works to our advantage.

In general, students found the small and large group process useful in retaining and retrieving scenario information compared to traditional teaching-centered approaches. They also conveyed that this approach was a fun way to learn. As one student commented:

PBL allows you to get more involved in learning the information and you retain the information much better when it is reinforced in this manner. It was fun and interesting and every week there was a new method used to present the information. It was interesting to see what each group thought was necessary to be taught to the large group.

One limitation identified by a small number of students related to their dislike of the small group approach. Specifically, some groups’ felt disadvantaged because of the lack of contribution of one their group members. As one student commented:

The only disadvantage that I feel comes from PBL is that to work in groups, I feel that you should have the choice of who you wish to work with, in order to work effectively. This is especially true when a portion of your mark depends on the group’s ability to work together and achieve their outcomes. The disadvantages of using the PBL approach in the young families course was that the groups were chosen at random and some group members did not pull their weight, other group members had to do more to make up for it.

In relation to the large group discussions, several students felt uncomfortable learning in this context as they found it intimidating and stressful to present scenario findings to the large group. Their lack of exposure to PBL in a large group setting and confidence in large group communication skills may have accounted for these issues.

Enhanced applicability to the clinical setting

The students identified that PBL was very useful in enhancing the transfer of knowledge from the classroom to the clinical setting due to the reality of the scenarios. Most of the students believed that this method of learning increased their confidence in the clinical setting by preparing them for common practice situations. As two students commented:

I think that PBL made it easier to transfer the knowledge to the clinical setting. It worked well because so much of the learning in class correlated with our clinical experiences. I think it made the information "sink in" more than just sitting through lectures would have.

One of the strengths of the design of this PBL course was that students were engaged in the clinical setting during the same semester. Further, the faculty tutor was engaged in both the clinical and classroom settings. This allowed the students and tutor to have many practical discussions around the application of the theory to practice. For example, some students demonstrated course concepts by using equipment and teaching resources from the clinical setting.

Effective use of on-line tools

The format of the course website was deemed useful in that it provided a means to communicate and retrieve course-related information. Further, the website was helpful in monitoring and evaluating individual contributions to the PBL process. Although the majority of students appreciated using the course website for discussion and communication, there were some issues around the timelines of the postings and the responsibility of the group to summarize the information into a format that could be shared with the large group. As one student commented:

The information is repetitive, people write too much instead of narrowing the information, the information is posted by several people in the group and not put together like it is supposed to be.

Coordination of the postings seemed to be more of an issue at the beginning of the course. A few students identified access to a computer as an issue or difficulty with posting discussion messages due to their own computer or difficulties with the network.

Discussion and recommendations for future use

The use of PBL in a large class with one faculty tutor augmented by an on-line course website was an overall positive experience for the students. The findings from this study are congruent
with previous studies reporting the benefits of enhanced small group communication skills, improved autonomy and responsibility and more active participation in the learning process (Morales-Mann and Kaitell, 2001; Cooke and Moyle, 2002). The use of PBL in a large group had the added benefit of multiple perspectives resulting in enhanced depth and scope of scenario-related information. In addition, students conveyed that the use of a course website to post, retrieve and share information facilitated communication between the small and large groups. Similar findings on the effectiveness of PBL through a solely web-based course approach are reported (Price, 2000).

The limitations of the use of PBL in a large group format are similar to small group formats with one faculty member. For example, some students do not like PBL due to group work and/or feel that there are challenges related to unequal contribution of group members’ or superficial coverage of scenario information (Morales-Mann and Kaitell, 2001; Papastrat and Wallace, 2003). As noted in Woods (1996) these issues may be more amplified with multiple PBL groups and one faculty tutor. In addition, students unfamiliar with the PBL approach may struggle without the direct guidance of a tutor in their small group. Biley (1999) found that making the transition to PBL from a more traditional learning format creates significant tension for students, requiring tutors to reiterate the process and the aims of the PBL approach throughout the course (Biley, 1999). Clearly, tutors with multiple groups are challenged with how to manage the PBL process with students from traditional course-based curriculums who may be inexperienced with the PBL philosophy and/or approach.

The implications of this survey indicate that PBL in large groups was a positive experience and suggests that PBL in a large class with one faculty tutor is a feasible alternative to the traditional small group format. However, consideration must be given to orientation to the PBL process and strategies to ensure communication within and between the groups. In this course, on-line course materials and discussions were a useful adjunct to the students and tutor as this format provides concrete evidence of the contributions of individual group members. This format allows the tutor to manage multiple groups despite less contact time with the students during class time. Future evaluation studies should be conducted to determine the long-term implications of PBL in a large group setting. Specifically, multiple cohorts of students should be surveyed to determine both student satisfaction and learning outcomes with this approach. Further, there is a need to better understand the tutor role in managing multiple PBL groups while maintaining the key elements of the PBL process.

Conclusion

PBL as a method and philosophy is a widely adopted and effective approach to fostering autonomy, critical thinking and self-directed learning in nursing students. These skills are needed for managing the growing complexity of the professional nursing role. Yet, application of PBL strategies within course-based programs can be challenging due to insufficient numbers of faculty to monitor and evaluate small group process. Despite these challenges, modifications to the traditional small group PBL approach can be both effective and feasible by combining both class and on-line learning strategies.

References


