DOCUMENT RESUME

ED 386 800 EA 027 011

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TITLE Problem-Based Learning as Cognitive Apprenticeship in Educational Administration.
PUB DATE Apr 95
NOTE 28p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 18-22, 1995).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Administrator Education; Cooperative Learning; Course Descriptions; *Educational Administration; Educational Philosophy; *Graduate Study; Group Dynamics; Higher Education; *Independent Study; *Leadership Training; *Problem Solving; Theory Practice Relationship
IDENTIFIERS *Problem Based Learning

ABSTRACT

This paper proposes that problem-based learning (PBL) can serve as a cognitive apprenticeship in administrator-preparation programs. The paper presents an overview of PBL and its application in the administrator-preparation program at the University of Connecticut. The initial training in group processing for students enrolled in the program is described. Two examples of actual PBL projects, including their planning and execution, are presented. One vignette describes a simulated-problem project on technology, and the second details an authentic-problem project. Finally, reflections are offered regarding the roles of instructors and the challenges encountered in using a PBL approach in educational-administration programs. Problem-based learning is based on the following premises: (1) The starting point for learning is a problem; (2) the problem is one that students are likely to face as professionals; (3) students need knowledge organized around problems rather than disciplines; (4) students, individually and collectively, are responsible for their own instruction and learning; and (5) most of the learning occurs within the context of small groups other than lectures. (Contains 29 references.) (LMI)

Running Head: Problem-Based Learning

Problem-Based Learning as Cognitive Apprenticeship in Educational Administration

A Paper Presented at the American Education Research Association
San Francisco, California
April 18-22, 1995

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In a paper presented at the seventeenth UCEA Career Development Seminar held in Portland, Oregon in 1967, Keith Goldhammer urged school administrators to become clinicians. He recommended that administrator preparation programs afford future administrators opportunities to apply their experiences and knowledge to the identification of educational problems and to search for solutions to those problems. Goldhammer called for preparation programs to be constructed with the following components: "knowledge-building experiences, skill-building-experiences, diagnostic experiences, experiences in the application of knowledge and data to concrete situations, experiences in the interpretation of knowledge and its 'reduction' for the specific application to discrete problems and communities" (p. 181). Just as clinicians learn and practice their skills on real problems, Goldhammer recommended that administrator preparation programs focus on actual problems encountered in educational settings.

The challenge for preparation programs lies in designing experiences in which students can learn and practice adaptive behaviors associated with clinical practice. In her 1987 presidential address for the American Educational Research Association's annual convention, Lauren Resnick urged schools to find ways "...to reintroduce key elements of traditional apprenticeship in forms appropriate to modern conditions of work" (p. 17). Her 'bridging apprenticeships' simulate "work environments and specially designed social interactions" (p. 17). Brown, Collins, and Duguid (1989) suggest that, "Cognitive apprenticeship methods try to

enculturate students into authentic practices through activity and social interaction in a way similar to that evident--and evidently successful--in craft apprenticeship" (p. 37). According to Resnik, programs should focus on preparing students "to be good adaptive learners, so that they can perform effectively when situations are unpredictable and tasks demand change" (p. 18). Since a major goal of administrator preparation programs should be to develop knowledge and cognitive skills, learners "will need to construct appropriate mental models of systems with which they will eventually interact..." (p. 18).

This paper proposes that problem-based learning (PBL) thoughtfully incorporated into specific bodies of knowledge in administrator preparation programs will serve as bridging or cognitive apprenticeships. The description of how PBL can be applied to the preparation of educational leaders has six sections. We begin with our conceptualization of problem-based learning. Following this explanation, we discuss the underlying philosophies on which the University of Connecticut's program is based and how a PBL approach is an integral part of the operationalizing of the programs' beliefs. Next, we describe the initial training in group processing that is afforded all program students prior to working on PBL projects. We then provide in detail two examples of actual problem-based learning projects, including their planning and execution. One vignette describes a simulated-problem project on technology; the second vignette details an authentic-problem project. Finally, we reflect on our roles as instructors and the challenges

encountered in using a problem-based learning approach in educational administration preparation programs.

A Conceptualization of Problem-Based Learning

According to Bridges (1992) problem-based learning has five characteristics:

1) The starting point for learning is a problem.
2) The problem is one students are apt to face as future professionals.
3) The knowledge that students are expected to acquire during their professional training is organized around problems rather than disciplines.
4) Students, individually and collectively, assume a major responsibility for their own instruction and learning.
5) Most of the learning occurs within the context of small groups other than lectures (p. 6).

Bridges describes two major versions of PBL: student-centered learning and problem-stimulated learning. These versions are similar in that both begin with content, include administrative problems, and have project teams with the instructor serving as a resource. In both versions students are evaluated in a variety of ways and "Developing administrative and problem-solving skills, and building a knowledge base for administrative practice...(p. 7)" are common to both.

Bridges explains one way in which the versions differ, "...student-centered learning emphasizes the goals of fostering the skills needed for lifelong learning" (p. 7). Thus, the student-centered

PBL version is more self-directed; students decide what the objectives are, as well as the readings and other resources they will consult. Cafferella's (1991) focus on self directed learning as a self-initiated process of planning and managing learning appears to be akin to Bridges' student-centered PBL approach.

We have conceptualized PBL differently from Bridges and Waterman, Akmajian, and Kearney (1991). Since problem-based learning is an approach to learning with a challenge at its core, we believe that there are additional versions and variations of problem-based learning. For example, the project method, as originally proposed by William Heard Kilpatrick in the first quarter of the twentieth century, could be considered a form of problem-based learning (see Kilpatrick, 1918). We have conceptualized problem-based learning in two overarching categories: *simulated* problem learning and *authentic* problem learning. We believe that both can be student centered.

Authentic-problem-based learning utilizes actual problems of current practice. Simulated problem learning focuses on using problems either created by the instructor and others, or actual problems that have already occurred. The instructor and others present the problems to students. The instructor may or may not include related readings and other resources in the PBL Project. Thus, the significant difference between the two overarching categories described here is that in *authentic* problem-based learning, a "real" problem which currently needs solving is the focus of attention.

The conception of PBL presented here addresses three issues related to the need for learning to be situated which increases the likelihood transfer will occur: problem complexity, reflective thinking, and group involvement. Because the student is involved in a "live" problem in authentic problem-based learning, the conditions for what Lave and Wenger (1993) call "legitimate peripheral participation" are more closely approximated. Lave and Wenger view legitimate peripheral participation as a process in which learners "...participate in communities of practitioners and that the mastery of knowledge and skill requires newcomers to move toward full participation in the socio-cultural practices of a community" (p. 29). Problem-based learning is certainly not full participation in the community of practitioners: that part of the preparation program is the internship. However, this partial participation affords students opportunities that more closely are aligned to issues of transfer.

Whether the problem is *authentic* or *simulated*, problem-based learning requires students to act on, rather than simply talk about, the issues. Laker (199) differentiates between near and far transfer of learning which can be placed on a continuum. Near transfer is the extent that an individual applies what was learned in training to similar situations in the workplace. Far transfer is the extent to which trainees apply the training to new or different situations from the ones experienced in training. Problem-based learning affords students opportunities to act on problems. Thus, one can speculate that a PBL approach may enhance the likelihood of the transfer of learning.

Another part of this conception of PBL involves the nature of the problems used in a PBL project. Leithwood, Begley and Cousins (1994) categorize problems which confront educational leaders into two types: high ground and swampy. They discuss the characteristics of preparation programs for developing expert school leadership and urge programs to focus on "swampy" problems. High ground problems are those which are "...of a more technical nature, where a well rehearsed procedure for solving was available" (p. 53). Swampy problems are those which are complex, at least to the person who has to solve them. The authors argue that problems are swampy when "...one only vaguely understands the present situation, has no clear way of knowing what would be better, and lacks procedures for addressing the obstacles or constraints in the situation" (p. 43). Similarly, King and Kitchener (1994) discuss well-structured and ill-structured problems. Well-structured problems are those that can be solved with a high degree of certainty. Experts tend to agree on the correct solutions. Ill-structured problems are those in which experts often disagree as to the best solutions. Thus, not only is it nearly impossible to describe these problems with a high degree of completeness, they cannot be resolved with a high degree of certainty. Given the vast array of constituents and needs with which school administrators are faced, it is crucial that the preparation of future educational leaders focus on solving swampy, ill-structured, problems.

At the same time students need to have conversations with experts in order to probe how effective practitioners solve these same problems. This can be done through both categories of PBL.

Real audiences for the culminating activity of the PBL project as well as people serving as resources in solving the problem, afford students opportunities for learning how experts engage in problem solving and self reflection. The goal of reflection is that the learner will use reflective skills to examine ill-structured problems by continually analyzing, exploring, gathering data, and critiquing. For example, describing the findings from a study on the problem-solving of reputationally effective superintendents Leithwood (1995) discusses the high level of reflection that was an integral part of their problem solving practice. Similarly Schön (1987) advocates for the need for "reflection-in-action through which practitioners sometimes make new sense of uncertain, unique or conflicted situations of practice" (p. 39). Schön argues that if instructors encourage reflection the student will not assume "that existing professional knowledge fits every case nor that every problem has a right answer" (p. 39). Reflective thinking is crucial to helping students improve their problem-solving expertise.

Since a major goal of affording our students opportunities to learn using a PBL approach is to increase their problem-solving expertise, Vygotsky's concept of the 'zone of proximal development' can be considered as a foundation. This zone is the gap between what a person's individual capacity for problem-solving is and the capacity of the group with which the learner is working. In the group process of discussing and critically reflecting, the problem-solving capacities of the group afford the individual learner opportunities to internalize these group understandings.

Thus, because PBL situates learners, requires reflective thinking, involves swampy, ill-defined problems and includes groups problem-solving together, the likelihood increases that what is learned in administrator preparation programs will be transferred to school settings.

Underlying Philosophy of UCONN's Administrator Preparation Program

The graduate programs in the Department of Educational Leadership at the University of Connecticut incorporate a variety of field-based and classroom experiences for students. Currently two sections in the department, Educational Administration and Adult and Vocational Education, have incorporated problem-based learning. In our efforts to improve the effectiveness and efficiency of these programs faculty have collaborated on projects and identified areas that increased both program effectiveness and efficiency (Cordeiro, Kehrhahn, & Sheckley, 1995).

An underlying program belief is the importance of situated learning (Lave & Wenger, 1991). An extended apprenticeship with at least one practicing expert administrator is a key program component for educational administration. This apprenticeship is different from a craft apprenticeship in that the cognitive apprenticeship can "support learning in a domain by enabling students to acquire, develop, and use cognitive tools in authentic domain activity" (Brown, Collins, & Duguid, 1989, p. 39).

Other components for both programs include a reflective practicum, cohort learning involving research teams and the integration of both simulated and authentic problem-based learning

projects. Both the experiences afforded to students in the research teams and the PBL projects, encourage group problem solving and afford students opportunities to understand the multiple roles played by group members in actual activities.

A typical 15 week course includes one PBL project lasting from four to seven class sessions. Students are provided with at least four opportunities to work on PBL Projects during their graduate studies. A program goal is to provide multiple opportunities for students to practice solving swampy, ill-structured problems through both simulated and authentic problem-based learning projects. Some proponents of PBL in educational administration argue that "...the best problem-based learning is not simulated" (Martin, Murphy, & Muth, 1993, p. 145). We believe critical determinants for transfer of learning are the types of problems, the involvement of the group, and the opportunity for students to reflect with expert problem solvers as these experts attempt to solve these ill structured problems. These factors may be equally important as is the issues of whether using authentic problems is superior to using simulated problems.

The work of ecological theorists such as Shaw, Turvey, & Mace (1982) and Gibson (1986) is concerned with the structures in the physical environment. They focus on action as an interaction with the environment. Since our view of learning is influenced by the works of these ecological theorists as well as Lave and Wenger (1993) and Vygotsky (1962), we believe that PBL projects, whether they are simulated or authentic, afford learners opportunities "to participate in an activity in a socially constructed domain of

situations..." (Greeno, Moore, & Smith, 1993, p. 161), that increase the likelihood that transfer will occur.

Thus far we have incorporated PBL projects into areas such as law, multicultural education, evaluation, staff development, technology, and educational partnerships.

Initial Training in Group Processing

Analyzing and improving group dynamics is a key part of the PBL project. Since PBL is an integral piece of several of the department's graduate programs, students are taught group facilitation skills during orientation to programs. This orientation includes approximately four hours of group process training. The *Interaction Method* by Doyle and Straus (1982) is the main focus of group process training. However a variety of strategies and exercises are included. In debriefing a group process simulation students are encouraged to reflect on the functional and dysfunctional roles of group members, skills useful for group discussion (Hill, 1977, Corey & Corey, 1987), power structures and conflict in groups(Savage, 1968; Kuperman, 1981), and effective discussion leadership (Study Circles Resource Center, 1993).

First Bytes: A Simulated-Problem Based Learning Project

The PBL Project entitled "First Bytes" requires students to apply previous learning from modules and courses on change, staff development, group interaction, and communication to the complex issue of integrating technological tools in the learning process. In "First Bytes" students assume the role of an elementary principal who has been asked by the superintendent to prepare a technology plan for the first year of a three-year implementation. At the

completion of the project, students should be able to define the opportunities and challenges associated with technology integration, develop a viable plan for integrating technology, produce the plan using electronic technologies, and participate productively in an administrative review of the plan with a live audience.

Thus far, "First Bytes" has been a module for two summers. In the following sections, the description of the project's 1994 implementation will focus on planning and scheduling, content and activity sequence, and data collection.

Scheduling and Planning

Initial discussions between the authors (one of the authors is a professor and program facilitator; and the other author is an adjunct professor) began in the late fall of 1993. These conversations focused on the scheduling the PBL Project, the cohort of students who would be completing the project, revisions to its content and sequence based on data from previous implementations, and site selection. Scheduling involved coordinating students' summer internships with the availability of the adjunct professor and suitable facilities. Since students had already experienced several problem-based projects as part of their Sixth-year program, the professors discussed issues such as group characteristics and student experience in group roles. The collaborative review of past PBL Project data is a requisite for improving both this project and the sequence of PBL experiences in the program.

For example, analysis of the data gathered from the 1993 implementation of "First Bytes" revealed that, because most students have limited personal and professional experience with technology,

they were handicapped in their ability to produce a forward-thinking integration plan. It is indeed difficult for professionals familiar only with a single classroom computer used for drill and practice to contemplate the integration issues associated with a fully networked environment described in "First Bytes." To compensate for this experiential deficit, the instructor decided to hold the project in a state-of-the-art "electronic school" and engage the services of its technology leader as a resource person on integrating technology.

Setting

During the summer of 1994, nine students spent four half days working on "First Bytes." The site for the PBL Project was one of the computer laboratories at a middle school. Built in 1991, the school is equipped with classroom telephones, a building LAN (local area network) which supports both computer platforms and modem access, and a media distribution system which can deliver programming to classrooms which is live or transmitted from cassettes, cable, and satellite. Holding the project work sessions in this kind of environment with immediate access to multiple technologies seemed a partial solution to the student experiences encountered the previous summer.

Sequence of Project Activities

During the session prior to the start of the PBL project, students received a notebook containing a class list, a summary of the group interaction roles, a copy of "First Bytes," a set of readings that accompanied the problem, a tentative meeting schedule, and directions to the site. Because of her knowledge of student involvement in previous PBL Projects, the program facilitator

assigned group roles for the initial session. Since we recommend that the same person remain as manager through the project, that role did not change. Other roles such as facilitator and recorder were assigned for the first session only. At this time the facilitator provided a brief overview of the scheduled activities. Students were told in advance that all sessions would be videotaped and that these videotapes would be used by them to analyze their behavior in the groups.

On day one of the project, students first met with an employee of the district who had designed the middle school's sophisticated technologies and is a member of the district's Information Team, a K-12 department charged with building a community of independent technology users. For approximately 90 minutes, this guest expert engaged students in a dialogue designed to raise their awareness of instructional technologies, to explain the instructional potential of networked technologies, to share his experiences with integrating technologies into teaching, learning, and administering processes, and to prepare them to use available technologies for the project. This guest and the Team's other computer teacher agreed to be available throughout the duration of the PBL Project as "experts on call."

During class break the instructor met with the group manager to review the manager's plan, the role assignments, and housekeeping details. Following the break, she provided an overview of the PBL, explained data collection processes, described the culminating administrative review activity, and reviewed her observer/coach role.

Responsibility for the PBL sessions was then turned over to the group in their assigned roles. The instructor assumed the role of observer, coach, and video camera operator during the sessions. Typical sessions included the presentation of the agenda by the manager and facilitator reviewed the remaining agenda for adjustment. As the facilitator conducted the session, the recorder kept a written record on a flip chart and posted completed sheets on walls. The group regularly recessed for a food break, a time during which the manager and facilitator reviewed the remaining agenda for adjustment. This break also allowed the instructor to consult with individual students. Each session closed with two activities--eliciting volunteers for the facilitator and recorder roles for the next session and debriefing role performance and group effectiveness in oral and written formats. Whenever appropriate, the instructor also debriefed on the group's interaction and its progress and posed questions to nudge the group toward successful completion.

Culminating Activity

The PBL Project culminated in a two-hour administrative review session rather than a formal presentation to a live audience. While planning for the project, the instructor had decided that students would not have adequate time to develop a plan and to prepare a formal presentation of it. Since administrative review of plans is a standard practice in many school districts, she decided to have students participate in an administrative review. For the project, an administrative review was defined as an informal session during which administrative colleagues (the live audience of practitioners) review the integration plan. Its purpose is to share

insights and expertise to improve plans prior to their formal adoption. For the administrative review the instructor contacted several administrators and technology members from several districts which had successfully integrated multiple technologies. The live audience was composed of an urban school district assistant superintendent for curriculum and instruction, a suburban computer teacher credited with integrating technology at the elementary level, and the instructor in her professional role as a K-12 supervisor of the district's Information Team. Practitioners were mailed a copy of the project and assessment criteria for the plan evaluation which had been drawn from PBL readings and exemplary practice covered in previous modules and courses. Because of the tight timeline of the PBL Project, it was not possible to send members of the live audience advance copies of the technology integration plan. Consequently, the group distributed it to the review panel upon arrival. The panel then retired to an adjacent room to review the plan. The instructor provided audience members with rating sheets based on the assessment criteria to guide their reviews and evaluation of the plan and answered questions.

Upon reassembling, the members of the audience took turns commenting on the plan and asking students questions. A lively dialogue ensued with students having an opportunity to probe the audience's experiences. The session was also videotaped, and the group's recorder used a PowerBook to make notes.

Assessment

Assessing student performance on the project for the purposes of grading occurred within a week. The instructor then mailed each

student a packet which included his/her grade for the project, her comments on the student's role behaviors, a summary assessment of the plan (from the panelists as well as the instructor), summary comments and mean scores on the group process, and the recorder's notes from the administrative review.

Data Collection

Assessment of student performance on the problem, their group interaction skills, and the content and sequence of the project itself was based on data collected from participants (peer-peer and peer-group), the observer/instructor, the real audience, the plan, and videotapes. Data formats included written, oral, and taped.

Role Behaviors. Individual role behaviors and group effectiveness were assessed at the end of each session in a debriefing by the students and the instructor. From peers, each group member received positive feedback on appropriate behaviors and at least one "stretcher" to promote growth in group interaction skills.

Since practicing administrators rarely receive feedback on their group interaction skills, personal reflection on these skills is a critical habit for prospective administrators to develop. To this end, the instructor added a written component to the debriefing process. Each student was asked to record peer feedback on a "Reflections and Feedback" sheet. Overnight the student reflected and commented on the feedback and his/her own perception of role performance. At the following session, the sheet was given to the instructor so that she could add her comments from her observation notes. The sheet was then returned to the student with instructions to keep them until the end of the project. At that time, students were instructed to

review their feedback sheets, view the videotapes, and reflect on their role behaviors in their journals.

The instructor had also planned to have students grade their peers' role performances. However, because she had not developed a scoring rubric for the behaviors and because students were uncomfortable with the process, the assessment was discontinued.

Group Behaviors. Group effectiveness was rated by each student at the end of the session, using the "Rating Group Effectiveness" form adapted from Hill (1977). It is composed of eleven characteristics of effective groups: participation, listening, leadership, goals, diagnosis of group problems, conflict, decisions, creativity and growth, trust, and feelings--were rated using a seven point Likert scale. After students completed the rating at the end of a session, the instructor commented on her observations of the group's interactions.

After class, the instructor calculated the mean and range for each characteristic and reported them at the next session on a spreadsheet. Students used the data during the sessions to discuss ways in which to improve group effectiveness. Each student received a copy of the final spreadsheet and a summary of the instructor's observations on the group's effectiveness.

Plan Assessment. The quality of the group's integration plan was measured against criteria gleaned from the background readings and prior learning. The plan architecture criterion, which deals with the format and structure of the plan, requires students to apply what they had learned in earlier modules regarding executive communication. The plan efficacy criterion and its indicators

measure the extent to which students were able to apply what they had learned about change and had gleaned from the background readings on technology. In addition to the "live" feedback, the reviewing audience used a five-point Likert scale for rating the plan on each criterion and provided written feedback. When assessing the plan, the instructor used the same rating sheet. She then calculated the range and mean for each criterion and summarized the written comments. Each student received a copy of the summary.

Valuable data for improving the content of the PBL were gathered from the students' talkback sheets, their written evaluation of the background readings, and a reflective journal kept by the instructor. Together with the assessment of the quality of the plan, these data have been analyzed by the instructor for the purpose of improving the content of the project and revising its sequence. All data are then reviewed to identify trends for improving the overall program.

Trees, Totems, and Tager: An Authentic Problem-Based Learning Project

The PBL Project entitled "Trees, Totems, and Tager: An Educational Program at the Hole in the Wall Gang Discovery Camp" is a description of an actual problem currently being addressed at the 300-acre facility at the Hole in the Wall Gang Camp in Ashford, Connecticut. This camp, founded by Paul Newman in 1987, is utilized in the summer months for children with cancer and blood diseases. However, the facilities are underutilized from September to June.

In January 1995 four groups of students representing four cohorts of graduate students from the Educational Administration

and Adult and Vocational Education sections of the Department of Educational Leadership were presented with this under utilization problem. This authentic problem project asked them to create a plan of educational offerings that would be available to school districts throughout southern New England. At the completion of the project students should have defined the opportunities, challenges, and possible content of the educational offerings they proposed to be offered at the facility.

Scheduling and Planning

In the summer of 1994 the camp's part-time education director and University of Education faculty discussed the need to take advantage of this unique, underutilized facility which had been made available to them by Mr. Newman for approximately nine months a year--September to June. For two years the camp had offered two, two and a half week sessions to urban and suburban schools for integration partnership activities with a focus on outdoor education and the arts. Conversation focused on affording educational leadership graduate students, their mentor principals and other practitioners involved in the department's programs to bring their collective expertise and problem solving to the proposed expansion of the educational offerings at these facilities.

Setting

During the winter of 1995 thirty-nine students, faculty members, and practitioners divided into four groups spent three and a half hours at the camp facility. In advance of the first session all participants were given a seven-page problem project containing background information, previous evaluations of the two-week

experiences, guiding questions and project specifications. In addition, key related readings about educational partnerships and research on school/community relations were included in the project information. Upon arrival at the camp participants toured the facilities: the dining hall, theater, wood shop, craft areas, library, medical facility, administration building, cabins, boat house, and other recreational facilities. This tour was followed by an opportunity for participants to ask questions of key players involved in the current educational offerings at the camp from September to June. Holding the first session of the project in the camp environment was crucial to providing participants with firsthand experience with the many possibilities that a facility of this type has the potential to afford children. Next, groups spent a few hours beginning the work on the project.

Sequence of Project Activities

Subsequent meetings were scheduled by groups in a variety of settings--schools, at the university, and in students' homes. Each group attacked their challenge quite differently. For example, one group assigned its members to contact education directors at other camps in the US, while another group explored partnerships with museums, social services agencies, youth agencies and organizations, and other institutions of higher education. Given that all participants are currently educators (primarily teachers and principals) groups explored possible connections with schools and various community organizations.

Since all participants were trained in group process, the four groups debriefed orally and rated themselves at the end of each

session. Depending upon the group, two to four sessions followed the camp session. Some of these sessions involved the entire group. For other sessions groups divided tasks and met in small units or worked on the project by telephone and/or e-mail, and accessing the internet for further resources.

During the initial session the instructor observed each group and focused on group management issues such as seating and participation patterns. The instructor also answered several questions posed by individual group members, however, the instructor did not spend more than fifteen minutes with each group at any one time.

Culminating activity

The PBL project culminated in a two-hour session. Two groups reported at each of the sessions. Each group had fifteen minutes to present its plan to a live audience that consisted of practitioners currently involved in the camp's leadership or in positions such as regional service education directors, heads of social service agencies, etc. Presentations were followed by questions from these real audience practitioners. Panel guests then met as a group to discuss the feasibility of the plans presented and the quality of presentations. Upon reassembling the panel of guests took turns commenting on the plans and presentations and explored further areas. These sessions were recorded and the tapes transcribed.

Assessment

Students were not graded on their plans or presentations. They were provided with written individual and group feedback drawn from notes taken by the instructor during the project as well

as from the presentations and transcripts of tapes made during the presentations and comments of the panelists. Students also assess their own group and individual behavior during the project and at the conclusion. Because of the nature of this being a "live" problem students were highly favorable in reviewing their involvement in the project. On a talk back sheet completed at the conclusion of the project, one student commented,

> I am a proponent of situated learning and problem-based learning activities. In developing situated learning environments the learner must be engaged for reasons defined within the situation. You need to say to yourself, "I'm doing this to enable the camp facilities to be available for children throughout the state to have opportunities to learn in a wonderful setting." --not "I'm doing this because my instructor asked me to." This 'buy-in' has a strong affective component. (K. R. M.3.95)

Challenges Encountered in Problem-Based Learning: The role of the Instructor

The role of the instructor during a problem-base learning activity can be compared to that of a coach, resource provider and co-learner. Students have reported in the early stages of their group problem-solving that the instructor providing feedback and serving as a resource are roles particularly helpful. However, as students become more comfortable with their group processing skills and ways to access resources they tend to view the instructor more as a coach (Cordeiro, 1994). As instructors we have also found ourselves to be co-learners. It is not until most students have had several

opportunities with PBL projects that they realize the instructor is a co-learner throughout the project.

There are numerous emerging issues that PBL instructors need to explore. Edmonds (1994) found that faculty who teach in PBL structured courses are concerned with issues such as: coverage of material, student collaboration; standard setting, and student frustration and confusion. Maxwell and Wilkerson (1990) found that non-volunteer PBL faculty were concerned with not having sufficient knowledge concerning the wide range of material, and the inability to handle the issues which arose in group dynamics.

In her review of the conditions under which the use of small classroom groups can be productive, Cohen (1994) argues that the role of the instructor is crucial to fostering interaction within productive small groups. The major role of the instructor in preparing for the PBL project is undeniably crucial to the project's success. However, the role of the instructor during the PBL itself needs to be analyzed. In a study examining cooperative and mathematical problem solving Nastasi, Braunhardt, Young, and Margiano-Lyons (1993) described observing that "...the teacher's presence was associated with noncollaborative interaction as the students focused their attention on the teacher and discontinued interactions with partners" (p. 27). Although we have found that as we observe students there is great temptation to interject and make suggestions, the more familiar with problem-based learning projects that students are, the less there is need for the instructor to continuously monitor a group's progress. Further examination of the instructor's role during the PBL project should be examined.

In this paper we have provided an overview of problem-based learning and how it is applied in one administrator preparation program. Problem-based learning has considerable potential for affording students "authentic instructional settings and tasks" (Leithwood, 1995, p. 130). This authenticity is related to Perkins and Salomon's (1988) "high road" transfer. If preparation programs foster flexible and conscious uses of knowledge to swampy problems, then the likely that what occurs in the preservice preparation will transfer to the school setting.

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