

SUMMARY REPORT

Qualitative Assessment Activities for Pew Grant on Problem-Based Learning (PBL)

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The qualitative assessment efforts are guided by the goal to explore the nature of individuals' experiences with learning and teaching in a problem-based learning (PBL) setting. Specifically, the study investigates how students experience the PBL context (rewards and challenges) and what kinds of learning occur in the PBL setting. Originally, the qualitative evaluation component had been designed to elicit data from multiple sources: (1) undergraduate student perceptions of their learning experiences in a PBL instructional context; (2) undergraduate peer tutors' perceptions of their role in assisting students with PBL; (3) graduate teaching assistants' (TAs) perceptions and experiences with assisting faculty in PBL instruction; and (4) faculty perceptions and experiences with using PBL as an instructional approach. The design was modified to focus the qualitative assessment efforts on gathering undergraduate student perception data to ensure a representative sample size in each of the targeted departments. Undergraduate students experience the PBL instruction first-hand and provide valuable insights into the educational benefits and challenges of this methodology. Student perception data have been a minor focus in the research on problem-based learning.

The student perception data will be used to inform research- and practice-based guidelines and recommendations for the instructional use of PBL at the University of Delaware. The data will be shared with faculty in the targeted departments to inform future curricular and instructional decisions. In addition, various PBL models for undergraduate instruction at the University of Delaware were identified. These models were implemented while considering such variables as class size, instructional goals, students' intellectual maturity, and faculty preference.

Methodology

Guiding Research Questions

- How do students experience the PBL context?
- What kinds of learning occur in the PBL setting?

Focus Group Methodology

Focus groups are carefully planned discussions designed to obtain perceptions in a defined area of interest, namely PBL, in a permissive, and nonjudgmental environment. The research team selected the focus group methodology because it allowed them to collect in-depth data by having students articulate and reflect on their learning experiences in a structured and nonjudgmental environment. The qualitative methodology facilitated clarification of student comments and enabled the researchers to ask for examples, clarification and elaboration. All members of the research team were trained focus group facilitators.

Data Collection

Data Collection for Formative and Research Purposes

During the Fall 1999, Spring 2000 and Fall 2000 semesters, we observed instruction in PBL courses in targeted departments, we interviewed selected faculty, and we conducted focus groups with

undergraduate peer tutors and graduate teaching assistants (TAs) to enhance our understanding of various PBL formats, their pedagogical objectives, and their instructional implementation. In addition, the classroom observations provided us with an understanding of the instructional context in a particular PBL course and they played a critical role in the data analysis process.

Overall, we observed 23 PBL classes (spanning courses in Biological Sciences, Political Science & International Relations, and Education) and, at the faculty members' request, we shared the observation data with them for immediate instructional improvement. We also conducted semistructured interviews with three faculty, one from each of the targeted departments, who had employed PBL instruction for at least two semesters. We conducted two focus groups with undergraduate peer tutors (six students total) who assisted with the instruction of PBL courses in the Biological Sciences and we moderated one focus group with graduate TAs (three students total) who provided teaching support in a required Science course for Education majors.

Data Collection of Undergraduate Student Perceptions

During the Fall 1999, Spring 2000 and Fall 2000 semesters we conducted 40 focus groups with 119 undergraduate students total. We continued to collect student perception data until we had reached theoretical saturation, i.e., we observed that the same themes kept emerging in the focus group discussions and that we were not hearing any new topics. All students participated voluntarily; they were offered a \$10 deposit into their UD#1 Flex account as incentive to participate. The students were enrolled in PBL courses in the targeted departments of Political Science & International Relations (eight courses), Biological Sciences (four courses), and Education (2 courses). The focus groups consisted of students who were taking courses in the same discipline and ranged from three to five students. At each focus group meeting, the researchers explained the purpose of the study, provided an outline of the process and answered any questions. Then the participants were asked to complete a demographic background form and to sign a consent form (see Appendixes B and C). The discussion took about 60 minutes and was tape recorded for transcription purposes. The researchers also took notes to facilitate data analysis. Table 1 provides a summary of the focus groups conducted with undergraduate students in the targeted departments.

For reference, we have attached the following documents: (1) focus group session outline for discussion with students (Appendix A); (2) student demographic background form (Appendix B); and (3) informed consent form (Appendix C).

We analyzed and summarized the student perception data during the Spring 2001, Fall 2001, and Spring 2002 semesters. We have enclosed the summary reports regarding the effect of PBL on student learning and their instructional experience from PBL courses in political science, biology, and education. The summary reports outline the main themes that emerged from the focus groups within a particular department. The reports are organized by the sequence of questions asked in the focus groups (see Appendix A) and selected comments are included to illustrate certain themes.

Table 1. Undergraduate Student Focus Group Summary (F99, Sp00, F00)

Targeted departments	Number of focus groups	Number of students in focus groups	Number of courses represented	Number of faculty represented
Biological Sciences	17	49	8	5
Education	8	29	2	1
Political Science & International Relations	15	41	8	6
TOTAL	40	119	18	12

Data Analysis

The tape recorded focus group data were transcribed and then analyzed going back to the goal of the study: to explore the nature of students' experiences with learning in a PBL environment. The researchers employed content analysis to identify recurring, main thematic patterns in the students' responses to key questions, as well as throughout the focus group discussion. The researchers established inter-rater reliability by working independently with the transcripts, by comparing emerging themes, and by identifying and clarifying points of ambiguity. The investigators also ensured that the main themes were plausible given the participants' comments from which they emerged. The main themes were described and factors such as intensity of participant comments, internal consistency, frequency, extensiveness, and specificity of comments were considered. Selected comments were included to illustrate certain themes. The data were reported as group data; no participants or courses were identified.

Limitations

Given the nature of the study, the data are not generalizable beyond the context of the courses. The courses were selected based on faculty involvement in PBL instructional development activities and faculty interest in participating in the study. The undergraduate students participated voluntarily, no random selection occurred.

Benefits of Focus Group Methodology

The participants were interested in sharing their perceptions, and telling their stories and most gave extensive answers to the questions. They wanted to share experiences, information and advice with one another. The focus group format gave students the opportunity to reflect on their learning experiences-- for many students the first formal occasion to talk about their learning. Several participants indicated how helpful it had been to hear from other students and to compare experiences. They learned from listening to different approaches to problems, such as how to deal with a domineering student in a group. Some also noted that the discussion made them aware of their own learning preference and helped them realize how to work more successfully in a PBL format. About half of the participants expressed their appreciation for having had the opportunity to talk about their experiences in PBL courses. The focus groups signaled to the participants that their comments were taken seriously and that their feedback counted in the instructional process.

Overall Findings Across the Targeted Departments

Reflections on Learning

Participation, compromise, respect, acceptance of different approaches and working styles, interpersonal, small group and communication skills, awareness of learning preference.

Main Benefit

Active involvement, motivation, level of comfort and inclusion, deeper learning, accountability and responsibility for work, peer instruction, preparation for the workplace.

Main Challenge

Maintaining student contributions to the group project, getting group grade, learning course content, accomplishing work in the group, receiving clear guidelines for outcomes of group work.

Topics for Future Research

- Do student perceptions of PBL differ based on the number of PBL courses taken? That is, do students with a single PBL experience respond differently to that learning environment than students with multiple PBL experiences?
- Do student perceptions of PBL vary based on academic year? That is, do first and second year students perceive PBL experiences differently than third and fourth year students? If so, what differences emerge?
- Do student perceptions of PBL vary based on major? That is, do students who are majors in the respective discipline perceive PBL experiences differently than those students who are non-majors? If so, what differences emerge?
- Do student perceptions of PBL differ according to academic status, i.e., honors vs. non-honors?

The research team involved in the data collection, transcription and preliminary analysis process of this research project consisted of Gabriele Bauer, Teaching Consultant, Center for Teaching Effectiveness, University of Delaware; Beth Jones, Associate Professor, Education, West Virginia University; Candice Archer, Doctoral Candidate, Political Science & International Relations, University of Delaware; and Kristin S. Kight, Doctoral Candidate, Education, University of Delaware.

SUMMARY REPORT

Focus Groups with Students Enrolled in Problem-Based Learning (PBL) Courses in Biological Sciences

Background Information

Seventeen focus groups with 49 students enrolled in courses designated as problem-based learning (PBL) were conducted during the Fall 1999, Spring 2000 and Fall 2000 semesters. Eight courses taught by five faculty were represented. The courses ranged from freshman through senior levels. The lower-level courses fulfilled a science requirement and included both standard and honors sections. Class size ranged from 20 to 100 students.

Course Description and Student Demographics

Class size tends to serve as the main determinant of the instructional model used for implementation of PBL. Courses with smaller numbers of students (i.e., ranging from 20-25) follow the medical school model characterized by its student-centered nature with little formal instruction. Larger enrollment courses tend to be more teacher-centered. They typically consist of an interactive lecture followed by class discussion with designated days each week set aside for problem-based learning. Typically the lecture component proceeds the problem-solving day to ensure that the lecture content is directly applicable to the problem. The PBL component tends to cover about 40 percent of the entire course.

All courses incorporate the following aspects of PBL: (1) students work in permanent learning teams (four-six students) to address a problem (e.g., case, series of questions); (2) problems, designed by the faculty, are based on real-life situations, address current issues, tend to be complex and extend over more than one class period; (3) students use the Internet to gather resources for problem solving and to communicate with group members; (4) faculty post PBL assignments and resources on a course web site to facilitate access and collaboration; (5) students complete self and peer evaluations regarding group dynamics and contribution to group work; (6) group work culminates in a group product (e.g., research paper, oral presentation, written analysis of one aspect of the problem); (7) a graded group project contributes to the final grade.

Most courses utilize undergraduate peer tutors, majors in the discipline who took the course before, to facilitate the group discussion and assist with learning issues as the students work through the problem. The dedicated peer tutors hold responsibility for one or two specific groups. They meet regularly with the faculty to prepare for the PBL aspects of the course. Through discussion, students identify learning issues (i.e., what they know and do not know) and decide how to research these issues and learn about them (i.e., what resources, where and how to find them, who is responsible for what task.) Almost all the courses require the students to conduct research out of class. The students bring the research findings back to the group, teach group members, analyze and synthesize the material, and then decide how to organize the information and how to communicate it to others.

Participants included 39 students enrolled in lower-level courses and ten in upper-level ones. Students' experience with PBL courses ranged from 30 students taking their first PBL course to four students taking their fourth. Twenty-six participants were majors in the discipline, 23 were non-majors. Table 1 provides demographic information on course distribution and focus group participants.

Table 1. Course and Student Demographics in Biological Sciences

Level of course	Number of courses represented	Number of students in focus groups	Gender of students	Number of students with PBL experience	Course in students' major
Upper level	2	10	women (4) men (6)	1 course (1) 2 courses (1) 3 courses (4) 4 courses (4)	majors (4) non-majors (6)
Lower level	6	39 (23 enrolled in honors sections of courses)	women (30) men (9)	1 course (29) 2 courses (8) 3 courses (2)	majors (22) non-majors (17)

The following summary outlines the main themes that emerged from 17 focus groups with 49 students total. The summary is organized by the sequence of questions asked in the focus groups (see Appendix A). Selected comments are included to illustrate certain themes.

Main Findings

Collaboration – given the collaborative nature of PBL, students' perceptions are heavily impacted by their group experiences

- Maintenance of functional groups is essential. Undergraduate peer tutors help monitor group dynamics and keep the groups on task.
- Emphasis on regular attendance, preparation, participation and equal contribution to group project.
- Unequal contribution to the group work causes concern and anxiety, particularly when a group grade is assigned to the project.
- Request for clear guidelines for group discussions and clear expectations for results of group work.
- Opportunity for formal peer evaluations of group members' contribution as part of group grade.
- Greater level of comfort and inclusion in the class.
- Opportunity for questions and feedback helps comprehension of the content.

Learning

- Consideration, evaluation and respect for different perspectives enhance learning. Discover that there is no right answer and more than one answer to an issue.
- Application of theory to real world issues and peer instruction contribute to deeper understanding of the content and assist retention. Content becomes more interesting and relevant.
- Interpersonal, small group, and communication skills are acquired and refined.
- Research skills and problem-solving abilities are enhanced.
- Nature of assignments and final products as well as student allocation of tasks contribute to perceived quality of learning experience.

Findings

Student Role (How would you describe the student's role in this course?)

The students emphasize that they are more actively engaged in PBL courses by conducting research activities, finding information, teaching content to their peers, explaining what they have learned, and presenting findings. Several students describe their role as “teaching themselves and others” compared to the role of typical students who are “just watching, listening and taking notes.” Several students perceive that in this contributing role, they are shaping the course and the amount of time allocated to certain subject areas. Many students mention that they are more motivated to attend class regularly because their contribution impacts the group’s learning. They stress that they hold responsibility not only for their own but for the group’s learning; thus they need to complete the portion of their work on time and be prepared to explain their work to others. As one student states, “In a regular class if you don’t come to class, it’s your problem, but if you don’t come to class here it’s hard because that only leaves four people to do the work. You have to think of other people, they are counting on you.”

Faculty Role (How would you describe the professor's role in this course?)

The words that the students use most frequently to characterize the faculty members’ roles in the PBL courses are: “helper,” “resource,” and “guide.” The students stress that the faculty provide them with information without prescribing how to proceed or how to use the information: “The faculty are there to help you, to push you along, to make sure you’re getting the education out of the problem that you’re supposed to be getting.” Most of the students find it helpful to work through the problems in small groups and to use the faculty member as a resource when needed. While students work in groups, the instructors float from group to group, answer students’ questions, ask probing questions to push students’ thinking further and in general make sure that the groups are on track and have the necessary resources. All the students emphasize that they find it most helpful when the faculty take time to explain a difficult concept in detail. One student mentions, “When the instructor notices that a group is having trouble with a certain area she explains it to all of us via a mini-lecture in the middle of the problem so that the rest of us can understand what is going on.” Several students also stress that it is very helpful to have faculty highlight what they should have learned from a particular problem. It helps them identify what they still need to pay more attention to.

A few students mention, that compared to non-PBL courses, they perceive that the instructors are doing very little to help the students learn since they are not explaining the content. Several students also express concern about the lack of access that groups may have to the faculty. They observe that, when faculty does not visit with all the groups during class time, the students tend to get lost as a result. They suggest that faculty try not to stay with one group for an extended period of time.

Several students from PBL courses with a lecture component recommend that the problem discussion follow the lecture so that they can apply the lecture content to the problem; this process would also help them clarify their understanding of the content.

Undergraduate Peer Tutor Role (How would you describe the peer tutor's role in this course?)

Most students strongly agree that the undergraduate peer tutors are very helpful in the courses, particularly because they have taken the courses before and know the material well. They find the peer tutors well-prepared since they meet with the instructors prior to class. According to one student, “The peer tutor is exceptionally critical to the success of the class. If I were to pick one thing that would be the cornerstone of this class it would be the peer tutors.” Another student says, “For the group to function the peer tutor is essential. Faculty can’t be with the group all the time; the peer tutor plays a very important role. I can’t imagine the PBL class without him.” The peer tutors’ instructional roles are described as

content, instruction, and group process-related. They initiate the problem discussion, answer students' questions, clarify information, connect ideas, ask hypothetical questions (e.g., What would happen if ...? How would you explain ...?), keep the instructor apprised of the groups' progress and keep the groups on track. In addition, the students perceive the peer tutors as helping them gain confidence in a difficult subject area. One student's experience illustrates this point, "Our peer tutor is like a coach, telling us that we can make it. Sometimes we do encounter downfalls, like a bad grade, but he is there to tell us that it is okay." Some peer tutors also provide additional resources that are pertinent to a particular problem.

All the students stress that the peer tutors are not supposed to provide them with the correct answer but rather to ensure that the groups are moving in the right direction to solve the problem. When the peer tutor tries to provide correct answers, students perceive it as hindering their learning: "The peer tutor gives us a lot of hints which doesn't help us learn as much. He'll basically give us the answer; he doesn't get us to think on our own. This is not helpful." Several students are concerned about peer tutors who come to their groups unprepared to lead group discussions and who are unable to answer students' questions. Students do not perceive these peer tutors as helpful and find them rather confusing.

Student Perceptions of Groupwork (How is your group working for you?)

Approach to Solving Problems

Most students begin the problem-solving process by deciding as a group how to proceed towards the solution. They also attempt to divide the work equally among the group members. Each member conducts individual research on a specific question or learning issue and brings a written report back to the group. Generally, all the separate reports are then combined into a group paper. In some groups, a designated recorder has responsibility for putting together the final paper. In most groups, the students do not designate specific roles (e.g., leader, recorder) but rather, the roles tend to emerge based on the specific skills or content knowledge that the students bring to a problem: "Roles switch based on what people know. For example, I know more about nutrition, so I'll take a lead when the problem focuses on nutrition. Whoever knows more about an aspect of the problem speaks up first; we even switch during the problem based on expertise."

A number of students observe that group time tends to be allocated towards process (i.e., how to organize the group paper, rather than discussion of the content.) They suggest that the faculty provide clear guidelines for the group discussions and outline the expected results of group work.

Working Collaboratively

Given the nature of problem-based learning, many students recognize their dependency on other group members for acquiring content knowledge. They stress the importance of being on-time, prepared, willing to contribute, and focused on work during class. As one student states, "The group depends on all members being present and one group member who is absent can affect the entire group. That puts pressure on all of us--positive pressure. If you have to explain something to four people which affects their learning, you will not let them down. You will be there and be prepared." Participation constitutes another critical aspect of effective collaboration: "If you tend not to participate, you're going to be totally lost in the group. If you're not participating, you might as well not be in the group." In addition, the impact of group work on the final grade further motivates many students.

A number of students find that working in a group allows them to ask questions and to receive feedback and explanations, and thus it helps their understanding of the content. According to one student, "I find the group work very helpful because the members of my group have strengths in different areas. So, being a collective group, we're able to go through the problem much more effectively than if I had to do it myself." In addition, several students emphasize that effective collaboration occurs when group members

respect each other's abilities and viewpoints and trust that each member will do his or her share of the work: "We respect everyone's abilities. We don't make fun of someone for not knowing something. I think that's really important so that everyone can contribute to the group and learn from the group."

About half of the students have established ground rules in their groups to guide expected group behavior and outline consequences. They perceive that these rules help assure quality contributions by all group members. As one student describes, "The ground rules are there if someone starts slacking off, and to ensure that one group member's behavior doesn't hurt the entire group."

Many students highlight the value of anonymous peer evaluations, both as a formative tool at midterm and as a summative tool at the end of the term. As a formative tool, they appreciate receiving feedback on what they are doing well in the group and how they could improve. As a formative tool, it gives them the opportunity to rate students' contributions to the group work. As one student mentions, "We evaluate each other in our groups to make sure that everybody's putting everything into our work."

Reflections on Learning (What have you learned besides content?)

Participation, Communication, and Group Work

Many students emphasize that they have learned to participate more actively in class via group discussions. They learn to consider different perspectives and to investigate issues from different viewpoints. A majority of the students highlight communication as the foremost skill area that they acquired. The small group facilitates interaction and appears less intimidating than the lecture-setting. Several students report increased levels of comfort and confidence in contributing to the class and sharing their viewpoints. Specifically, students learn to talk about their area of study, to explain things clearly, to make sure that they have been understood and to provide constructive feedback. As one student mentions, "If I understand a certain aspect of a problem, I have to think of a good way to explain it so that everyone else can understand it and that helps me remember that concept better too." Another student states, "The course has helped me learn how to articulate what I've learned because I have to do research on a learning issue and explain it to my group." Students also report that their research skills (i.e., finding information using multiple resources) and problem-solving abilities (i.e., breaking a large problem into learning issues) have been enhanced greatly.

A number of students state that they learned how to work effectively with other people to accomplish a goal. They mention specific skills such as preparing for the group work, contributing to the group, keeping the group on target, listening and respecting different viewpoints. The group environment also helps them learn to trust people: "Working with others teaches you to rely on people. When you first start out doing problem-based learning you're always worrying that your group members are not going to hold up their end of the bargain. You learn to trust people a bit more because everyone wants to do well, and you know that your group members are not going to willingly mess you up because that messes them up as well." Several students state that they have become more responsible, prepared and accountable for their work, mainly because other students depend on their quality contributions.

Main Benefit (What do you perceive as the main benefit of taking a PBL course?)

Deeper Learning and Application

Most of the students identify the main benefits to be deeper understanding of the content and better retention. The students feel that deeper learning occurs because they get to figure things out individually and in the group by asking questions, answering questions, and exchanging ideas. They reach a deeper level of understanding because they talk about the content with the group members; they explain things to each other, and thus gain new insights and exposure to different ideas and approaches. Their

comprehension is further enhanced by teaching each other and articulating the content in their own words as opposed to the language used in textbooks or in the faculty lecture. Some representative student comments: "I think that teaching is a great way to test your knowledge." "Explaining the content to others is the best way to show that you understand it yourself." "When you have to teach other people, you get a different depth of knowledge. You have to understand it better if you're going to explain it to someone else. You can't just repeat what the book says; you have to think about it to be able to explain it and to articulate it clearly."

In addition, the PBL format helps many students apply what they have learned to real world issues. These real world problems are interesting and engaging and contribute to a relevant and enjoyable learning experience. Two students' experiences: "We had an example of someone with a disease and we had to use what we knew to figure out why this person had the disease. Working with this example helps me understand because there are people actually with this problem." "We had to design a ride at Disney World that would bring people through the process of photosynthesis. I'm never going to forget that because it was such a great project."

Participation, Collaboration, and Accountability

Many students stress that, compared to lecture-oriented classes, they participate to a greater extent because they get to know other students in the class and they interact with them on a regular basis. They become more comfortable asking questions and welcoming help in the small group setting: "I speak up more in the group because if I'm wrong, I'm only wrong in front of four other people. Since I know them well, I'm not as embarrassed to ask questions." "There are times when I feel stupid asking something, like what does DNA stand for, you feel stupid asking that in a lecture. In a group, I'm much more comfortable asking questions." Several students indicate that PBL has enhanced their ability to work with others and has served as preparation for the workplace: "PBL prepares for a career later in life. It teaches you to work with others, to respect their ideas and listen to their opinions. This is an important skill because very rarely will you find a career where you don't have to interact with other people."

A number of students credit the group aspect with helping them become more accountable and responsible. Because others depend on their contributions, the students are motivated to attend class regularly, to stay on top of their assignments and to come to class prepared with their work completed.

Learning Preference

Some students find that problem-based learning better fits their learning preference and helps them meet their academic and professional goals. They have transferred this approach to learning to their other non-PBL classes and find it helpful to identify learning issues as they are working with the lecture material and the text. According to one student, "PBL is the right way for me to learn. I'm going to go to medical school and I know that PBL is used there."

Main Challenge (What do you perceive as the main challenge [problem] of taking a PBL course?)

Student Contribution to the Group

Students perceive that the quality of their PBL experience is directly linked to the motivation and commitment of their group members. Students' unequal contribution to the groupwork constitutes the main concern for many focus group participants, and it is a recurrent theme throughout the discussion. Many students express strong concern about group members who demonstrate a lack of commitment to the group. This lack of commitment is evidenced by irregular attendance, unpreparedness, unreliability, disinterest, lack of motivation, and incomplete work. According to one student, "We consistently have two people missing from our four-person group. It's not good especially if one person kept group notes

the day before and then she doesn't show up for class the next day." Most students respond to the problem of non-contributing group members by doing the work themselves since they are worried about their grade: "If you have people who don't care and there is one person who is trying to get a good grade, she will wind up doing everything. The other people will walk away with the same grade even though they did hardly any work." Typically, students are reluctant to enforce established ground rules so as not to hurt others' feelings and cause greater disruption in the group. None of the students informed the faculty of their difficulties with non-participating members.

Group Paper

A number of students who serve as recorders in their group (i.e., they are responsible for compiling individual papers into a group paper) strongly express frustration with group members who do not complete their share of the work. They feel that, given the weight of a group grade, they have to write the entire paper and make up for others' incomplete work. One student states, "The problem with writing the group report is that if one student fails to do her end of the work then everyone else fails or the recorder has to make up the work so that the group is not hurt." Difference in writing abilities constitutes another element of frustration. Students find themselves re-writing others' papers. They perceive this task of putting together the group report as a burden and express frustration about the lack of support that they receive from the group (i.e., the recorders receive no feedback from the group because the group members are not expected to read the final paper). The students strongly recommend that faculty reconsider the group paper assignment. None of these students has tried to approach the group with their concerns or made the faculty member aware of these issues.

Learn Less

Several students perceive that, due to the division of the PBL problem among the group, they are deepening their knowledge in a specific content area while neglecting other content areas. They research one learning issue in depth but they are not as familiar with other aspects of the problem. Since they are mainly responsible for their part of the problem, they typically only read summaries or outlines of others' work. As a result, students perceive that they learn less content than in a traditional course. For a small number of students the student-centered nature of the PBL method causes frustration. They feel strongly that the only way to learn is by attending lectures and by listening to faculty. Other students are not perceived as credible sources of knowledge.

Collaboration and Trust

A number of students are concerned about the impact of others' work on their grade. They are not comfortable relying on their peers to do the work required. They question their peers' carefulness, thoroughness and accuracy in conducting and reporting the research. They feel that they can only trust the quality of their own work and they are most worried about needing to trust the quality of others' work. This concern is magnified by the possibility that their grade may suffer, and the realization that they cannot do all the work required themselves. One student expresses his concern: "I am most concerned about depending on other people for my grade, especially because they are not responsible enough to do the work and they are satisfied with a low grade in the course." Another student states: "When it comes to academics, I'd rather rely on myself than anybody else, especially when it comes to grades. I'd rather do all my studying so that way I don't have to rely on anyone else. If they prepare the topic incorrectly, I don't have time to correct it and my grade may suffer."

Advice to Students (What advice would you give to a student who is considering taking a PBL course for the first time?)

Most students emphasize the willingness to contribute to the group, doing the work, open-mindedness and acceptance of different approaches and working styles as core aspects of a rewarding PBL experience. They advise other students to participate in the group from the very beginning and not to be afraid of making mistakes: “Speak up in the group, even if you get it wrong. You do learn much more that way.” “Be prepared and have confidence in your knowledge. Then you will be more willing to voice your opinion.”

They also stress the importance of coming to the group meetings prepared with the work completed since the group is counting on each member’s contribution. In turn, students also recommend that others perceive the groups as safe places to ask questions, and to get clarification and encouragement.

The majority of students recommend that others take a PBL course: “PBL courses help you learn more about a topic and its applications to everyday life. It makes the topic seem more relevant when it’s being studied. The groups enable you to listen more closely to others’ views and opinions.” “I enjoy working in small groups and getting a better understanding of each topic.” “I think that PBL is an exceptional teaching tool. It enhances the learning experience and creates an environment that fosters mastery of the class material.”

A number of students who are enrolled in courses with designated PBL days recommend that these courses be taught entirely in a PBL mode. They find it difficult to switch from the lecture-based, instructor-centered, format to the group-based, student-centered, format. They mention that the time delay between the PBL days causes the groups to become disconnected from the problem and it takes additional time to get re-focused. They would prefer an instructional format that is mainly group-based with occasional mini-lectures by the faculty as needed.

SUMMARY REPORT

Focus Groups with Students Enrolled in Problem-Based Learning (PBL) Courses in Education

Background Information

Eight focus groups with 29 students enrolled in courses designated as problem-based learning (PBL) were conducted during the Fall 1999, Spring 2000 and Fall 2000 semesters. Two courses taught by one faculty member were represented. The courses were required courses for the elementary teacher education major and they ranged from freshman through junior levels. The lower-level course was offered as an honors section and fulfilled a multi-cultural requirement. The upper-level course entailed a standard section. Class size ranged from 15-20 students.

Course Description and Student Demographics

The PBL component of the Education courses is designed to meet the main course objective, namely to integrate pedagogical theory and practice by helping the students reflect on their practicum learning experiences. In both courses the students participate in a field-based teaching practicum experience (i.e., developing and implementing informal after-school programs for children at a community center and designing and delivering lesson plans for the instruction of elementary school children). During the practicum, the students experience various issues, dilemmas, challenging instructional situations and surprises. These issues constitute the authentic problems that the students bring back into the classroom to discuss; thus, the PBL element is practice-based and is created by the students.

In the lower-level course the PBL aspect tends to cover about 90 percent of the entire course. Given the small class size, the students mostly discuss the instructional issues that they encountered as a large group. The small group work mainly serves for initial brainstorming of pedagogical issues or actions. Small groups (i.e., ranging from four-five students) work together to brainstorm instructional issues or pedagogical actions. The course utilizes a graduate teaching assistant, a major in the discipline, to assist with the practicum experience and serve as a resource.

In addition to reflecting on authentic problems, the students in the upper-level course work on instructor-initiated issues and they use the permanent small group as a forum to present lesson plans and receive feedback. Typically, the students work in permanent groups first (i.e., ranging from five-six students), then present their group work to the entire class.

In addition to the practicum experience and the PBL discussions, the students in both courses participate in weekly online discussion forums that follow up on readings and class discussions. The students' reflective learning experiences culminate in an individual project, the grading criteria of which is designed by the students in consultation with the faculty.

Participants included 11 students enrolled in the lower-level course and 18 in the upper-level one. Students' experience with PBL courses ranged from 12 students taking their first PBL course to 13 students taking their fourth. All the participants were majors in the discipline. Table 1 provides demographic information on course distribution and focus group participants.

Table 1. Course and Student Demographics in Education

Level of course	Number of courses represented	Number of students in focus groups	Gender of students	Number of students with PBL experience	Course in students' major
Upper level	1	18	women (16) men (2)	1 course (4) 3 courses (1) 4 courses (13)	majors (18)
Lower level	1	11 (enrolled in honors colloquium)	women (11)	1 course (8) 2 courses (3)	majors (11)

The following summary outlines the main themes that emerged from eight focus groups with 29 students total. The summary is organized by the sequence of questions asked in the focus groups (see Appendix A). Selected comments are included to illustrate certain themes.

Main Findings

Collaboration – given the collaborative nature of PBL, students' perceptions are heavily impacted by their group experiences

- Maintenance of functional groups is essential.
- Emphasis on regular attendance, preparation, participation and equal contribution to small group and class discussions.
- Nature of problems impacts group performance (i.e., complexity of problems impacts time-on-task).
- Request for clear guidelines for group discussions and clear expectations for results of group work.
- Opportunity for reflection, questions and feedback facilitates analysis of issues.
- Greater level of comfort and inclusion in the class.
- Opportunity to contribute to the course agenda motivates learning.

Learning

- Consideration, evaluation and respect for different perspectives enhance learning. Discover that there is no right answer and more than one answer to an issue.
- Authentic problems and peer feedback contribute to deeper understanding of the content and assist retention. Content becomes more interesting, relevant and meaningful.
- Interpersonal, small group, and communication skills are acquired and refined.
- Reflective practices and problem-solving abilities are developed.
- Nature of practicum, course activities and student collaboration contribute to perceived quality of learning experience.

Findings

Student Role (How would you describe the student's role in this course?)

The students stress that they actively contribute in the PBL courses to a greater extent than in other courses. They participate both in small group and class discussions, post ideas and experiences on the online forum, and present instructional activities and lesson plans to their classmates for feedback. They feel strongly that their level of participation is enhanced by the instructor's openness to their comments and non-evaluative approach, as well as their peers' support. Several students describe each other as "assets" to others: "By listening to others' personal experiences, it helps us come up with a solution to the problem. That wouldn't happen without people willing to share their opinions and others willing to listen to these opinions and to take them into consideration." The students perceive that their comments are valued and taken seriously, and they feel most comfortable participating in the class and raising opposing viewpoints. A representative student comment: "I feel like an equal in the class. If we have anything to say we're completely welcome to say it. I never feel uncomfortable sharing what I'm thinking because the instructor would never say that it was wrong." The students also agree that a certain level of preparation for the in-class activities is essential for a productive discussion. Both the readings and the postings to the online forum provide opportunities for preparation.

Faculty Role (How would you describe the professor's role in this course?)

The words that the students use most frequently to characterize the instructor's role in the PBL courses are: "guide," "moderator," and "resource." The students emphasize that the faculty member's main role is to get them to think about various issues by providing background information and asking questions. Typical instructor questions are: "What do you think?" "Why?" "Why did this happen?" "What could you have done instead?" The students perceive these open-ended questions most helpful as they allow them to reflect on their practicum experiences and start to analyze issues at a deeper level. According to one student's experience: "The instructor likes to know what's going on in our heads. He tries to make us reflect about the things we did in the practicum." Another student comments: "He doesn't tell us what to think, he asks us and by his questions we figure it out ourselves." When the students work in small groups the instructor visits with one group at a time, listens in and participates in the conversation.

The students identify several instructor behaviors that facilitate small group and class discussions: the instructor invites all students to participate, he offers non-judgmental feedback, he does not provide any right or wrong answers to students' questions but rather introduces students to different sides of an argument, he initiates debate and controversy, and he withholds judgment and personal opinion. A frequent observation: "He likes to play devil's advocate, he brings up ideas that we would never think of, he introduces opposing views and brings in different perspectives." Many students appreciate that the faculty is interested in, and respects their viewpoints, which in turn makes them feel very comfortable participating in class: "You are never scared to say anything in this class because the instructor makes your comment an important issue and you don't feel dumb." The instructor also encourages students to bring in resources and readings from other courses as they apply to the course content. Most students are motivated to attend class because they contribute significantly to the content: "The instructor is just another mind in the class; he is not the one with all the knowledge. We have to contribute as well."

Given the nature of the courses (i.e., teaching practicum experiences), several students perceive the faculty as a role model for instruction. They indicate that they have just recently realized that they use the instructor's teaching as a model to interact with the students that they are instructing. They mention that by observing the instructor they have internalized some of his behaviors and actions, such as relating to the students at their level and being open to, and accepting of, different ideas. According to one student, "I think the way he relates to us has rubbed off on the way we treat the kids. The same way he gets down

on our level, we get down on their level. The way he lets us decide what we're discussing in class, we let the kids have a say in what they'd like to do."

Student Perceptions of Groupwork (How is your group working for you?)

The two education courses differ in their implementation of group work. Given the small class size in the lower-level course, the students spend the majority of their time working as a class (i.e., 75 percent) rather than in small groups. The students stress that they are motivated to participate in class discussions because the format gives them the opportunity to share different ideas and perspectives in a supportive, respectful environment.

In the upper-level course the small group work occupies about 75 percent of the class time. The small group work serves multiple purposes: (1) students work on instructor-designed problems; (2) students discuss actual problems that arose in their practicum; and (3) students present lesson plans that they developed to their group members and give feedback. Generally, the small group serves as a forum for problem discussion with no designated roles (e.g., leader, recorder). Following the group discussion, the students combine their ideas into an oral group presentation. They deliver their presentations to the class and receive feedback.

Reflections on Learning (What have you learned besides content?)

Collaboration, Acceptance and Respect

Many students highlight that they have learned to work collaboratively with others, to listen to their viewpoints, to communicate their own ideas clearly, and thus they benefit from each other's knowledge and experiences. They indicate that they have learned to share their perspectives in a non-judgmental and respectful manner. They also emphasize the need to compromise and to be tolerant of others' differing views. As one student's experience notes: "I've learned that there's not just always one or two sides to these topics. There's many different ways to look at them. I've learned to consider these different ways rather than disregard them." Several students comment that by considering different approaches to problem-solving, they have learned more about themselves, their background and values. Some students express a greater willingness to take risks and a greater interest in finding creative solutions to problems (i.e., to find alternatives to a linear approach to solving problems).

Profession of Teaching

A number of students state that they have learned more about the profession of teaching and the factors that contribute to being an effective teacher and to helping students learn in the class. They attribute this learning of teaching to their observations of the course instructor, their peers and the students in the practicum, and their in-class reflections on the practicum experience. According to one student, "I have learned to be flexible and try to adapt in a teaching situation. The children and the teacher take turns in guiding each other and learning, and both have to give and take a little when there is learning going on."

Main Benefit (What do you perceive as the main benefit of taking a PBL course?)

Authentic Problems and Preparation for Future Profession

Almost all the students identify the main benefits to be working with authentic problems and better retention. The students emphasize that when they work with actual problems that they have encountered in their practicum learning becomes meaningful and relevant to them. They reflect on personal experiences in the practicum, they listen to their peers' observations of these experiences and they discuss possible interpretations and solutions to these issues. Such teacher-guided dialogue helps them think

about how they may prevent these problems in the future and helps prepare them for their future profession as teachers. The students find these courses most beneficial because they work with problems that they have experienced first-hand and thus are meaningful to them. One representative student comment: “We’re working with problems that we’ve actually encountered. It’s not just reading a textbook or listening to a lecture. The problems are very practical and immediate.” Another student: “The content is more memorable for me because I’m actually working with students who I can apply my knowledge to. It’s not like I’m reading articles about studies that have nothing to do with my situation. I am actually working with these kids, I know them and that makes a big difference to me. I have a reason to learn.”

Student Involvement and Diversity of Perspectives

Many students find that the PBL environment makes the course material more interesting for them than a lecture-oriented class. They are actively involved in the class via small group work and open class discussion and also have the opportunity to contribute to the course agenda. They indicate that both the faculty member and the students shape the course content. The students contribute topics that are of interest to them and they describe their learning as “self-initiated.” According to one student, “We’re discussing issues that we’ve dealt with in the practicum, like the kids swear at us or the kids don’t follow our instructions. We bring these problems to class; the instructor doesn’t tell us what we’re going to do.” Such a student-centered environment also results in regular attendance. The students find that they are motivated to come to class because they get to know their peers and the instructor on a personal level and they care about their learning.

A number of students stress that they benefit in the PBL courses because they have learned from other students not just the instructor. Both the small group work and the class discussion forum expose the students to a multitude of opinions and personal experiences. They have been introduced to opinions and problem-solving approaches that are quite different from their own, and that they would not have considered before. The students perceive that this diversity of perspectives has broadened their thinking and made them more tolerant and accepting. They describe themselves as less likely to judge.

Collaboration

About a third of the focus group participants mention that they have learned to work with others in a small group setting to accomplish a certain goal, such as develop and present a group product. In addition, the group work has helped them learn about group dynamics and how to contribute effectively as a group member. They perceive these skills of collaboration and teamwork as critical factors in their future teaching profession. As one student states, “Working in groups helps us because we will be part of a team teaching situation. We’re always going to have to cooperate with other teachers, so it’s good that we’re getting practice now in a supportive environment.”

Main Challenge (What do you perceive as the main challenge [problem] of taking a PBL course?)

Time Commitment

About half of the students enrolled in the lower-level education course express concern about the time-consuming nature of the course. They indicate that when they registered for the course, they were not aware of the out-of-class practicum experience. Thus, they find it challenging to balance the workload (i.e., time needed to participate in the practicum) in this course with the other courses that they are taking. They highly recommend that the course be assigned four credits instead of three.

Group Tasks

A third of the students who are enrolled in the upper-level education course are concerned about the amount of time allocated to small group work. They mention that the problems are not interesting and complex enough to warrant the amount of time set aside for group discussion. The students find that many times they complete the tasks very quickly and spend the rest of the time discussing unrelated topics. According to one student, "The assignments the instructor gives us don't take long and he gives us a lot of time. So we end up sitting there and starting to talk about something else since we have time to kill." Several students state that they tend to get off-task because they are confused about the expected outcomes of the group work. They strongly recommend that the instructor inform them of expected outcomes of their work and also check with all groups to ensure that they are on track.

Course Structure and Grades

A number of students in the upper-level course are concerned about the course structure which they describe as quite different from other courses with graded work. According to the students, the course has one graded assignment; all other assignments receive checks for completion. This lack of graded work causes anxiety in some students because they do not know how they are performing in this class and what final grade to expect. They perceive the instructor's grading policy as unclear and ambiguous. They strongly emphasize that clear expectations for grades need to be provided. In addition, the lack of pressure to complete graded assignments and tests has affected several students' motivation to attend class. Students admit that they tend to put their other courses (with graded work) first and focus on this course the last: "I admit, I don't come some times because there are no assignments due and all we do is sit and talk. My other courses have priority."

The perceived lack of daily organization and instructor direction causes further concern to several students. They find it most challenging to adjust to a course whose content is almost entirely determined by the students. One student's perspective: "There is no direction. The entire class is a discussion of topics that come from comments made in class by the students. Whatever someone brings up, that's what we'll talk about. The instructor doesn't teach us anything." They state that they have not learned any new course content because they are spending most of their time listening to others' opinions without instructor input or correction. They are frustrated by the open forum discussion format where every student's input is equally valid and the content is discussed superficially. The students perceive that their learning is inhibited by the lack of faculty guidance and presentation of content. They emphasize that the instructor needs to outline clear expectations for their learning as well as for their performance. In addition, they would find it helpful to receive instructor guidance and concrete feedback on a regular basis.

Advice to Students (What advice would you give to a student who is considering taking a PBL course for the first time?)

A number of students stress that it is important to attend class regularly, to be prepared, to contribute to both small group and entire class discussions, and to do the work required. Several students recommend that, given the unique nature of PBL courses, other students enroll in PBL courses with an open mind and that they prepare themselves for a different educational experience. The students remark that others cannot expect PBL classes to be conducted in the same fashion as non-PBL courses. They report that they have seen the greatest difference in course organization and grading policies. A representative observation: "Do not look for organization. Things change from day to day, discussion flows from topic to topic. When you walk into this class try to go with the flow. You will realize that organization is not always needed to learn."

SUMMARY REPORT
Focus Groups with Students Enrolled in Problem-Based Learning (PBL) Courses
in Political Science & International Relations

Background Information

Fifteen focus groups with 41 students enrolled in courses designated as PBL were conducted during the Fall 1999, Spring 2000 and Fall 2000 semesters. Eight courses taught by six faculty were represented. The courses ranged from freshman through senior levels including both standard and honors sections. Class size varied from nine to 65 students.

Course Description and Student Demographics

The courses typically consist of an interactive lecture followed by class discussion with designated times set aside for problem-based learning. The PBL component tends to cover about 40 percent of the entire course.

Students work in randomly selected, permanent learning teams (four-six students) to address a problem (e.g., case, series of questions). Problems, designed by the faculty, address current issues and tend to be complex and open-ended. Through discussion, students identify what they know and do not know and decide how to research these issues and learn about them (i.e., what resources, where and how to find them, who is responsible for what task.) Students conduct research out of class, they bring the information back to the group, teach group members, analyze and synthesize the material, and then decide how to organize the information and how to communicate it to others. In all courses students use the Internet to gather resources for problem solving and to communicate with group members. Most instructors also post PBL assignments and resources on a course web page to facilitate access and collaboration. The problem-based aspect occurs over several class periods and culminates in a group product (e.g., paper or presentation); no out-of-class meetings are required to complete group work. Typically a group grade is assigned which contributes to the final grade.

Participants included more students enrolled in upper level courses than in lower level ones. Students' experience with PBL courses ranged from seven students taking their first PBL course to eight students taking their fourth. Twenty-six participants were majors in the discipline, 15 were non-majors. Table 1 provides demographic information on course distribution and focus group participants.

Table 1. Course and Student Demographics in Political Science & International Relations

Level of course	Number of courses represented	Number of students in focus groups	Gender of students	Number of students with PBL experience	Course in students' major
Upper level	5	25	women (18) men (7)	1 course (7) 2 course (4) 3 courses (6) 4 courses (8)	majors (18) non-majors (7)
Lower level	3	16	women (13) men (3)	1 course (10) 2 courses (4) 3 courses (2)	majors (8) non-majors (8)

The following summary outlines the main themes that emerged from fifteen focus groups with forty-one students total. The summary is organized by the sequence of questions asked in the focus groups (see Appendix A). Selected comments are included to illustrate certain themes.

Main Findings

Collaboration – given the collaborative nature of PBL, students' perceptions are heavily impacted by their group experiences

- Maintenance of functional groups is essential.
- Emphasis on regular attendance, preparation, participation and equal contribution to group project.
- Unequal contribution to the group work causes concern and anxiety, particularly when a group grade is assigned to the project.
- Request for clear guidelines for assignments and criteria for student performance on group projects.
- Opportunity for formal peer evaluations of group members' contribution as part of group grade.
- Greater level of comfort and inclusion in the class.

Learning

- Consideration, evaluation and respect for differing viewpoints enhance learning. Discover that there is no right answer and more than one answer to an issue.
- Application of theory to real world issues helps learn the content more thoroughly and assists retention. Content also becomes more interesting.
- Interpersonal, small group, and communication skills are acquired and refined.
- Nature of assignments and final products as well as student allocation of tasks contribute to perceived quality of learning experience.

Findings

Student Role (How would you describe the student's role in this course?)

Most students agree that a PBL course differs from other (non-PBL) courses in terms of their expectation for participation. They explain that, while they can take a more passive receptive approach to a lecture course, they need to participate in a PBL setting by conducting research activities, teaching content to others, contributing to the group project, and presenting findings. Students stress the importance of contributing to the group and being committed to the group: they refer to regularly attending meetings, being prepared for group work, sharing their ideas, and listening respectfully to others' viewpoints: "You're part of a group, people are depending on you and your feedback and your work. The teacher's also dependent on you, you're part of a group and you have a responsibility now." Several students view teaching themselves and others as a central element of their contribution. A number of students feel strongly about their responsibility to the group and express frustration about those students who do not demonstrate this sense of commitment (discussed in section on "challenges").

Faculty Role (How would you describe the professor's role in this course?)

All students perceive their instructors as helpful and supportive, engaging them in the PBL component of the course. Students describe the instructors' roles as moderators and facilitators who are responsive to their needs, a description manifested by the following instructor behaviors: While students work in groups, the instructors circulate among the groups, answer questions, probe for understanding, and provide online and print resources. Students find this resource role particularly helpful because it helps them contextualize the PBL assignment on which they are working. They also stress that, since faculty offer support on an as-needed basis, they can decide how to address the problem. As one student says, "I like that our professor does try to get involved in our PBL groups. He walks around the classroom, he contributes, he's available for us if we don't understand something or have questions. It's helpful because it's kind of like the students are in charge, but he's there in case we need a backup."

A majority of students express the need for instructors to outline student expectations more fully and to provide clear guidelines for projects and student performance. They are also concerned about unclear grading criteria and highly recommend written guidelines.

Student Perceptions of Group work (How is your group working for you?)

Approach to Solving Problems

Most students indicate that they try to divide the work equally among all group members. Each member is responsible for both conducting research on a specific area and sharing the results of this research with the group. Following group discussion, the material is combined into a final paper or presentation. The students use various approaches to solving the problem depending on its length and complexity: "We look at the problem and bring out our textbooks and try to see if there is any overlapping principle that we can use, and from there we just dig in and go through the details."

Students vary in their approach to designating tasks among group members. Some students assign specific roles, such as secretary, reporter and devil's advocate, often at the instructor's suggestion. Other students take on roles as needed. One student explains, "In our group no one delegated. People would volunteer to take different parts of questions. It wasn't very difficult." Students agree that, while faculty recommend that they assign specific group roles, they do not check whether these roles are actually in place.

Working Collaboratively

Many students stress that, in order for groups to work well, group members need to be open-minded and listen to differing viewpoints. They find it helpful when they can offer two or more feasible solutions to the problem rather than having to come to consensus.

Reflections on Learning (What have you learned besides content?)

Participation, Compromise, and Respect

Most students focus on learning to shift from being a relatively passive class member to taking an active part in group discussions and decision making. They are exposed to differing viewpoints and learn that these viewpoints need to be considered and responded to. They learn to listen to group members' diverse opinions and ideas, to respectfully disagree, and to compromise to accommodate diverse viewpoints: "We learn how to work together to answer the question and to respect each other's ideas. If we have conflicting views, we have to compromise. I compromise by backing up people's ideas that are valid. This teaches you respect." "You have to listen to others' viewpoints, you cannot exclude them from the project because you don't agree with them." "I have learned to look at the other side. I'm not as quick to come to a decision. I examine the other side to see if I have any holes in my opinion." Several students also mention that they feel better prepared for interacting with individuals who have different priorities, interests, motivations, and work habits. They admit that responding to such individuals is initially difficult but necessary to make the group work effectively.

Learning Style

Some students become more aware of their learning preference and why certain approaches work better for them. A group of students state that they feel more comfortable in a lecture setting because they receive direction from an expert: "I learn better when I have an expert pulling things out, like a professor, instead of being in a group and just sort of muddling my way along. I tend to get side-tracked when people say things and I don't know whether they are correct or not." Interestingly, what one group of students finds confusing another group finds helpful: "When I hear what other students think, it clicks better."

Main Benefit (What do you perceive as the main benefit of taking a PBL course?)

Deeper Learning

The majority of students identify the major benefit to be deeper learning of the content. They emphasize that, compared to other instructional formats, they learn the content more thoroughly because they apply the theory learned in lecture to solving real world issues in their groups. Working on current issues helps students see the immediate relevance of the material, while the content becomes more interesting and they tend to remember the information longer. A typical comment: "You're actually coming away with an understanding of the material rather than just memorizing it for the test. I think PBL is effective because I remember so much. I remember the material better when I get to practice and apply it right away." "A professor can sit there and lecture all he wants, but unless you actually go out and try it, and practice to see if you can solve these things, that's really the evidence of your learning."

Many students also note that they learn from hearing other students' perspectives and explanations, and that they are more likely to ask for clarification and examples in a small group than they would individually. As some students indicate, "It allows you to get a better understanding because you're seeing more perspectives than just the professor's." "When you say to a group what your idea is, you can get feedback that it might not be that easy and it's such a different experience than if the professor would

just lecture." "If you're in a big lecture and you don't understand something, it's hard to ask a question, but you can always turn to your group and say, did you guys understand that? One out of four people probably understood it and can explain it to you a little better."

Interpersonal and Communication Skills

Many enjoy getting to know other students in the class and express a greater feeling of inclusion; it motivates them to attend class regularly and increases their sense of responsibility for the quality of their performance. They are not only responsible to themselves, but to their peers who are counting on their work. In addition, several students report that they are more comfortable participating, sharing ideas and asking questions. As one student indicates, "It forces me to be more forward, not shrink back into a corner like I'm tempted to do, like big lecture classes that I take where I just sit back in a corner. . not a very good way to learn. In this PBL class, I have to participate more."

Preparation for the Real World

Several students stress that the problem-based learning setting helps prepare them for future professional responsibilities such as working with other people, utilizing others' expertise, identifying resources, and approaching problems or tasks. They perceive the PBL approach to be a simulating experience that they anticipate encountering on the job. "If you want any kind of job in political science, you've got to be familiar with problem-based learning, and you need to know how to work well with other people and work on a problem efficiently and effectively." "I learned how to deal with things that may come up unexpectedly, and that's something that you can take into the real world."

Main Challenge (What do you perceive as the main challenge [problem] of taking a PBL course?)

Student Contribution to the Group Project

Students' unequal contribution to the group work emerges as the main concern for almost all focus group participants, and is a theme recurring throughout the discussion. Students express strong concern about group members who do not pull their weight, who do not attend class regularly, who seem disinterested and unmotivated, and who do not do the work expected of them. Typically, they describe such students as not caring about the group and the project: "The main challenge is to get everyone to work to his or her full potential." Few students have tried to address the problem of unmotivated group members. As one student observes, "The more these students didn't do anything the more we felt pressured to do it, and the more they saw us do it the less they were going to do it."

Students perceive that the quality of their PBL experience is directly linked to the quality of the members in their group. As one student states, "Many people have different levels of intensity regarding their studies. Whereas one may want to put 120 percent into the project, the other may only want to put 75 percent into it. Unless you have people who are willing to contribute 100 percent, you're not going to have a successful group." None of the students informed the instructor of their difficulty with non-participating group members, although some wished in retrospect they had done so. Most reported that they tried to ignore the non-participants and did the work themselves.

Group Grade

A majority of students feel frustrated when those who do the minimum amount of work receive the same grade as the rest of the group: "You have to depend on other people, and a lot of times there are people in your group who aren't as dependable as they should be. In a lecture class, if you don't get a good grade, it's your fault. When you have different people contributing to one product, your final grade depends on

how much work someone else puts into it. In a way, you have less control over your grade, which I don't like." Students strongly feel the need to compensate for the lack of work by other students. Some find it difficult to trust other students to do their share of work. Therefore, they choose to do the work themselves. Several students strongly suggest that instructors ask students to provide feedback on group members' contribution to the project and recommend this feedback to be factored into the final grade assignment. As one student mentions, "I think it's vital that there be some way that you can critique the other people in your group, and you can hold them responsible for the work they do because that's always an issue."

Learn Less

A number of students express disappointment in the PBL aspect of the course for two reasons: (1) the PBL assignment does not offer enough of an intellectual challenge, and requires little work and problem-solving; (2) the division of the assignment allows students to explore one aspect in depth while ignoring all the other aspects; consequently students perceive that they learn less content than in a traditional course: "I feel like I learned less because if I do an individual project I have to research all aspects of the project and in PBL I learn one fifth of the topic because it was divided up. I didn't learn any other aspect because we all sent our information to one person and he compiled it."

In connection with their learning, some students question the appropriateness of instructors' assigning a paper as a final group project. They maintain that writing tends to be an individual task and recommend a presentation over a paper. They also associate PBL with creative thinking and perceive a paper as too traditional and constraining: "I think it would be good instead of writing a paper making a marketing campaign. When I think PBL, I associate that with creativity which is not a two page paper. The paper is basically facts. If we had a more creative outlook for the assignment, we'd probably gotten more into it and more out of it."

Several students state that they are frustrated by group members who are close-minded, do not accept differing opinions, and tend to take over the group. This behavior, they find, prevents other group members from participating although they may have valuable things to contribute. The group's learning is affected, as a result. One student suggests, "It would be helpful to remind students at the beginning of the course to be open-minded and that it's okay to change your mind when you're learning."

Accomplishing Work in the Group

A number of students find it challenging to use group time productively and to get work accomplished. They get sidetracked by conversations irrelevant to the task, particularly when the task is perceived as simple or when students come unprepared for group work. To remedy this problem, students request more structure and guidance from instructors, especially expected outcomes for the group session: "When the professor states specific goals that we should accomplish, I think it's better . . . we don't waste so much time."

Advice to Students (What advice would you give to a student who is considering taking a PBL course for the first time?)

Many students stress open-mindedness, acceptance of people, and willingness to participate a central aspects of a rewarding PBL experience. They also recommend being prepared and staying on top of assignments and readings. One student advises, "You have to be positive. Concentrate on what you can do instead of other people not doing what they should do."

The majority of students recommend that others take a PBL course: "PBL courses and other courses where the Socratic Method are encouraged, foster a greater sense of community in the classroom and, I

believe, lead to a better overall academic experience.” “I enjoy challenging and being challenged by my peers. It forces me to understand the material.” Those students who do not recommend taking a PBL course cite the unpredictability of group work as their main reason. As one student reflects, “I think that this is a good way for students to actively learn about the subject matter. One area which can be improved is the way in which the students are graded. Right now people who do next to no work receive the same grade as those in the group that do almost all of the work!”