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ABSTRACT

Collaborative strategies were used for the conduct of research on two topics: preservice teacher education for elementary school teachers, and preservice and inservice education for secondary school mathematics teachers. The collaborative arrangements were the same for both projects, but the tasks differed. The intent of the elementary school teacher education project was to establish a single collaborative team that would determine appropriate ways to introduce knowledge of effective teaching into preservice curricula and to implement plans for including this knowledge in teacher preparation programs at three colleges. The team consisted of a researcher and three teacher educators. The secondary school mathematics teacher education project consisted of three separate collaborative teams, each having a researcher, a high school teacher, and a university-based mathematics teacher. The task of this project was to identify and describe conditions surrounding the education of high school mathematics teachers and to implement plans for the improvement of mathematics teacher education. The collaborative process used in these projects is analyzed in six different areas: (1) team selection; (2) team preparation; (3) history of participants; (4) status and role perceptions of participants; (5) rewards and incentives; and (6) parity and reciprocity between participants. (JD)

FAR WEST LABORATORY
FOR EDUCATIONAL RESEARCH AND DEVELOPMENT

COLLABORATION IN APPLYING RESEARCH TO TEACHER EDUCATION

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Introduction

It is widely believed that collaboration in research can improve research results; the benefit derives from the presence of multiple perspectives. It is also held that collaboration holds benefits for the participants--a sense of ownership of the results and a willingness to make practical applications of those results. In this portion of the Symposium we want to raise and respond to some questions regarding our efforts in utilizing collaborative strategies for the conduct of research on two topics: preservice teacher education for elementary school teachers and pre- and inservice education for secondary school mathematics teachers. First, we would like to describe some possible collaborative modes, and indicate ways in which our work with two projects relates to these modes

Some Possible Forms of Collaboration

There have been several efforts at collaborative research in education; each has proceeded with a particular definition of collaboration in mind. Although not all of these efforts can be characterized as including the full involvement of practitioners, the extent to which all participants are involved in the research effort serves as one important measure of the degree to which collaboration is present. There are several roles that teachers might play in collaborative research efforts. These include serving as a model of teaching which is available for the researcher to analyze and serving both as a model and a participant. In the former, the teacher participates as a part of the setting for the research; without the teacher the research could not be carried out. In the latter, the teachers' behavior is observed and, in addition, the teacher receives feedback from the researcher that may lead to reformulation of the research question. Another role that teachers may play is that of data collector; the teacher collects data and may discuss and interpret the data with the researcher. A teacher could serve as a practitioner consultant; in this mode the teacher describes and analyzes the teaching act and assists the researcher in formulating and conducting the research. And a teacher may serve as coinvestigator, partcipating in all stages of the research effort from conceptualization to completion. Finally, teachers may be the initiators of the research, and seek the assistance of researchers as consultants.

This range of modes of collaboration describes how teachers may serve as collaborators in research on teaching. Our research was not limited to this topic; we were also interested in collaborating with teacher educators in research on teacher education. Research on teaching was a part of our efforts, and the possible modes of participation for teachers also describes the possible modes of participation for the teacher educators with whom we collaborated. Where do our efforts belong in this description?

We never intended that the teacher educators (we included both university-based teacher educators and practicing teachers in this definition) serve only as models of teaching which we could analyze; we were less concerned with their own actions in educating others to teach. We did not observe their behavior, provide feedback and expect them to assist us in any reformulation of the research (although some reformulation did occur). They did more than collect data (although they did much of this) and they did more than describe and analyze their own teacher education efforts. We believe that their participation is best described as coinvestigators of teacher education practices.

Why did we decide to use a collaborative approach? In addition to the advantage of enhancing the research results through the inclusion of multiple perspectives, collaboration has the potential advantage of being seen as more practical by the practitioners who will implement the results. We chose to use collaboration not only because their perspective was important, but because we believed their participation would contribute to the likelihood that the results would be implemented by them and by others in similar roles.

The Collaborative Setting

The topic of the research was decided by the Laboratory staff when the research proposal was prepared. Potential team members were told of the general direction of the research and invited to participate in the project. In both projects the field collaborators were selected through an informal nomination process. Thus field collaborators did not enjoy full parity at the outset; all agreed to participate on a predetermined research topic. The intent was that parity in the design, investigation, implementation, and documentation phases would evolve.

The collaborative arrangements were the same for both projects but the tasks differed. The elementary teacher education project included a Laboratory-based researcher and three teacher educators, representing three universities in different states. The intent was to establish a single collaborative team which would determine appropriate ways to introduce knowledge of effective teaching into preservice curricula and to implement plans for including this knowledge in teacher preparation programs at three sites. The three field-based collaborators were teacher educators at Mills College (Oakland, California), The University of Nevada at Reno, and the University of Utah.

The secondary math teacher education project consisted of three separate collaborative teams, each consisting of the same Laboratory-based researcher, a high school mathematics teacher, and a university-based math teacher educator. The intent of this project was to identify and describe the conditions that surround the education of high school mathematics teachers at the pre- and inservice levels and to implement plans for the improvement of math teacher education. Early in the project a decision was made to first examine the

nature of the practice of math teachers who were perceived as being successful (on the grounds that little research on effective teaching of high school mathematics had been completed) and to use the results in an examination of the condition of teacher education. Teams were located near Logan, Utah (working with Utah State University), Washoe County, Nevada (working with the University of Nevada, Reno), and Sacramento, California (working with the University of California, Davis).

Some Questions About Collaboration

These teams have been at work for over a year; from our perspective, the results have been satisfying, and teams are about the task of implementing their conclusions. During the course of the two projects' efforts, several questions have arisen regarding the collaborative process. Each question is related to at least one of six topics: TEAM SELECTION, TEAM PREPARATION, HISTORY, STATUS and ROLE, REWARDS and INCENTIVES, and PARITY and RECIPROCITY.

Under the topic of TEAM SELECTION are two related questions: To what extent does knowledge of the selection process affect the collaborative participation of a team member? Does the recommendation by one member of other team members affect the nature and extent of collaboration?

In the Elementary project this was not as pertinent because only one Regional team was formed, and no member nominated another. Because we wanted to work with two specific universities in the Region served by the Laboratory, two field collaborators were nominated by their institutions; the third was selected by the project director after an informal survey within the state. All three joined the project with little knowledge and no experience in collaborative research. They were aware of the selection process, but the fact that two members were nominated by superordinates and the third by field recommendation seems to have made little observable difference.

A similar situation obtained for the Secondary project; two sites were predetermined. At these sites the university representatives were nominated by their deans. The third site was selected after an extensive informal survey of math educators in the state. For both projects, all participants welcomed the opportunity, although for some their participation was encouraged by superordinates, and for others their participation came after learning that they had been recommended by peers.

However, the organization of the Secondary project into three separate teams, each working in their local area, and each including both a university professor and a high school math teacher, presented a more complex situation. The high school teachers were all nominated by the university professor on their team. In two cases, the teachers' knowledge that his or her participation was a result of a recommendation from the other team member did seem to have an effect on the

nature and extent of collaboration. A deferential attitude on the part of the classroom teachers was present when decisions were to be made and tasks accepted. Whether this was a consequence of knowledge of the selection process or the presence of unequal perceived status is unclear. The knowledge that another team member holds one in high esteem could contribute to a positive attitude within the team. Alternatively, it could suggest that some "debt" is owed or that the judgement of one member is more respected than the judgement of another; teachers weren't (for logistical reasons) asked to nominate professors. More will be said about this when we discuss t. effects of status and role differentiation.

The topic of TEAM PREPARATION also suggests two questions: Were the expectations of the Laboratory clear? Were expectations of individual team members known?

The answer to the first question is, we think, a qualified "no". We qualify it because the collaborative process is difficult for all participants; it must evolve from the group as they work together. Each group becomes an entity with its' own characteristics; there is no formula to guarantee that collaboration will occur. From our perspective, it was difficult to establish team members' responsibility for their projects. There was an initial feeling that the Laboratory staff was not entirely sincere in calling for a full collaborative effort--that some "hidden agenda" might be present. It took time, time, and more time discussing and trying different strategies before team characteristics began to appear to be as important as individual characteristics.

In part this is addressed by the second question: Were the expectations of team members known? Initially, it appeared that the expectations of the Laboratory were the most important, as revealed in questions such as "What do you want?" or "Is it OK for us to do this?" As the teams worked together, those expectations changed. Although each participant had individual goals, group expectations evolved. The possibility of assisting in the design and implementation of recognized improvements in the teacher education efforts in their area was an expectation from the outset; as the two projects developed, this was seen as more and more possible. Negotiations almost always centered on the local context and reasons why one procedure was preferred over another. And, because local team members were obviously more knowledgeable about their own context (this is after all, a major reason for collaboration) it was possible for them to assume increasing responsibility for the results of the projects.

In retrospect, we both believe we would start differently, with much more attention given to individual and organizational expectations, perhaps even committing these to writing so that participants could observe the degree to which they were achieving and revising their initial expectations. This would include candid statements about the constraints each brings with his or her participation.

In discussing this topic with Tom Bird, he provided us with the useful metaphor of diplomats working around a table. Each brings useful knowledge and skills to the context, but each is always aware of the larger external context and the potential for intrusion. These two collaborative projects did not proceed on the assumption that the rest of the world was irrelevant. However, a clearer understanding on the part of all participants of what any one participant can and cannot do would assist the collaborative process.

In examining the collaborative process, we believe HISTORY to be very important. It is useful to know what previous interactions have occured and the nature of these interactions. In what ways did previous interactions affect team outcomes? Did previous relationships affect the division of labor within a team?

In the Elementary project, team members had few previous interactions. One had worked with the Laboratory on another project, and two knew each other from previous work at a different institution. A third was unknown to all other participants. These few previous relationships were all positive, and no one came to the project with negative attitudes about the other participants. This had obvious value for establishing a collaborative approach.

Although there were no previous interactions between teams in the Secondary project, there were extensive interactions within teams. All three professors had placed and supervised student teachers in the classes of the participating high school teachers, and were familiar with their teaching methods. Each teacher member of a team knew the professors' reputation on campus. One had completed a doctorate with the other team member as senior professor. Another had completed his Masters' degree in another department in the Education school. On one team the two field collaborators had worked together in a university inservice education program for local math teachers, and expressed admiration for each others' work. No deferential attitude was observed on this team, perhaps due to their previous work as colleagues in a teaching task.

On the other two teams, there was an apparent effect on the division of labor, at least in the early stages of the project. Although tasks were often shared, it was less likely that the high school teacher would request that the professor complete a task. The previous interactions on these two teams had always been that of subordinate and superordinate, with the accompanying perceptions of status and role differentiation.

There is an elusive component related to the importance of previous relationships: the interpersonal relationships that team members carried to the work of the project. (Although those who were unfamiliar with each other were not affected by this element, the degree to which team members respect or even enjoy the company of each other was important at the outset.) In the Elementary project, this quality remained important as the work progressed. The four members became friends; in their intensive interactions

they became a team in the full sense of the word. This was not so important for the Secondary project, which operated as three separate teams. However, relationships among the project director and the two field collaborators who formed a site team were very important. The mutual respect and admiration already present on the team which had worked together on another project was a major reason for the ability of this team to pursue their work in the implementation stage. When disagreements occured, they were always amicable. This suggests the importance of attending to previous interactions and perceptions held by potential team members during the selection process.

The topic of STATUS and ROLE raises questions about the collaborative process for both projects. To what extent did role determine status within a team? Did role differentiation continue within a teams' interactions, and how did this affect collaboration and outcomes?

In both projects role differention was present. The project director represented the Laboratory and carried some status as a person with research expertise. The fact that the directors represented the Laboratory, without which the project could not exist, was very important.

I: the Secondary project, additional differentiation was present. The perceived status of university professor as contrasted with that of high school teacher was always present. However, as work progressed and it became necessary to identify apparently successful math teachers, gain access to their classrooms, and conduct observations and interviews, the value of the teacher participants became more recognized. This was an important point in the development of shared responsibility and recognition of the contributions each team member could provide. Professors were at an obvious lack in describing the classroom methods of most math teachers in their area; even the ability to know individual schedules and perceptions held by peers became an important source of status within the teams. Finally, this was a project on mathematics teacher education, and the project director had no experience in that field. This allowed other team members to rely on him when questions of research were under discussion, and allowed him to defer to the other members when questions of mathematics teaching were being discussed.

In the elementary project a similar development occured; although the project director was perceived as knowledgeable about research on effective teaching, she had limited experience as a university-based teacher educator. This made it possible for the other team members to take the lead in discussions of program design and revision. And, for both projects, knowledge of the local context was held by the field collaborators, allowing the project directors to defer to that expertise in discussions.

We conclude that the ability of team members to recognize the contributions they cannot make, and the contributions others can make, is critical to collaboration. Status and role differentiation

can be positive components of a collaborative team if opportunities for each member to demonstrate and contribute his or her expertise are provided.

For every participant some REWARDS and INCENTIVES must exist if they are to participate. In both projects all field collaborators were supported for fifty days of work; in fact, all of them contributed more from their own time. Without payment, it would have been impossible to devote the time needed to conduct the investigations. This was especially true for the high school teachers, who used much of their payment to provide substitute teachers for their classes. But we do not believe money was the major incentive for their participation. What other rewards and incentives existed for team members? To what extent did they affect team efforts? How can individual aspirations be met within the context of team responsibilities? How might team members assist other members in attaining their own rewards?

Perhaps the most important reward was the possibility that improvements in the teacher education programs would occur; the opportunity to contribute to an effort that results in improvements in ones' own field was certainly appealing. Participants regularly cited this as the motivation for their participation.

There are other rewards: the prestige associated with a Laboratory appointment, peer recognition that the participant was involved in a research effort that extended beyond their own campus, the possibility that participation would result in publications, and that participation would contribute to professional advancement were all important to field collaborators. Possibly only one participant was not concerned with such rewards. He is a high school teacher with over thirty years of experience, enjoys a favorable reputation in his district and has no advancement aspirations. His motivation was to contribute to the improvement of math education in his school and district.

We know of no instance in which rewards and incentives for individual members had a negative affect on team activities. In fact, the opposite seems to be the case. As participants achieved their own rewards a sense of satisfaction with team efforts has resulted. The work of one participant contributes to another participants' rewards; they work together and they critique each others work.

Our final topic is PARITY and RECIPROCITY. To what extent did status and roles determine the presence of parity and enhance or inhibit reciprocity? Were tasks perceived as mutually determined and accepted? Are there occasions when it is appropriate for one member to insist on a specific decision, and thus signal lack of parity? Are there ways in which parity can be assured?

We have already discussed some ways in which status and role relate to this topic. This was important for two teams in the Secondary project; the perceived status differential of university professor and high school teacher resulted in according some deference. This was seen in less important events (moving to the use of first

names) as well as in more important events (feeling comfortable in suggesting that a colleague assume responsibility for a task).

For both projects, it took time for the project directors to be perceived as equal contributors. Intentional behaviors, such as being careful to use the collective "we" when discussing team plans or abstaining from discussion in a decision so that others will shape the conclusions, were practiced from the outset. Initially, decisions were not seen as mutual; about halfway through the first year, this changed. Even so, the fact that the project directors represented the Laboratory and were, in an indirect sense, seen as the source of monetary support, meant that full parity has probably not been attained. Perhaps, given the context of external funding, it never can be. For us, this remains an open question.

Certainly there are times when one participant is correct in insisting on a specific decision. As project directors, we have learned that our own plans will not always be acceptable in the local context. Field collaborators know that completion dates, research methods, and reporting are not always negotiable. This may signal a lack of parity, but we think it does not. Rather, it illustrates the fact that each participant also serves as a representative of other contexts (the world beyond the diplomats table) and must attend to those contexts. When that is understood, parity is present because tensions and constraints become a part of the operational definition of that context.

A key to this is interdependency. Field collaborators are in some sense dependent upon the project directors; certain final decisions must rest with us. However, we could not conduct these activities without the collaboration of the other team members; their expertise, their access to the local context, their ability to perceive the meaning behind statements and events, and their knowledge of ways in which implementation is most likely to succeed (or fail) are all critical components of each effort.

Collaboration encompasses a broad range of experiences and operates at several levels. The degree to which teams reach an appreciation of the contributions and limitations all participants bring to the situation is in large measure dependent up two variables: the complexity of the task and the length of time spent on that task. As complexity and length of time increase, the importance of initial understandings regarding incentives, constraints, and individual contributions becomes increasingly important.

In these comments we have looked back on our experience in working with the collaborative process. We hope this hasn't left you with the impression that the flaws outweighed the strengths. We are pleased--very pleased--with the results of the efforts. One of the most important outcomes hasn't been mentioned, though perhaps this is a great advantage of all collaborative efforts: participants have more and different perspectives on their own work setting. They have had time to reflect on their own practice. This cannot help but be of benefit.