Examining AMSP Partnerships:
Increasing Capacity for Distributed Leadership

Final Report – AMSP Research Project
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INTRODUCTION

As one of the 52 mathematics and science partnerships funded by the National Science Foundation, the Appalachian Math and Science Partnership (AMSP) is a unique mechanism for teacher professional development in math and sciences throughout the Appalachian region. One of the components of AMSP, the program to fund individually-developed partnerships between higher education institutions and one or multiple local school districts (Partnership Enhancement Project or PEP grants), was conceived as a way to expand and promote improvements in math and science K12 education by focusing on local needs. Over a five year period, AMSP has funded over 50 PEP grants (some as continuation projects, others as new initiatives) to initiate and drive professional development. The purpose of this study was to analyze the effect and activities of 10 PEP grants during 2005-06 (Round 2) in terms of the leadership and overall structural characteristics that lead to successful partnership. The underlying hypothesis of this study is that "distributed" leadership, that is, leadership responsibilities that are shared across institutional levels provides an ideal structure for promoting and encouraging teacher leadership and successful university-school partnerships.

Research questions:

- Research Question 1: What is the nature and extent of distributed leadership practiced in AMSP university-school partnerships?
- Research Question 2: How are distributed leadership characteristics and structural characteristics as practiced by AMSP partnerships, related to success data?
- Research Question 3: Given this backdrop of leadership practices, what sorts of interventions might increase leadership capacity and partnership success?

Partnership Profiles

The 10 partnership projects that were analyzed for this project were funded from the second round of PEP projects. PEPs were located throughout the Appalachian region of Kentucky and Tennessee and included counties that were extremely isolated as well as some that were fairly close to large municipal and cultural districts, although still considered rural. All partnerships involved a different number of participants with different goals and different activities so inevitably cross comparisons were difficult. Nevertheless, leadership structures were a necessary mechanism for all partnerships no matter how many schools were involved, although they looked very different across partnerships (see Appendix A for a summary of relevant characteristics).

BACKGROUND

Distributed Leadership in University-School Partnerships

Briefly, distributed leadership refers to a structure of leadership that creates the possibility for teachers to develop into leaders by establishing a framework of sharing and co-responsibility threaded throughout school district authority networks. In other words, distributed leadership ideally allows for people at all levels of the school hierarchy (district leaders, superintendents, college professors, principals, teacher leaders, teachers and students) to participate in cooperative inquiry-based activity that is in some important ways unbounded by traditional patterns of communication and authority. For this study the term distributed leadership is used chiefly to define a prototype, or an ideal case of maximally shared authority, and as a blueprint for thinking about how to improve and effectively maximize "structures of leadership". In do doing, this study attempts to build on leadership research that acknowledges the limitations of traditional models of leadership, emphasizing the charismatic leader who assumes total authority. In contrast, this study builds on recent leadership and organizational management research that acknowledges and recognizes the presence of many inter-connected positions of leadership within an organization or partnership. Thus, facilitating distributed teacher leadership may have the potential to promote significant sustainable and long term improvements on math science education by fostering teacher community, collaboration and leadership skills.

Studies of university-school partnerships often suggest that their success was predicated upon a concept of distributed leadership. In particular, William Firestone and Jennifer Fisher found that university school partnerships worked best when leadership experiences were attained through being involved in a network of different interest groups and stakeholders. In other words, people who could easily fit into the culture of either schools or higher education institutions provided the kind of direction and leadership that led to partnership success (Firestone and Fisher 2002). Moreover, in an analysis of 57 urban university-school partnerships, Kirschenbaum and Reagan found that leadership was most effective when it involved as many stakeholders as possible, when there was shared ownership of outcomes (2001). Similarly, Kehle and Maki from the Indiana Mathematics Initiative emphasized that teachers must also be leaders and professionals, that leadership must be formed from the "bottom up" (2005). In sum, many sources have touted the benefits of distributed leadership (DL) for school systems, organizations in general, and school partnerships specifically (Spillane 2006; Elmore 2000; Firestone and Fisler 2002; Timperly 2005) however, there is some debate about the actual context and practice of this concept as it is not a clearly defined and rather new in terms of its application to university school partnerships.

Spillane defines distributed leadership as something qualitatively different from either shared decision making or team leadership in that it can be located in the interactions between leaders and followers, not in the actions of the leaders (Spillane 2005). Distributed leadership is also not necessarily more democratic but is a new approach to connecting with people and resources under a common goal. But as Spillane is quick to note, distributed leadership is not a blueprint for effective leadership. As an analysis of the Bay Area School Reform found, distributed leadership still may require a strong leader who is seen as "the person in charge" (Copland 2003). Other useful definitions of distributed leadership suggest that it often occurs in conjunction with clarity

of structure and accountability as well as with an investment in leadership capacity (Arrowsmith 2005)

Distributed leadership has theoretical and practical connections with recent literature on distributed cognition (Lave and Wenger 1990; Hutchins 1995; Brown et al 1989) and so defines leadership in terms of the social knowledge that is formed in a community of practice. It goes against the prevailing idea that trait forms the most important notion of leadership and suggests instead that actions and interactions between materials and people are what determine good leadership. That is, distributed leadership involves the interactions and transactions between both peripheral and core members of a community working toward a common goal. In this model, all individuals have important and significant roles to play in the community. Similarly, distributed leadership implies that each participant is considered an expert at his or her individual part and leadership is concerned with creating unity and forming learning communities (Elmore 2000) rather than micromanaging.

Interest in distributed leadership has surged recently as evidenced by the newly established focuses for the study of distributed leadership, including Northwestern University's "Distributed Leadership Study," headed by James Spillane and funded by the National Science Foundation. In addition, Massachusetts Institute of Technology Sloane Center has developed a center to study distributed leadership and the Philadelphia-based Annenberg Foundation has provided a new $4.9 million grant to the Center for Educational Leadership at the University of Pennsylvania to study distributed leadership. All these initiatives are concerned with developing democratic decision making communities of practice and helping principals and teachers realize shared and collaborative decision-making as a function of being a leader.

As most concepts can be also usefully explained in terms of what they are not, distributed leadership can be contrasted with what Elmore calls "**loose coupling,**" a more common practice, particularly in relation to schools. In this organizational state, teachers and administrators often exist in isolation, in "egg cartons," working independently toward goals that may or may not be congruent with each other. In addition to a lack of focus or overall unity, other qualities of loose coupling are what Elmore describes as a "nervous, febrile, and unstable condition," that may be susceptible to various politics or infighting (Elmore 2000, p. 7). Loose coupling is also generally factionalized and characterized by infrequent informal communication. It's also, however, considered to be more democratic and was a step forward toward more teacher independence.

In addition to contrasting distributed leadership with loosely coupled leadership, this study invokes a third framework, "**centralized leadership**" to describe another predominant characteristic of many university school partnerships and organizations. Centralized leadership is defined as a partnership model where there is one identifiable leadership force who keeps a tight control over the processes and activities of the partnership. In some cases, this can be a very dynamic or "heroic" individual who is able to motivate people but who may also impose a strict hierarchy and centralized authority. These partnerships may be very successful but may at times tend to stifle creativity and experimentation. Moreover, once the leader is gone, the reform is often left behind. .

One of the key strengths of this project is that it builds on that idea of multiple contexts for partnerships and attempt to translate leadership structures into a 3 part framework for analyzing distributed leadership. That is to say, this study analyzes partnership leadership in terms of a combination of these three categories so as to more accurately represent actual partnership leadership conditions. Since some partnerships will presumably contain elements of distributed leadership as well as elements of loosely coupled or centralized leadership frameworks, our work attempts to clarify some of these structures with a 3 part framework as well as to discuss them in relation to success indicators and structural conditions.

Structural Characteristics of Successful University-School Partnerships

While distributed leadership provides a kind of template for thinking about leadership, it does not necessarily dictate specific structures or models for partnership enhancement projects. Toward this end, Gordon Kingsley provides a useful template from which to evaluate the structural conditions of university/school partnerships in terms of a number of key variables, including the ways in which partnerships form, evolve, and operate (Kingsley 2004).

A particular focus of Kingsley's work and a special emphasis in this project was on "need" or the how much each institution relies on each other for the outcomes of the project. For example, some partnerships to realign curriculum were very "needed" while others may have been more about refinement of already existing methods. Even relationships can be analyzed in terms of need and were a focus of this analysis. Indeed, research suggests that distributed leadership is often thwarted by problematic and inconsistent ties to the higher education partner in terms of the idea of "need". In a partnership involving university students, and educators at an elementary school, Gut et al. found that collaboration often lapses into consultation, and the roles of university participants become that of the expert or consultant rather than that of the collaborator or partner (2003). Similarly, Tanner et al. (2003) found that the culture and the language of university scientists and teaching personnel were very different and gave rise to communication difficulties and inconsistent or unrealistic expectations. The Innovative Links Project in South Australia noted that university participants often did not know about teacher needs or constraints, and felt that they were often "put into service" without much recognition of their needs or outcomes from the partnership. (Peters, 2002; Tanner et al. 2003). Distributed leadership or shared responsibility and "bottom up" partnerships were cited as especially important for creating more evenly shared benefits and responsibilities **(**Firestone and Fisher 2002; Kirschenbaum and Reagan 2001; Kehle and Maki 2005**).**

Kingsley's work also emphasizes the importance of embedded partnerships, another unique aspect of AMSP partnerships and for this study in particular. Embedded partnerships are those that have already existing relationships and structures within which successful partnerships can be built. Other variables the degree of complexity, the type of goals that are set and the forms and patters of communication. For this project, "need" and "embeddedness" were a particular focus in the analysis, especially given that many of these partnership enhancement projects were extensions of projects begun through another partnership grant mechanism that was established earlier. Furthermore, while complexity and communication were important variables, it became clear that these would require much more analysis and data collection that were proposed for this study. (See Appendix B for a list of the structural variables used for this study and their definitions.)

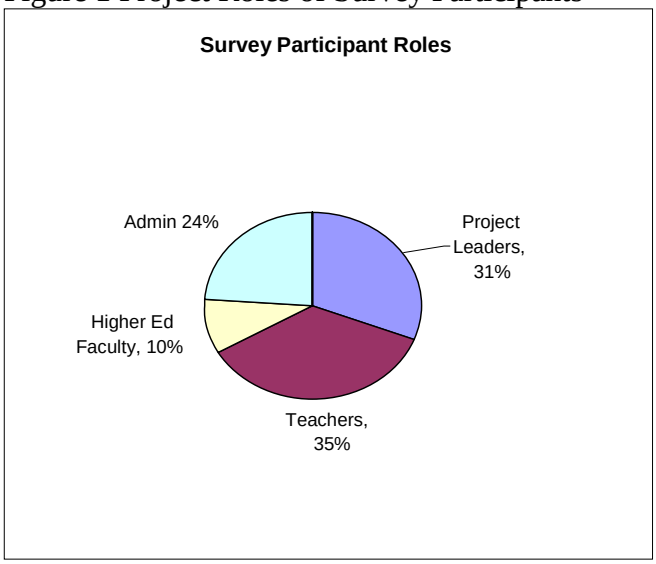
Indicators of Success

The last consideration for this study is "success," particularly in relation to sustainability. As discussed in Hargreaves and Fink (2003), deep educational change occurs only when it is sustained over time and given a chance to mature. This implies that relationships are committed and that resources are used at a rate that matches the pace of change. Sustainability further implies that a rich "educational ecosystem" be developed that embraces an increasingly complex environment that includes challenges such as high teacher and administrative turnover rates, high stakes testing distractions and university-school policies on outreach and professional development activities. So while ultimately the criteria for success in university school partnership is higher achievement among students, the assumption of this study is that there are intermediary steps that need to be developed and measured first in order to create a successful foundation for math and science education improvement. This also acknowledges the difficulty in measuring math and science student improvement as a result of the partnerships since the results for such work can be somewhat intangible and much delayed, only being measurable after the partnership has had time to build momentum and significant change. (Bodilly et al. 2004) This also echoes the perception among many who are involved in university school partnerships that time turns out to be a most important factor, that is, the inclusion of ample time to collaborate and partner together (Gut et al 2003). As such, this study presumes the importance of measuring success through relationship building and the activities that develop rich sustainable networks of colleagues as distributed across teachers, administrative districts and higher education outreach professors. (See Appendix C for a list and definition of the success criteria.)

RESEARCH METHODS AND RESULTS -SURVEY

Ninety five surveys were distributed during summer 2006 to all participants listed as key personnel on the AMSP 2004-05 PEP proposal with a 41% return rate (39 returned). Figure 1 provides a summary of survey participants and their roles in the PEP project.

Figure 1 Project Roles of Survey Participants



Potential interview applicants were self-selected from the surveys and interviews were pursued for all people who gave consent (see Table 1).

Table 1 Survey Participation by PEP

PEP	surveys returned/surveys sent
#1	7/12
#2	5/12
#4	0
#5	4/11
#6	4/11
#8	5/10
#9	5/11
#10	2/8
#11	2/3
#12	5/17

Leadership Characteristics

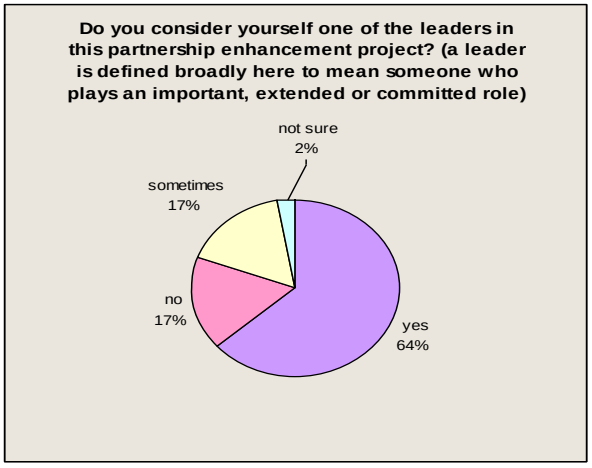
The following section is an overview of leadership data collected from the survey. As can be seen from Question 11 (see Figure 2) on the survey, PEPs overall appeared very collaborative and thus presumably many or most had strong distributed characteristics:

Figure 2 Survey question 11

The term collaboration was defined as activities fostering "social interaction" or "working together" so that respondents would include many different types of collaboration including partnerships between HE professors as well as district personnel or other teachers and schools.

In addition, most of these partnerships employed multiple leaders with 81% of survey respondents claiming they were a leader at some point in the partnership suggesting a high sense of shared ownership for all 9 partnerships that returned surveys (see Figure 3).

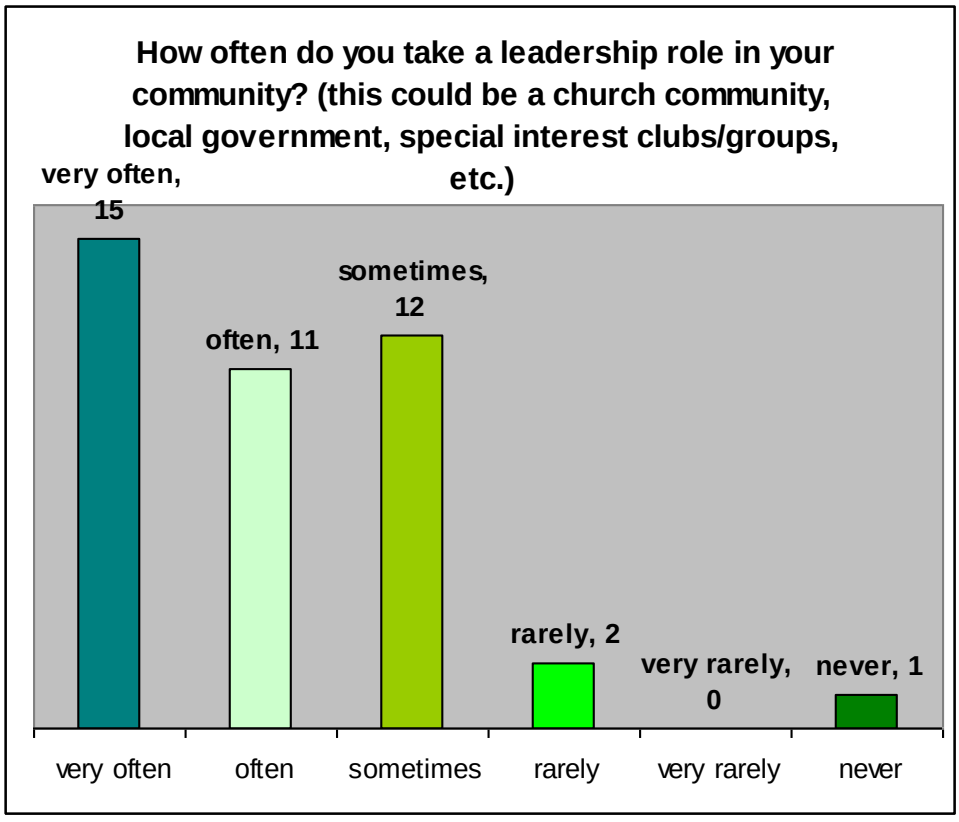
Figure 3 Survey question 3



Several other questions in the survey addressed individual perceptions of leadership by asking about their overall perceptions of themselves as leaders across institutions (see Figures 4 and 5)

Figure 4 Survey question 4

Figure 5 Survey question 5



Since collaboration and teamwork are an integral part of being a leader from a distributed perspective, several questions attempted to gather some information about individual perceptions of collaboration experience and participation (See Figures 6 and 7).

Figure 6 Survey question 6

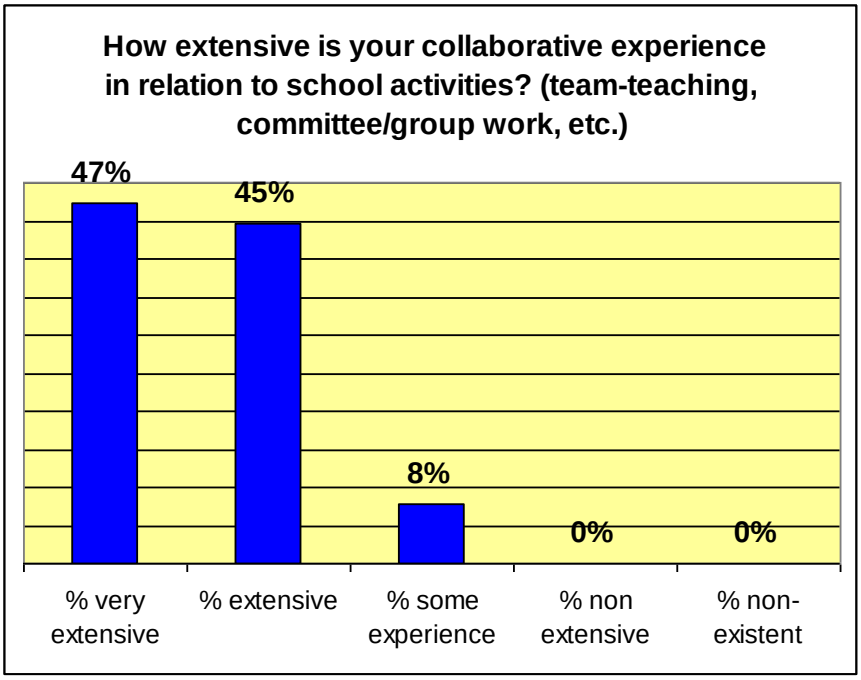
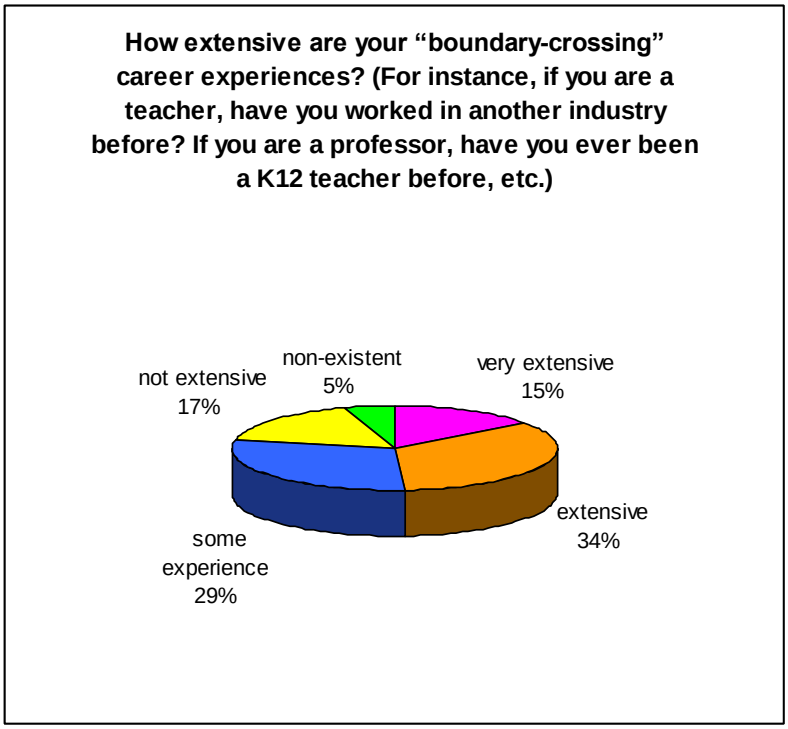


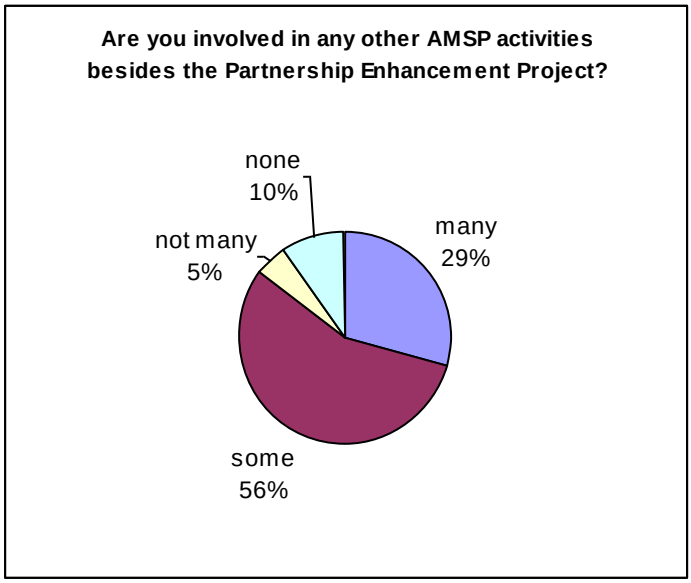
Figure 7 Survey question 7



Structural Characteristics

Other data in the survey provided a glimpse of the structural characteristics of the partnerships. In terms of "embeddedness," the survey asked participants about their level of involvement in AMSP activities. More than half the participants had already been engaged with another AMSP activity, including summer internships, and special programs (see Figure 8).

Figure 8 Survey question 1



Another set of questions attempted to address the notion of "complexity" and "embeddedness" by asking about new acquaintances and relationship-forming. (see Figures 9 and 10)

Figure 9 Survey question 10

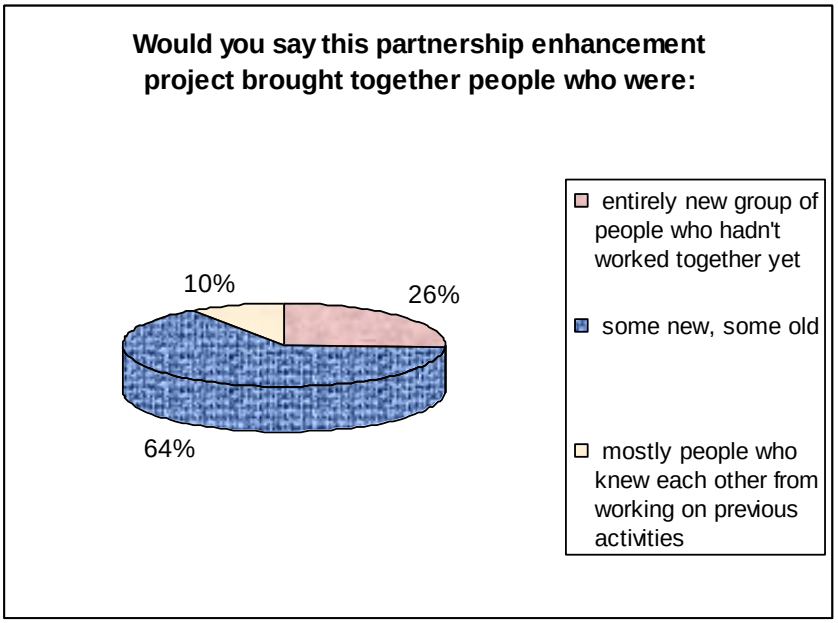
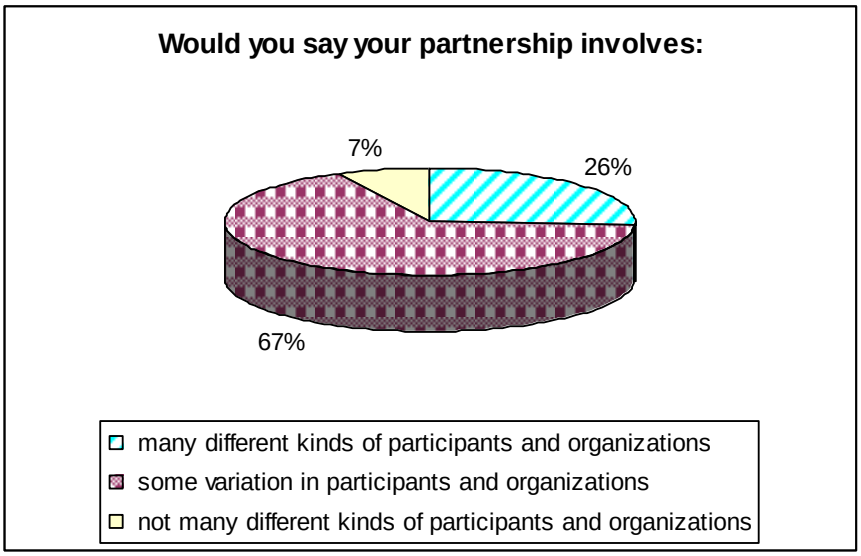
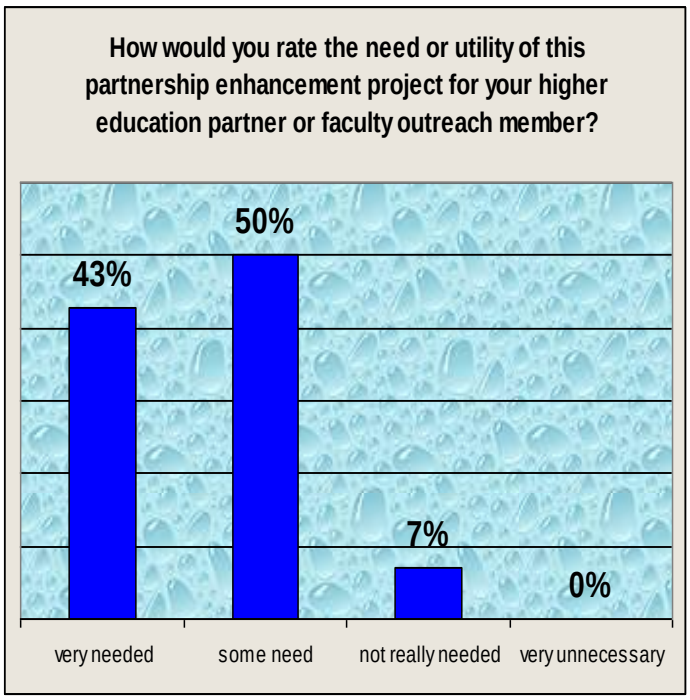


Figure 10 Survey question 15



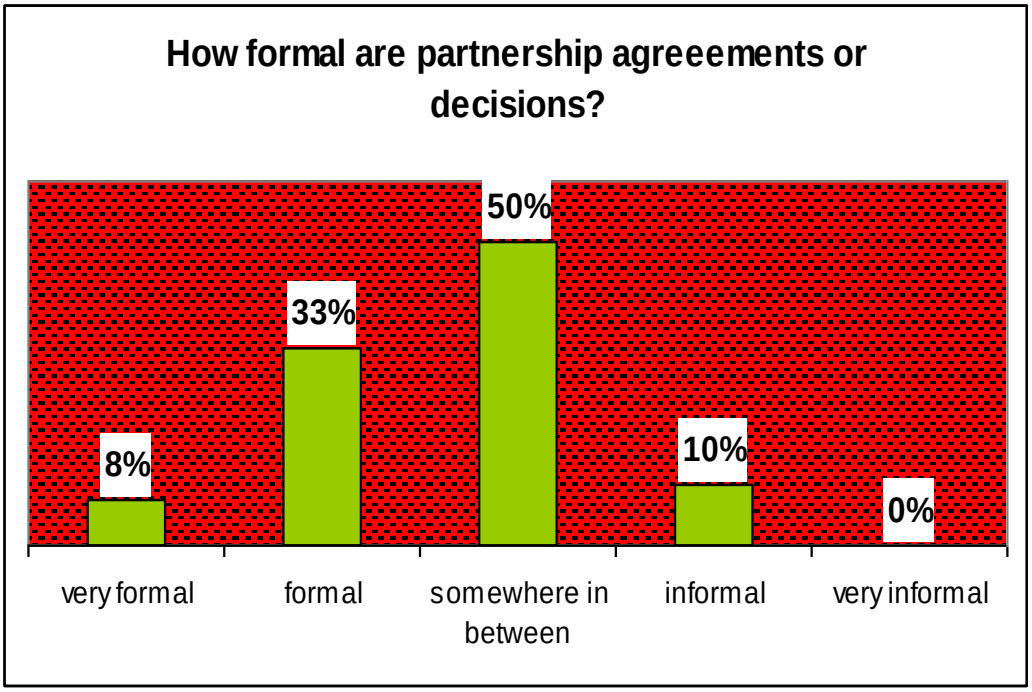
Another question in the survey section focused on the notion of "need", particularly in relation to the higher education professor. In Figure 11, 93% of survey participants thought that there was some need or a lot of need or benefit for the higher education partner.

Figure 11 Survey question 12



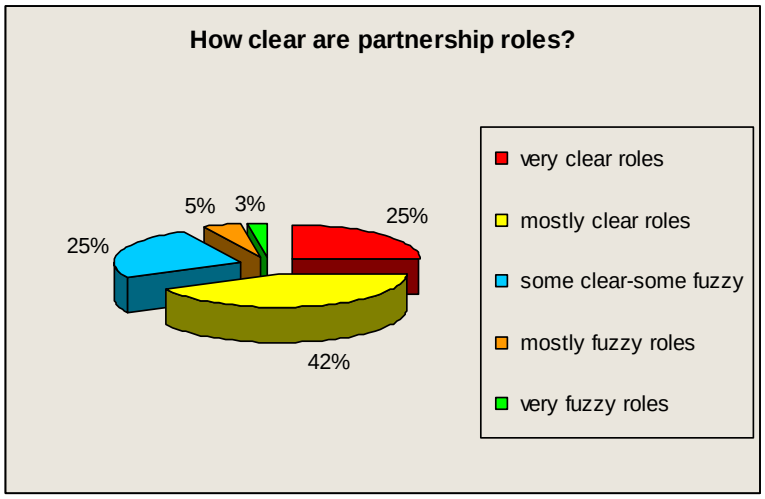
In terms of "communication" one survey question (Figure 12) attempted to grasp the nature of how things were discussed in terms of the general notion of "formality".

Figure 12 Survey question 13



Finally, in terms of structural characteristics, a question about "role clarity" was included as a way to understand more about the communication conditions of the partnership. As shown in Figure 13, roles in the partnership were presented according to a wide range of clarity and it seemed as if a diverse collection of clear and fuzzy roles was a more common practice among these partnerships, although 67% were very clear or mostly clear.

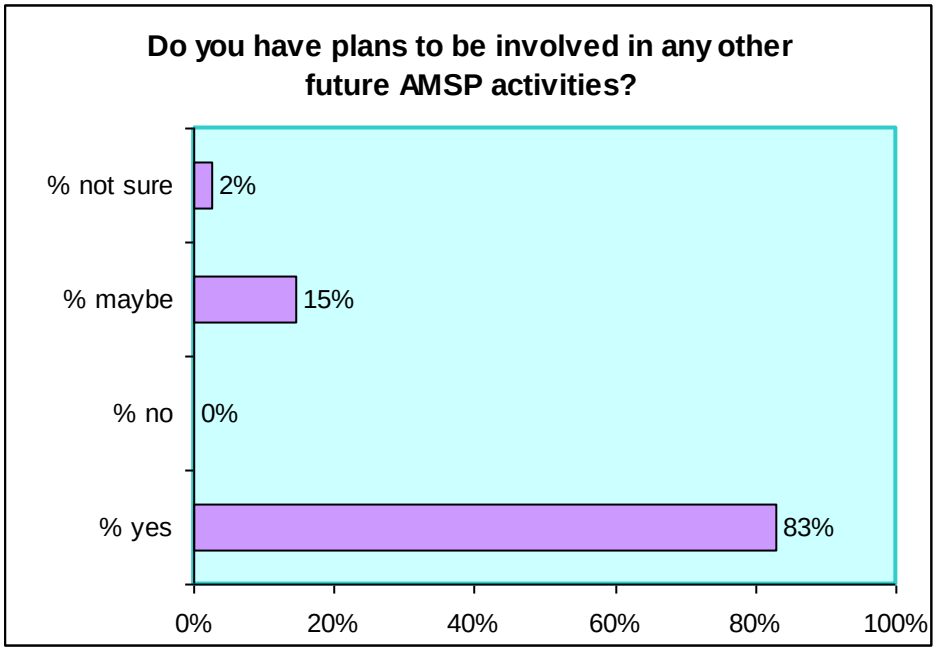
Figure 13 Survey question 14



Success indicators

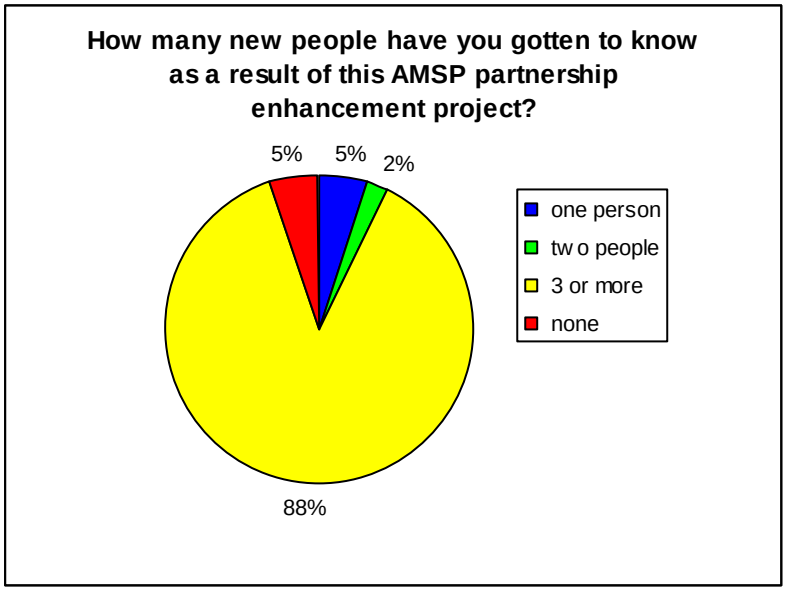
In relation to "success", one indicator which seemed crucial was whether many participants were willing and eager to be involved in future activities which is an important factor for the sustainability indicator (indicator #3).

Figure 14 – Survey question 8



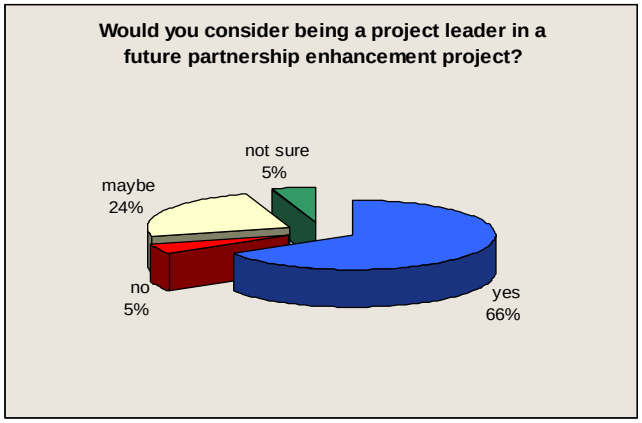
Another success indicator was the number of new collaborations or working relationships people were able to forge as a result of this partnership (indicator #5) As can be seen from Figure 15, 88% of participants established relationships with at least 3 or more people.

Figure 15 Survey question 2



Finally, another indicator was whether participants would want to be a leader in a future project. Overall, the results from the survey indicate 66% of participants would agree to consider being a leader in a future project whereas 29% were less sure, but willing to consider (Figure 16).

Figure 16 Survey question 9



RESEARCH METHODS AND RESULTS -INTERVIEWS

The next section includes a summary of interview results. Transcriptions of interviews were coded and analyzed accordingly (see appendices G,H and I for coding scheme). (The masculine pronoun was used throughout to preserve anonymity.) Table 2 provides a breakdown of interview participation rates.

Table 2 Summary of data collected for interviews

PEP	agreed to an interview	number interviewed
#1	7	5
#2	2	1
#4	0	0
#5	2	2
#6	2	0
#8	3	2
#9	2	2
#10	2	1
#11	1	0
#12	3	3

Table 3 provides a breakdown of roles for individual interview participants.

Table 3 Roles of Interviewees

PEP	Role in Partnership	Role outside of Partnership
#1	project director	curriculum specialist
#1	HE partner	professor
#1	teacher participant	teacher
#1	director/coordinator	regional coordinator
#1	director/coordinator	district administrator
#2	project director	curriculum specialist
#5	project director	teacher/varied
#5	HE partner	professor
#8	HE partner	professor
#8	project director	superintendent
#9	project director	district supervisor
#9	HE partner	professor
#10	project director	principal
#12	project director	librarian
#12	teacher participant	teacher
#12	teacher participant	teacher

Partnership 1

Project Leader Interview, PEP 1: This interview was with three project participants and included the three main project leaders who worked as a team. They appeared to work very well and were very comfortable with each other, joking and bouncing ideas back and forth. All three had experience as K-12 teachers but were now working as district professionals and one as a regional coordinator for AMSP. In terms of boundary-crossing, they all mentioned that teaching different levels of students (college versus K12 versus adults) provided unique insights and was important for helping them to develop as district leaders. Each particular person seemed reluctant to take credit for the idea of the project and was very humble about their individual contributions. Since the project had already had some momentum developing under previous projects, they had a congenial collaborative atmosphere and seemed genuinely interested in making the lives of the involved teachers better. They particularly emphasized that teachers don't have time to sit down with each other to discuss and share ideas. This collaborative time seemed to be the primary emphasis for this partnership project, and while the project leaders viewed the partnership with the HE professor as welcome and useful, it didn't seem to be the main purpose of the partnership, but rather a helpful but not essential addition. Even more, the project leader made the point that the relationships with professors were something he had to encourage and seek out, that the university did not seem to encourage outreach as much as he would have thought. In other words, there was no structure to make it easier for people to approach HEs with this sort of request and that HE professors were often too busy working on publishing to develop relationships with schools or the community. Despite this difficulty, this PEP worked well with their HE partner and developed a productive working relationship that yielded some important outcomes including online classes and an evaluation instrument. This partnership was notable for laying the foundation for future productive HE relationships. A good point about developing relationships and partnerships among HE's was brought up in terms of keeping these relationships and resource people to a minimum at first to keep the project manageable. They noted that camaraderie is much more easily attained when numbers of external or "new" participants are low enough such that people can start to feel comfortable with each other sooner. Similarly, they noted that this was true for teacher participants—that the combination of half new and half experienced teachers worked well and it created the right amount of excitement and sustainability for future partnerships.

An important point in relation to teacher participation and leadership development arose in a discussion of compensation. A comment was made that $100/day was simply not enough to support a project that was supposed to allow teachers to create and construct curricula. In other words, if the goal is to promote and sustain teacher professionals and leaders to take part on an equal level with other professionals, such as the HEs, then they should also be compensated and appreciated at a similar level within these partnership projects. They noted that the disparity between NSF-mandated allotments for facilitators and consultants versus teachers was significant and thus placed an unnecessary and undesirable division between leadership and participant roles in the partnerships.

Teacher interview, PEP 1: This particular teacher described his experiences as generally positive and counted herself as one of the leaders of the PEP project. He also indicated that he accepted other leadership roles in her school and community and had extensive collaborative experience. He found that the PEP project offered much in the way of helping to engage teachers in

collaborative efforts, particular team-teaching, and it seemed as if the school, district and principal were all supportive of the project. While the interview gave hints that the leadership team might have been less centralized (asking initially for more input from teachers) he was excited about the possibilities that the grant established. This teacher felt that the structure of the partnership was loose and flexible and that teachers were granted a significant amount of autonomy. In particular, he regarded the structure as "very informal" but with a meaningful agenda. The most significant learning experience for this teacher was a content-related issue; as a science teacher he felt he became much more comfortable with math and using mathematical language. Nevertheless, this improvement was not a result of the partnership with the HE institution but rather was due to the fact that the lessons he was developing for the project were *forcing* him to think about and integrate math, science, and literacy in his classroom. This teacher was not sure about the identity (could not remember who was the HE partner) and thought in general that the instruction provided by the HE partner was not valued among teachers in his group. He felt as if the HE partners had lost touch with the day to day activities and distractions of the classroom. Overall it seemed clear that he was a leader in the project but was still very much in the "teacher camp". Because the main leadership team was at the district level, this may have further cemented a kind of "us vs. them" mentality.

HE interview, PEP 1: This HE partner explained that he wasn't really involved in the early stages of the proposal development but rather was added at a later date. The project director and the regional coordinator contacted him to develop an online course, so the work was not central to the PEP but rather an addition or supplementary feature. This HE professor therefore was reluctant to talk about many aspects of the PEP in which he was not involved and answered questions in a very general way. When he was asked about his role in the partnership he said it was "evolving" and wasn't sure if it had been defined yet. It was difficult to pin down a real benefit for this HE partner and he wasn't sure about what he might gain from it as it was "just getting started." He didn't think the PEP had changed the way he taught or conducted research but agreed that it had him thinking more about what he does and was an asset in terms of providing him access to classrooms for research. He felt that it was difficult for this PEP to get an HE involved due to time commitments.

Partnership 2

Project Director Interview, PEP 2 Similar to many of the partnerships, this participant discussed how the partnership evolved, showing that it was developed from the pre-existing relationships that had already been established working with AMSP and its related activities. This project director took a fairly strong leadership role in making the activities happen. He felt that the bond between the HE was particularly strong. This person wanted to do more for the partnership and to have more time to execute some of their activities rather than monitoring activities. He wished that the principals could have been more involved with the monitoring of progress and in other ways. Overall this partnership seemed very organized (more formal) and teacher participants were given a letter contract to communicate expectations and activities. In terms of obstacles, time and scheduling were difficult, but he also mentioned that the size of the grant was somewhat limiting in terms of what they could do and mentioned that more money as well as more time would be ideal. When discussing additional grants that would be pursued to continue the activities of the grant, some state grants were mentioned, but he noted that those were hard to get, suggesting that additional funds would be fragmented and uncertain, although they were

pursuing any such opportunities. He also noted that most school grants today are small and are for technology, for concrete school supplies such as smart boards, projects and the like. In terms of improving participation, he recommended more followup, a critical component he claimed was often left out. Given the pressure for testing and the many distractions that occur during the school year, he thought that it would be very helpful to have someone who would communicate with teachers during their implementation of strategies and see how they were doing, offer advice, and provide ongoing support. This project leader also mentioned the importance of bringing school districts together to work collaboratively and this was one of the crucial benefits of the partnership. Going back to the leadership question, this project leader emphasized that one person should take the position of being in the lead, to keep everything going and organized.

Partnership 5

Project Director Interview, PEP 5

This project director experienced one of the key difficulties with developing and sustaining these partnerships directly, that is to say, the problem of participant turnover. In a somewhat unusual circumstance, this partnership project lost their project director due to changing job affiliations and while he was available to shepherd some of the grant components through despite no longer working at the schools, the partnership foundered somewhat due to personnel issues and the lack of a central person. While various meetings and events took place, the PEP project might have done a lot more if it had been able to transition the leadership to another person. This project director was very much in favor of sharing responsibilities and making it a team project but felt as if he was often the only one initiating activities and writing the grant. More time was devoted to retraining or going over initial discussed concepts than was previously thought necessary and lesson plans generated from trainings had to be refashioned when it was clear that everybody was doing something a little differently. Even more, one county that was involved in the initial planning decided to change to another system during the project. When asked about what he would change, this person suggested a "stronger" higher education partner, in terms of involvement and in depth collaboration as well as more "content" people at the planning meetings where the science was being worked out. One thing that came up was that in meetings with "content" experts for other projects, they had been astounded at the sheer amount of material (standards) that K-5 teachers were expected to cover.

In terms of leadership, he was disappointed that nobody really stepped up to fill his position, but he mentioned one teacher that really pushed and took the plan seriously. He felt like it was typical of the particular region he was in –that there was a true need for one strong voice to keep such projects going. Related to this problem, another idea or issue that came up was the inability or desire of many teachers to collaborate or team teach. As he noted, there just isn't that culture within schools – teachers are very independent.

Higher Ed Interview, PEP 5

This participant did not reflect on the changing of personnel so much as just provided a general overview that the partnership had gone well. He stated that the partnership was very informal and everyone communicated well. At one point he seemed a bit unsure who the project director was but earlier in the conversation made the point that teachers shouldn't be leaders for these sorts of partnerships since they don't have the time. He also mentioned that the superintendent for one of the main school districts involved was on the grant "in name only". He argued that

time was one of the inhibiting factors, especially when people have to travel from different counties and even states. He argued that one of the best things that came from the partnership was the development of communication between K12 and college. In addition, he thought that teachers were resistant to "thinking" and that this partnership helped to reduce this problem. As opposed to the other interviewee, this participant seemed to indicate that the partnership had gone as planned for the most part and was a success. Finally, this person finished with a plea for superintendents and principals to become involved and to take a leadership role.

Partnership 8

Project Director Interview, PEP 8

This person initiated contact with AMSP upon seeing an email inviting proposals and realized that it would be a great program to do some necessary retooling on their district. After hearing about the partnership program, he tried to get an assistant to take the lead on the program, but was unable to get him involved; but he thought it was important enough and forged ahead despite the lack of interest among some of his colleagues. He emailed teachers and attended some AMSP events with them and later decided to see if AMSP could help with raising their test scores. After attending various seminars and leadership workshops, he realized that the universities were simply not preparing teachers well to teach in sciences, particularly how to use equipment and laboratory techniques. In essence, AMSP gave him the sense at how rapidly things have advanced in terms of the technologies of schools. This director made a specific plea to have more of these type programs directed specifically at rural schools and made the point of how desperately needed they are. He also mentioned how helpful it was to have some support and guidance in writing the proposal and the whole process of getting the grant. When asked about how he would alter the goals, he suggested that he would have included even more grades so that P-12 would have a completely aligned curriculum from the "top down". One particular issue that became important for this person was the involvement of principals. He felt like these types of initiatives really needed leadership from principals and that he was not successful in getting that kind of commitment from them in this case. He also mentioned that it would have been nice to have someone there who would "be sure that it was being done," suggesting some additional support or foundational framework to guide progress. He also suggested that leadership training for principals would be a great help, so that they would "see how important this thing really was." And, he thought some help with "time management" would be essential in helping participants do these sorts of activities.

HE Partner, Interview: PEPs 8 and 9

This person started out by mentioning that his role varied greatly from partnership to partnership. In some cases, he argued, schools are looking more for a "security blanket", in other situations schools often just want to accomplish their goals, with or without a higher education person there. Ideally, he argued that the HE should be like an "expert consultant" for content knowledge who is "intimately involved". He was adamant about not being a leader in these partnership projects and felt that the leadership had to ultimately come from the school districts. In terms of some of the important ideas that he learned, he mentioned the "culture of elementary, middle or high school", to understand the environment that teachers work in. He also observed that teachers simply don't have the luxury of improving their teaching by "doing a little reading in the afternoon" because there simply isn't time and that is where the HE person can be of support.

One way he suggested to improve partnerships was to have an oversight person, someone who would call occasionally if a partnership project had not been communicating with their HE partner; this would be someone to provide an additional layer of support and follow up help to insure the partnership was working as it should. He also suggested that partnerships start out formal and then become more informal to help get things worked out from the start. When asked about what sort of additional expertise the partnerships could have used, he thought they could have used an assessment specialist. In reference to the figures describing the leadership structure (see Appendix F) of the partnership, he thought that no partnership was using Figure 3 but that most were probably following Figure 2 (in other words, they didn't have much overlap in roles as suggested by Figure 1). He commented that one of the important outcomes of the partnerships was helping teachers see that professors are human beings and are not afraid to become involved, even if it means getting down on your hands and knees to measure something. Finally, one of his suggestions concerning the overall structure of partnerships would be to have them include an HE as well as 2 districts so they could share ideas and resources with one another across schools. He also mentioned how important it is to have leadership at the district level and that teachers needed to become leaders – one of the hardest problems.

Partnership Project 9

Project Director Interview, PEP 9

This interview discussed a few problems first, such as the issue of travel time and that Lexington was very far from where the partnerships actually took place. He was interested in more face-to-face contact with the partners. The other issue that came up was that of the limitations of the grant in terms of how the funds were to be used. He was a bit discouraged by the regulations and restrictions of the grant funds and argued that it wasn't worth the effort to try to get money for their consultants as that would require too much work for little results. When asked about the kind of expertise he would have liked to have, he suggested that a "ready math expert" would be most ideal, someone who could train teachers in specialized programs like "Everyday Mathematics". In terms of his role in relation to the partnership, this leader described himself as the "initiator" or the one "that makes it happen," suggesting a more centralized or standard leadership model. Rather than "time" as the hardest part of collaborating, this person mentioned "communicating". One of the benefits this partnership brought about for this project director was to help him become less isolated and to realize that other people from other institutions can help and have tremendous resources.

Partnership Project 10

Project Director Interview, PEP 10

This project had some difficulties with getting and sustaining participation from new principals. In fact, principal turnover and transfer became a key limitation for this project but was unpredictable and inevitable. In addition, assessments for No Child Left Behind cut into a large portion of time and cut back on the activities starting right after the Christmas break. Had they had the change to do it over again, he said they would have "front loaded it" by meeting more often in the fall semester to overcome the testing in the spring semester. Another thing he mentioned was to have fewer participants – that is to say, involve fewer than 3 school districts. He remarked that the best thing about the grant money was the buying of time for the teachers to sit down, talk and reflect about their curriculum and how they assess. This partnership would have benefited with some clearer roles so as to help spread out the leadership tasks among the

leaders and could have also used more clerical or organizational support. In terms of leadership structures, this project director drew out an entirely different structure than proposed on any of the figures, suggesting another way of looking at these leadership frameworks. In her structure, the project director acted indirectly through the curriculum specialists and HE partners to influence and train teachers, suggesting more of a hierarchy or different levels. This person also remarked that the PEP project helped his professional relationships to become more "personal". He also talked about the benefits of breaking down the barriers between state officials, college professors and teachers and felt as if this was a real strength. He also noted that college professors are benefiting because they typically do not get into the classroom and it is "giving them credibility." Finally, this project director suggested that it would have been nice to have someone overlooking his progress, checking on him a providing support along the way to guide the project through rough spots as the regional coordinators just didn't have the time and there was really nobody else to reflect on the progress with.

Partnership 12

Project Director and Teacher Interview (2), PEP 12

This interview included 3 people who were instrumental to the partnership activities: 3 leaders who collaborated to form the key leadership structure of the partnership. One of the teachers emphasized how difficult it was to get teachers to collaborate but once the barriers were removed, they really enjoyed it. In particular he emphasized that it was important to tie the collaboration to the students, to let students help their teachers collaborate. The other teacher mentioned that one of the hindrances of the project was getting people to come in for training and he wanted to be responsible for training the teachers rather than have other people involved. As he suggested, it would "expedite the whole process." Related to this, the project director suggested that the project wasn't really a "buy-in" for the higher education people, suggesting that there was a lack of initiation or interest on the part of the HE partners.

He also mentioned that it is helpful if you plan in "makeup" days so that there can be a contingency plan for teachers who are unable to make sessions due to health, personal or other reasons. This person made a particular point that the paperwork of a partnership project and all the organization should really rest on one person's shoulders – that it is just too complicated or difficult to split up between 2 or more people. Along these lines, he would have liked additional help or understanding with writing the grant, as that was a difficult and time-consuming part of the process.

DATA ANALYSIS AND INTERPRETATION

Leadership Characteristics

As can be seen from Table 4, one partnership (PEP 1) stood out from the others with particularly high numbers of participants and collaborative activities. Another partnership that stood out from the others was PEP 12, who also included two teachers in the interview and the project leadership team.

Table 4 Overview of participation/collaboration

PEP	Surveys Returned	Agreed to an interview	number of leaders	goals very collaborative (survey #11)	Number Interviewed
1	58%	58%	7 or 58%	100%	5
2	42%	17%	4 or 33%	80%	1
4	0	0	no data	no data	0
5	36%	18%	2 or 18%	75%	2
6	36%	18%	2 or 18%	0%	0
8	50%	30%	3 or 30%	60%	2
9	45%	27%	4 or 36%	60%	2
10	25%	25%	2 or 25%	50%	1
11	66%	33%	2 or 66%	100%	0
12	29%	12%	3 or 18%	60%	3

A closer glimpse at survey responses to Question 11 (How would you describe the goals or activities of your AMSP partnership in terms of collaboration?) revealed additional useful information in terms of how "distributed" partnerships were (see Table 5).

Table 5 Breakdown of Survey Question 11 by PEP (How would you describe the goals or activities of your AMSP partnership in terms of collaboration?)

PEP	very collaborative	somewhat collaborative	slightly collaborative	mostly individual-based	entirely individual-based
1	100%	0	0	0	0
2	80%	20%	0	0	0
4	no surveys returned	-	-	-	-
5	75%	0	0	0	25%
6	0	100%	0	0	0
8	60%	40%	0	0	0
9	60%	20%	20%	0	0
10	50%	50%	0	0	0
11	100%	0	0	0	0
12	60%	40%	0	0	0

Table 6 provides an expanded analysis of answers to question 3 in the survey that asked respondents to identify themselves as a leader or not. The answers also included a couple of categories, "sometimes" and "not sure" to capture those who felt that their participation as a leader was more flexible, temporary, or contextual.

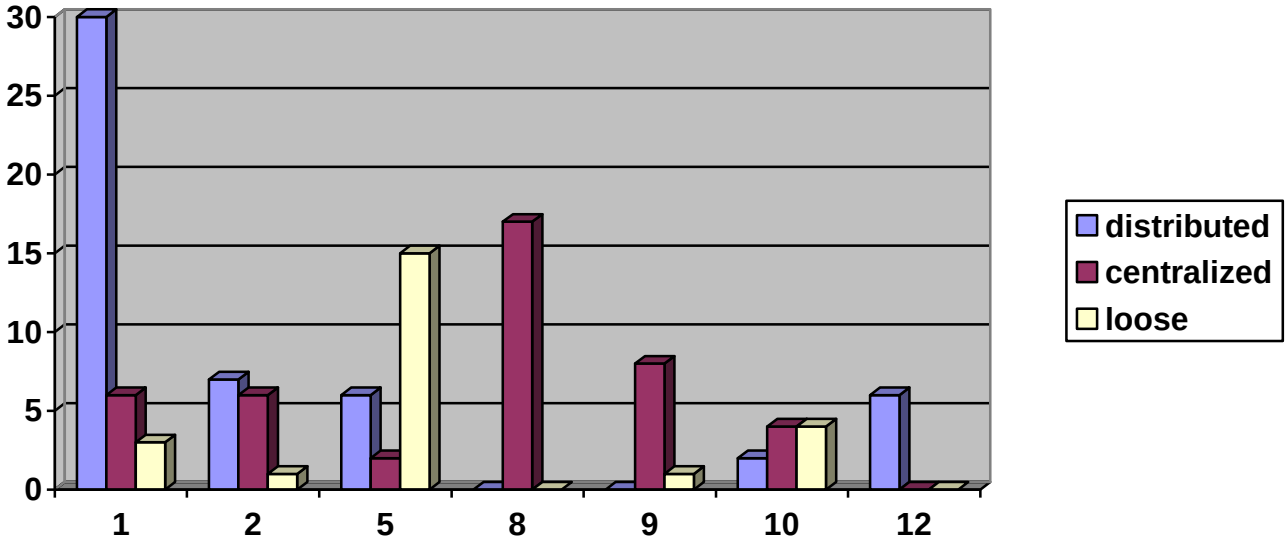
Table 6 from Survey Question 3 – Do you consider yourself one of the leaders in this partnership enhancement project? (a leader is defined broadly here to mean someone who plays an important, extended or committed role)?

PEP	yes	no	sometimes	not sure
1	71%	0	29%	0
2	60%	20%	20%	0
4	no surveys returned			
5	50%	50%	0	0
6	66%	33%	0	0
8	50%	0	25%	25%
9	75%	0	25%	0
10	50%	0	50%	0
11	100%	0	0	0
12	60%	40%	0	0

Of those who considered themselves leaders, 11 were project leaders (which included a few projects from another year), but 8 were teachers, suggesting a high sense of ownership throughout all partnerships. Interestingly, all higher education participants viewed themselves as project leaders even though most did not necessarily want to be in that role, as suggested by the interviews. People categorized as administrators were mixed on their role in the partnership with 4 saying they were a project leader, 2 saying they were not a leader, 3 saying they were sometimes and 1 wasn't sure.

Figure 16 below shows interview results visually according to their leadership characteristics as coded in terms of the three main categories: loosely coupled, distributed, and centralized. Each unit stands for a specific instance when a particular quality of leadership was discussed or mentioned. It was clear from the interviews that these partnerships contained components of all three leadership attributes to a certain degree.

Figure 16 PEP Leadership Attributes



Similar to the results in the survey, PEPs 1, 2 and 12 stood out as the most "distributed" examples of leadership. But as the graphic shows, both PEPs 1 and 2 had strong aspects of centralized structures and had particularly strong leaders. PEP 5 as had a large potential for distributed leadership, but ultimately experienced many aspects associated with a "loosely coupled" structure due to personnel turnover issues.

Partnerships 8 and 9 seemed clearly centralized as they were both run by a strong centrally focused leader who often had to work to get people motivated and the project to proceed well. Both of these partnerships experienced fairly few "loosely coupled" characteristics. In contrast, PEP 10 was both centralized and had aspects of "loose coupling" due to personnel turnover and other issues.

In terms of project leaders roles in relation to the structures, there seemed to be some indication that partnerships headed by people in administration, such as superintendents or principals tended to be more centralized. But since one of the key problems mentioned a number of times during the interviews was the involvement of administrators, in some ways, this partnership design solves that issue by the way it is structured.

Structural Conditions

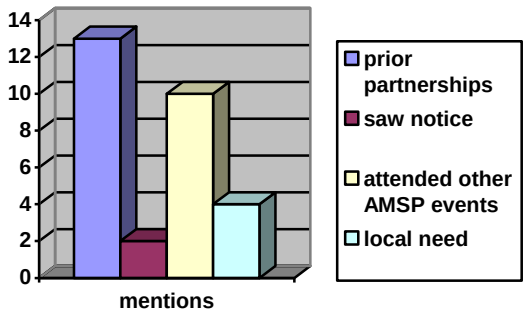
It was clear that all partnerships, while having similar attributes and goals, were very different in terms of the makeup, personnel and processes of operation. Conclusions about structural

components were difficult if not impossible to determine based on this. Even more, structural conditions were often intimately tied to leadership characteristics. For example, communication patterns were an essential component of leadership. Nevertheless, a successful "model" of partnerships is offered in the conclusions section that contains some recommendations for successful structuring of these partnerships with some caveats about context and resources. The following is a detailed discussion of each of the structural characteristics that were analyzed, with a particular emphasis on "need" as a key variable.

Goals. Interestingly, most interviewees said that they wouldn't change their goals as stated in the original proposal. But of those that did mention changes, one mentioned that they would make the goals "more comprehensive" or the idea that the project goals as written only encompassed a selection of grades and not the entire K-12 curriculum. In the future they would like to see a program that was integrated across all the different levels. Similarly, this person suggested that they would prefer to work from a "top down" model where the end goals would dictate the curriculum at the lower levels. The time issue came up over and over during the interviews. In this case, several partnerships would have included more time for teachers to come together and interact as a group. Another expressed it as a need for more time for the entire project to realize its goals.

Embeddedness. Almost all partnerships had some elements of "embeddedness" and were built upon pre-existing networks of personnel, but the manner in which each partnership evolved played a large role in terms of its leadership characteristics and how the partnership was embedded. Figure 17 provides a visual distribution of the frequency of responses for the interview question that asked about how partnerships began.

Figure 17 Ways Partnerships Became Involved



An important motivator for these partnerships included going to other AMSP events prior to the development of a PEP project and becoming inspired by the workshops and activities at these functions (see Figure 7). It appeared that the announcements and marketing strategies around all aspects of the AMSP programming helped to create a sense opportunity and that general knowledge about the program helped to pave the way for future partnership projects.

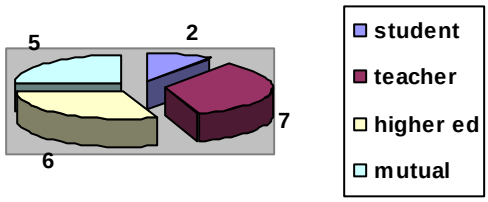
Survey question 10, which asked about whether the PEP had brought together an entirely new group of people or whether they had known each other from previous activities, revealed some interested conclusions. Of the 10% who said that their PEP was "mostly people who knew each

other from working on previous activities" all were from different partnerships: PEPs 1, 5, 6 and 8. Of the 26% who said it was an "entirely new group of people who hadn't worked together yet", 3 were from PEP 12, 2 were from PEP 8, and one each from 2, 5, 9 and 10. This suggests that new groups of people can be successful and productive, but that most PEPs had a mix of new and more experienced people. For those who knew each other previously, the most "embedded" PEPs, this was not necessarily something that made the partnership hold together or work more successfully.

Need. The most useful structural condition was the information about "need". Since one of the main goals and purposes behind these partnerships was to bridge the gap between higher education and schools, perceived need between constituents turned out to be an important indicator about the vitality and context of this linkage. For this project, need was considered in two directions. For example, the HE partner was asked about his or her need to be involved in such a project and the teachers and project directors were asked about their need for the HE partner in the project.

When asked about who got the most out of the partnership, interviewees thought that teachers and higher education professors benefited the most. Many remarked that they thought these partnerships were helpful for professors in the sense that they felt the professors were getting into the classroom and seeing the real process of schools. Notably absent was any mention of administrators and the students were often mentioned secondarily (see Figure 18).

Figure 18 Who got the most out of the partnership?



Other findings on the topic of "need" were that while higher education partners were not considered "essential" for partnerships to flourish in terms of providing content expertise, but rather teachers and school personnel saw their PEP project benefiting them in terms of improving the teacher education via the HE partner. In other words, school personnel were interested in making more connections between what is taught in higher education teacher preparation courses and what happens in schools and saw these partnerships as useful for establishing this awareness. They did not, however, view the HE Partner as an essential part of the project. Similarly, most HE partners did not express the opinion that being involved in the PEP was an essential need. Some suggested it provided an outlet for their students and preservice teachers to get additional experience and others added that they needed to be in classrooms for their research, but overall they felt it wasn't essentially a "new" or highly needed activity.

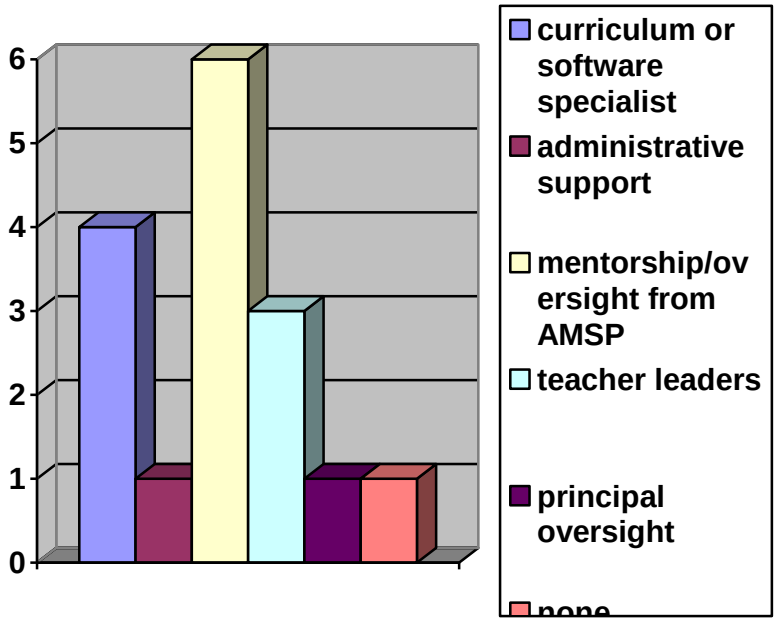
In terms of need, it was found that the administration also played a vital role in the "need" equation, in particular because many partnerships also found it difficult to get principals and superintendents involved, and some who were assigned roles in the partnership were not truly participants. The issue of time came up in almost every interview and if the administration saw more of a need for these kinds of activities, presumably there could be more time provided to help nurture teachers in these sorts of directions.

Similarly, testing and state standards are a structural condition that limited the effectiveness of these partnerships and which is related to issues around "administrative need". The priority of many schools is to get student scores raised and while many partnership projects' goals were to raise scores, activities to enhance teacher professional development are very different from direct time devoted to students practicing test taking skills. In other words, the priority becomes very pragmatic and focused on students rather than teachers in a way that can be most easily and quickly addressed, not on some long term goal of teacher and lesson improvement.

Complexity

When asked about what kind of additional expertise they would have liked to include (see Figure 12), several people specifically commented that the partnership could have benefited from another curriculum or software specialist or by participants or teachers receiving training themselves. Similarly, the core content development that the higher education professors provided was appreciated, but some interviewees remarked that the content could also be developed through other avenues, such as scientists or other specialists working in the field. As shown below, in response to a question about desired expertise, it was more often a curriculum specialist or an administrator or oversight team leader that was needed rather than additional content expertise (Figure 19).

Figure 19 What Additional Expertise Would Be Helpful (Y axis is frequency of mentions in interviews)



Finally, many partnerships expressed the idea that they could have used more oversight or coordination in terms of their overall partnership activities from the central AMSP office. Since these sorts of projects are new and add extra components to an already complex schedule for teachers, additional mentoring and direction from above would perhaps help toward facilitating the smooth running and operation of these partnerships and would provide teachers with an additional incentive to take on leadership roles. It might also have the affect of encouraging more participation from administrators.

Role Clarity

Survey question 14 asked participants about how they view their roles in the partnership (How clear are partnership roles? For example, is there a clear distinction between leaders and participants, teachers and professors, or are working roles fuzzy or blurred?) Of the 25% of survey participants who indicated that they had "very clear" roles on the partnership, 62% were from distributed partnerships and 38%were from centralized partnerships. From these results it seems as if role clarity was a strong feature of distributed partnerships overall. While this may seem counter to the idea of distributed leadership, the fact that those who had 'mostly fuzzy' or 'very fuzzy' roles, (8%) were also from distributed partnerships suggests perhaps that distributed partnerships simply allow for more role flexibility, but that clear roles are generally better.

Here the data from Question 14 on the survey about participant roles is presented with a more detailed breakdown of survey answers by PEP project. The assumption was that fuzzier roles or at least a mixture of roles would perhaps be indicative of distributed leadership. This seemed to be the case as demonstrated by PEPs 1 and 2. In other words, it appeared that a certain amount of flexibility with roles would be one hallmark of distributed leadership due to the more shared leadership patterns where roles were intertwined and interconnected. Nevertheless, it was also the case that PEPs 8 and 9 which were more centralized also had some fuzziness about the roles, although PEP 8 seemed to have clearer designations. PEP 12 was a bit surprising as it was an example of a PEP with many distributed characteristics but which also had very clear or mostly clear roles.

Table 7 Roles (Fuzzy or Clear) Survey Question #14

PEP	very clear	mostly clear	some clear, some fuzzy	mostly fuzzy	very fuzzy	no answer
1	14%		43%	14%		29%
2	20%	80%				
4	no surveys returned	-	-	-	-	-
5	25%	50%			25%	
6		100%				
8	60%	20%	20%			
9	20%	20%	60%			
10		50%	50%			
11	50%	50%				
12	40%	20%	20%	20%		

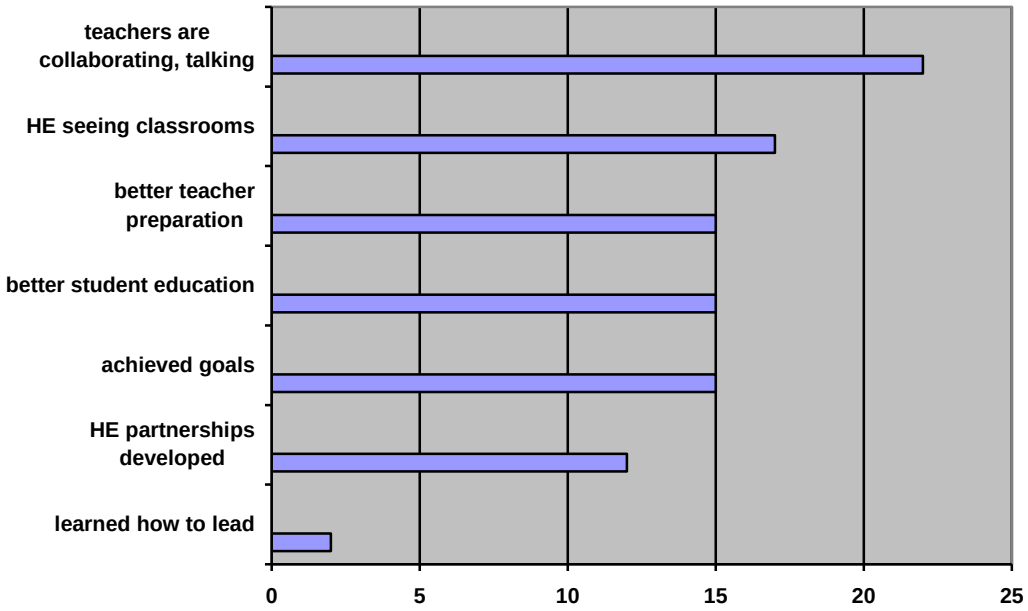
From the interviews, more often than not, higher education professors had a harder time with identifying their role in the PEP, and often expressed confusion or the idea that their role was "evolving" and hadn't been set yet. Others found themselves pressed into a role that they had not intended to fill, that is they became more leaders and less facilitators. This suggests that some of these important roles and expectations for PEPs should perhaps included clearer terms upon which to form the partnership. Fuzzy roles can be acceptable in certain circumstances when it is warranted, but when the fuzziness comes about from bad planning or lack of relationship-building, then it is a different matter.

Success Criteria

An important yet difficult issue was the overall evaluation of the partnerships or making an assessment of their progress and attained goals. Apart from the problem that teachers and district personnel were not trained in evaluation activities, one of the larger problems was defining success for these partnerships. Sustainability and networking were perhaps two of the most important indicators in this project, aside from the achievement of goals. Participation and institutional transformation were difficult to judge as the projects and activities of each partnership were so varied, thus this section focuses on goals, networking and sustainability.

Achievement of Goals. When asked about overall outcomes, participants generally felt that they had achieved their goals and had generally improved math and science education in their districts (see Figure 20).

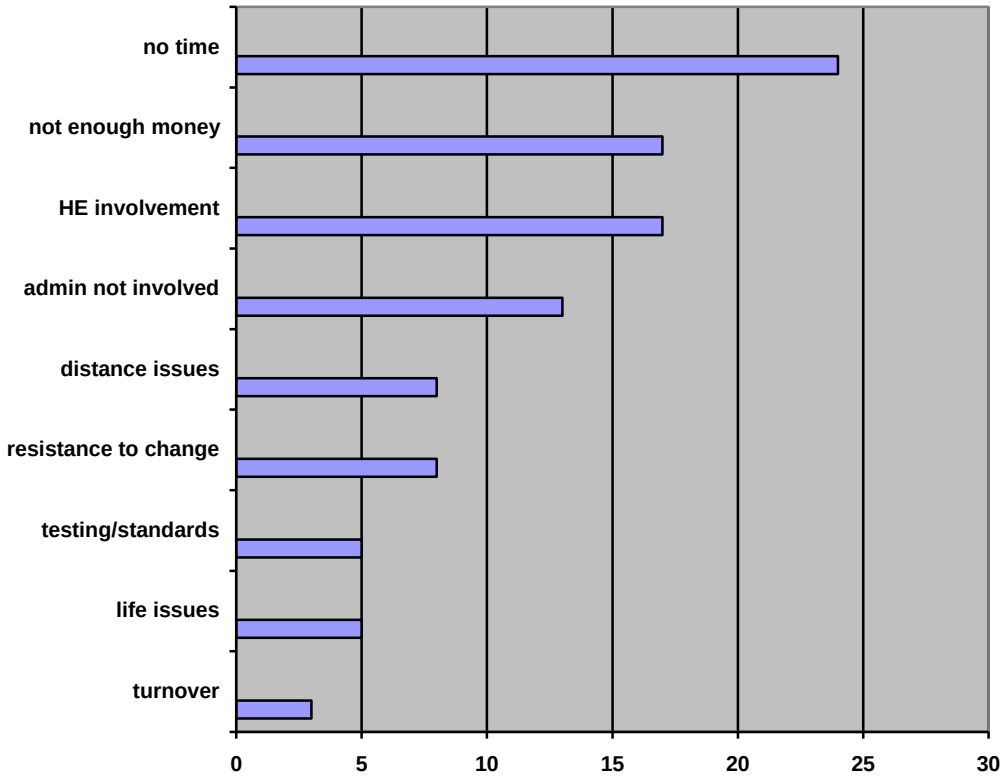
Figure 20 Interviews: Successful outcomes of PEPs



Only a few PEPs mentioned that they would change their goals, and even then, it was generally only to expand them or further work toward the same goals. Despite most PEPs feeling as if their goals were attained (as much as could be determined without test scores), many obstacles were discussed in the interviews. In particular, PEPs experience many levels of issues as they are

dealing with various institutions that operate in very different cultures. See Figure 21 for a breakdown of issues and their relative weight (number of mentions) in the interviews.

Figure 21 Interviews: Obstacles to Partnership Efforts



As Figure 21 shows, time was a huge factor for partnerships, in particular as they strove to create a process or pipeline for developing teacher leaders and establish curriculum reform. Time was the single most important factor for successful partnerships -- time to explore, brainstorm, think together and plan/coordinate the project or idea. Time management was a critical component and was discussed in terms of the writing of the grant, the paper work and administration of the project as well as the time for teachers to be off during the school year, if that was required.

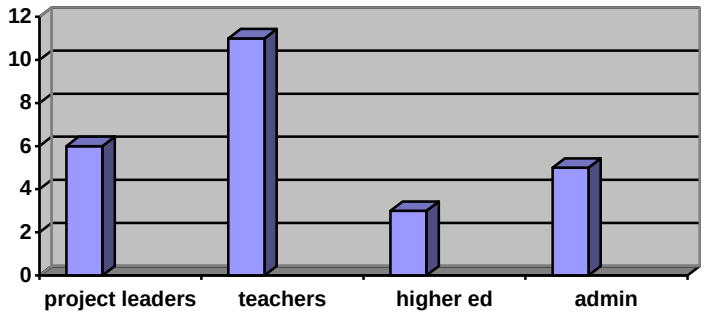
In terms of HE involvement, it was PEP participants also thought that the HE connection was difficult to make and many found it difficult to find appropriate people. Even if they were enthusiastic about collaborating with an HE, it was often inconsistent and sporadic due to the nature of HE appointments and time/geographic constraints.

Networking. One of the most significant outcomes appeared to be the collaborations among teachers and the conversations they had coming together as a working community and working toward educational reform (networking – success indicator) Most partnerships were extremely successful at this as 88% answered that they had gotten to know 3 or more people as a result of the PEP (see Figure 15).

The hardest part of networking was perhaps the university-school link and for K12 personnel to know how to establish such a relationship with a college professor. Other than regional coordinators, who were extremely valuable for setting these connections up, there was no informal or more natural manner of meeting with HE professors so that real working relationships could be fostered.

Sustainability. In terms of sustainability, of those who answered that they would consider being a project leader for a future project, (i.e., answered "yes" to question 9 in the survey), 44% were teachers, and 24% were project directors (see Figure 22).

Figure 22 Role Break down of Survey question 9 -Those Who Would Consider Being a Future Project Leader



Of the teachers who would agree to consider being a future project leader, 66% were in distributed partnerships and 33% were in centralized partnerships. Taken together, of all survey participants who answered 'yes' to the above question, 71% were from distributed partnerships and 29% were from centralized partnerships.

When asked about plans for the future, most partnerships had some sort of plans in the works. Several PEPs had already put together and submitted another grant. (see Appendix A). In particular, PEPs 1, 2, 8, 10, 6 received funding for future years and PEPs 1, 2, and 8 received funding for two more rounds of partnership activities.

In terms of sustainability or plans for future activities, individuals in the survey most often wanted to continue plans and develop further. A few were not sure, however, overall, whether centralized or more distributed, partnerships were being sustained at some level, no matter the leadership structure (see Table 8).

Table 8 Survey Question 8 Do you have plans to be involved in any other future AMSP activities?

PEP	yes	no	maybe	not sure	no answer
1	7/7				
2	5/5				
4	no surveys returned				
5	2/4		1/4	1/4	
6	1/3		2/3		
8	4/5				1/5
9	3/4		1/4		
10	2/2				
11	2/2				
12	3/5		2/5		

CONCLUSION

Both centralized and distributed paradigms provided successful models of partnership activities, but the distributed pattern appeared to provide more opportunities for teachers to become leaders and promoted more of a shared commitment to establishing teacher networks. Participant structures that involved 2 or fewer districts seemed more successful as did those that were working on a very specifically focused issue. A certain amount of role clarity seemed especially important, particularly for the HE partner and the new relationships that were formed. Need was a predominant issue in relation to the HE partner as was time.

Overall, leadership patterns mattered to a certain extent in terms of the success of the partnerships, but so many other variables and issues with the complex nature of these partnerships became apparent that the leadership structures were somewhat small compared to the larger organizational issues.

First was the problem of assessment and the measuring of "success". It seemed as if there was too much pressure to define success in terms of student gains and test scores, particularly in terms of state tests. If professional development was the goal, then that would be best evaluated in terms of how effective that particular program was. Similarly, if curriculum development was the goal of the PEP, then evaluation should strongly emphasize the development of a product in a timely fashion. Evaluating student achievement at the beginning of an overall curriculum reform is not an accurate measure and in fact works against such partnership goals. In other words, a large problem for evaluating these PEP grants was an evaluation plan that was disconnected from specific project goals and activities and attached to a very long term reform change – that of raising student scores. Typically, educational research suggests that student scores on standardized tests only go so far in measuring the complicated processes and systems that exist in schools today.

Another complementary strand to these partnerships might be to work with HE institutions to provide more of a mechanism or outlet for these partnerships – to enable buyout salary time or another form of time compensation. Along these lines, it would be very beneficial to make the connection with the HE partner easier and more natural as many felt that this aspect of the partnership, although a crucial part, seemed forced. One way to do this might be to have more coordinator administrators assigned to partnerships (as regional coordinators often are overworked) who could work closely with PEPs to develop relationships and connections with community colleges or other smaller liberal arts colleges closer to the school districts. This way, geography and travel time would be much less of a factor. Also, these coordinators could help with taking over some of the paperwork burden and could show support and resources for filling out final reports, assessing, grant writing and other skills necessary to make the partnership work as an externally funded activity.

Along these lines it would be also good to consider moving away slight from a traditional grant structure, to something more process-oriented and K12-friendly. The writing of the grant was a daunting talk and one in which many were not prepared for. The extra proposal writing seminars helped, as did the specific proposal review services offered, but more could be done with writing instructions and providing samples and details for potential participants. Older awardees or

projects could be posted and highlighted as is typical on grant websites to give a sense of the scope of the award and the type of activities that were fundable. Going in further in this direction, perhaps the proposal should be less like a typical proposal at the outset so that too many scarce resources were not overused for a proposal that might not eventually be fundable.

Limitations of Study

Given this very small study, it is clear that conclusions must be drawn carefully in order to not over generalize from such a small sample. Other limitations were the nature of the PEPs as locally driven. Despite this being a strength of the AMSP program, it made researching these different structures difficult and there was really no useful comparison method. A future set of studies should be undertaken to develop a bigger sample, and one that focuses more on one specific success criteria might be helpful. Furthermore, more in-depth participant observation studies would be ideal for investigating the processes and procedures of individual PEPs.

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Appendix A

Summary of Partnership Characteristics

Partnership	partners	number of teacher participants	Program Accountability	# Project personnel	geographic or cultural conditions	Project History	Nature of PEP	Future Plans
#1	1 district (1 middle school), regional coordinator, 1 HEs	6 (1 math and 1 science teacher per grade 6-8)	1	11 (includes 6 teachers)	rural central TN, but close to city and national science lab	Already engaged in project for 3 years; grant will provide partial support	Curriculum development and evaluation; science and math literacy, grand lessons	replicate for 3 other middle schools in district received Round 3 and 4 funds
#2	2 school districts (9 elementary schools), 3 HEs	30 (grades 3-5), 2-4 per school	1	12	SE rural, mountainous KY	previous ARSI and AMSP involvement for middle and high school math	Professional development; math content knowledge for NCLB standards	train trainers; obtained Round 3 and 4 funding to expand program
#5	4 school districts (2-3 grades per district), 1 HE	40 (K-9)	1	11	north central rural TN	Previous support from ARSI for partnership efforts	Curriculum development; and teacher training for life sciences	train trainers
#8	2 districts, 1 HE	22 middle school and high school	2	10	NE rural mountainous KY		Curriculum development; and teacher training for math	Received Round 3 and 4 funding
#9	1 district, 2 HEs	150 (K-5)	1	12	South Central rura KY		Curriculum development; and teacher training for math	
#10	3 districts (4 elementary schools), 1 HE	40	2	8	Central KY	Had round 1 funding for another PEP	Curriculum development and assessment development; science	Received Round 3 funding
#12	4 districts (2 middle, 1 elementary and 5 high schools, 1HE	13 (1-2 per school)	3 (includes 2 teachers)	17 (includes 12 teachers)	SE rural mountainous KY	Ongoing project	Professional development; environmental science	
#6	1 district (5 schools elementary, middle and high school), 2 HEs	10	1	11 (includes 2 teachers)	Central KY		Professional development; math	Received Round 3 funding
#4	1 district (1 elementary, one high school), 2 HEs	7 (grades 4-12)	?? no designated person	7	E Central KY		Professional development; math	
#11	1 district, 12 undergraduates, 1 HE	12 (grades 5-12)	1	3	West VA		Professional development; math and science	

Appendix B

Structural Characteristics

Embeddedness – the extent to which partnerships have already formed significant prior working relationships that are the basis of the present partnership. Kingsley notes that embeddedness must be further divided into positive and negative types to differentiate those partnership where embeddedness actually works against the partnership.

Need – the congruence or complementary of partner constituency needs. This measures the reciprocity of the partnership constituencies and the degree to which all partnership components and sub groups will derive adequate benefits from the partnership with equal costs.

Goals/Scope – goals may be either broad and ambiguous or narrowly focused

Communication – this refers to the general relationships and agreements as accomplished through formal or informal means

Complexity – this variable describes the degree to which many different partners, content areas, specialists and geographical regions are involved.

Appendix C

Table 3. Success Indicators

#1 Partnership achievement - achieved benchmarks or goals of specific project
#2 Institutional support/growth/sustainability - achieved a major policy revision or significant school-wide effect undocumented by project benchmarks; supported partnership activities
#3 Sustainability Created informal or formal plan for future activities; sought out external funding
#4 Participation High participation in partnership activities
#5 Networking Created informal and formal working relationships across institutional boundaries

Indicator #1 **Partnership achievement** - This indicator will probe the extent to which partnerships achieved their goals and how individual partnerships defined this achievement. This indicator is also about how well project leaders and other personnel were able to conceptualize realistic goals and will ascertain the extent to which obstacles and other limitations prohibited the attainment of partnership goals.

Indicator #2 **Institutional support/growth/sustainability** - A major policy revision or school-wide effect refers to the extent to which partnerships create deep embedded change within their school system or institution. For instance, if math and science partnerships engender an interest in developing small learning communities and schools develop a plan out of the partnership to create such changes, then the partnership can be said to have had an important school-wide impact. Furthermore, this indicator will provide additional data on the level of institutional support that was provided to the partnership, including any additional funding, supplies, release time, etc.

Indicator #3 **Sustainability** refers to those activities that might be informally or formally agreed upon that certain additional activities stemming from present partnership activities might be necessary and desirable. Additional activities can simply be a part of ongoing planning or an oral agreement, or part of a more extensive plan that has already been acted upon. This indicator also reveals whether or not partnerships have actually taken steps to secure additional funding or whether partnerships are in the process of planning for additional funding for partnership-related math and science education activities. It also measures the extent to which participants are willing to be involved in similar future or related activities.

Indicator #4 **Participation** will be derived from levels of participation in professional development activities and other partnership events.

Indicator #5 **Networking** is an assessment of relationships between partnership participants and the extent to which relationships between personnel from different institutions were formed. In many cases, geography may restrict the informal relationships that might develop; however, this indicator will probe the nature of partnership relationships with the idea that informal “friendly’ productive relationships across institutions are a large part of the initiative for sustainable partnership activities.

Appendix D

Email Survey

Section 1: Leadership

1. Are you involved in any other AMSP activities besides the Partnership Enhancement Project?
__many
__Some
__not many
__none
__not sure

2. How many new people have you gotten to know as a result of this AMSP partnership enhancement project?
__one person
__two people
__three or more
__none

3. Do you consider yourself one of the leaders in this partnership enhancement project? (a leader is defined broadly here to mean someone who plays an important, extended or committed role)
__yes
__no
__sometimes
__not sure

4. How often do you take a leadership role in your school?
__very often
__often
__sometimes
__rarely
__very rarely
__never

5. How often do you take a leadership role in your community? (this could be a church community, local government, special interest clubs/groups, etc.)
__very often
__often
__sometimes
__rarely
__very rarely
__never

6. How extensive is your collaborative experience in relation to school activities? (team-teaching, committee/group work, etc.)
__very extensive
__extensive
__some experience
__not extensive
__non-existent

7. How extensive are your "boundary-crossing" career experiences? (For instance, if you are a teacher, have you worked in another industry before? If you are a professor, have you ever been a K12 teacher before, etc.)
__very extensive
__extensive
__some experience
__not extensive
__non-existent

8. Do you have plans to be involved in any other future AMSP activities?
__yes
__no
__maybe
__not sure

9. Would you consider being a project leader in a future partnership enhancement project?
__yes
__no
__maybe
__not sure

Section 2: Partnership conditions:
10. Would you say this partnership enhancement project brought together people who were:
__an entirely new group of people who hadn't worked together yet
__some new, some old
__mostly people who knew each other from working on previous activities

11. How would you describe the goals or activities of your AMSP partnership in terms of collaboration? (collaboration means the degree to which goals or activities required or fostered social interaction and working together)
__very collaborative
__somewhat collaborative
__slightly collaborative
__mostly individual-based
__entirely individual-based

12. How would you rate the need or utility of this partnership enhancement project for your higher education partner or faculty outreach member?
__very needed
__some need
__not really needed
__very unnecessary

13. How formal are partnership agreements or decisions? (formal means clearly written notifications, planned meetings, committees, reports, due dates, assignments)
__very formal
__formal
__somewhere in between formal and informal
__informal
__very informal

14. How clear are partnership roles? (For example, is there a clear distinction between leaders and participants, teachers and professors, or are working roles fuzzy or blurred?)
__very clear roles
__mostly clear roles
__some clear-some fuzzy
__mostly fuzzy roles
__very fuzzy roles

15. Would you say your partnership involves:
__many different kinds of participants and organizations
__some variation in participants and organizations
__not many different kinds of participants and organizations

16. Can I call or email you for further clarification/information on this partnership enhancement project? (If you agree, I would like to schedule a face-to-face in-depth interview at your convenience that would take approximately 45-60 minutes.)
__yes
__no
__maybe
__not sure

Appendix E

Structured Interview Instrument

Part I-*General Partnership Overview: Characteristics, Structure and Conditions*

[Embededness]

- 1a. Describe the evolution of your partnership? How did it start? How did the idea come about? How did you recruit participants?
- 1 b.Do you think past collaborative or partnership experiences, or the lack of them, have hurt or helped your partnership?

[goals - scope]

- 2. What would you change, if anything, about the goals of your partnership?

[need]

- 3a. Who do you think got the most out of the partnership? (What group(s) of people?)
- 3b. Did you feel as if higher education partners were also benefiting from this partnership? In what ways did they benefit?

[communication]

- 4. Would you characterize your partnership as formal or informal? (provide some examples of how agreements were communicated or decided upon)

[complexity]

- 5a. If you could have added a certain kind of expertise to the partnership, what would it be?
- 5b. Of these diagrams of partnerships in relation to leadership (see attached diagrams) which is the closest structure that resembles your partnership? (or draw your own model)

Part II – *Leadership Attributes*

- 6a. Describe your role in this partnership.
- 6b. In what ways, if any, were you a leader in this project? (If you described yourself as a leader, what is your leadership style? Were there other leaders? What were their roles?
- 6c. Are their experiences in your background that you think were particularly valuable in terms of this partnership?
- 6d. What was the hardest part of collaborating in this partnership?
- 6e. In terms of your personal growth as a professional, what was the most important learning experience for you as a professional from working with this PEP?

Part III - *Success Data*

General Success Questions:

- 7a. What were the positive outcomes of these partnerships?
- 7b. How would you measure success in these partnerships?
- 7c. Has the partnership changed the way you teach or conduct research?
- 7d. Is there anything unique about Eastern KY that makes partnerships work or not work?

(Indicator #1 goals/achievement)

- 8a. What obstacles, if any, did the partnership encounter in achieving its goals?
- 8b. What do you think would have helped your partnership attain its goals?

(Indicator #2 – institutional transformation)

- 9a. How does your institution support your involvement in this partnership? (release time? Cost sharing? Service recognition? Tenure?)
- 9b. What kind of institutional changes have occurred, if any, as a result of your partnership?

(Indicator #3 - sustainability)

- 10a. What activities or other events have been planned (either formally or informally) to continue the efforts of the partnership?
- 10b. Have any other grants or funding been pursued?
- 10c. Would you agree to being involved in another partnership like this?

(Indicator #4 – participation)

- 11a. About how many people were actively participating in partnership activities?
- 11b. What recommendations do you have for improving participation in partnership activities?

(Indicator #5 - networking)

- 12a. Describe any important or productive relationships that have developed from this partnership.
- 12b. Have your partnership experiences changed the way you view others from different institutions? (describe how)
- 12c. Would you say you have developed any new friends from this partnership?
- 12d. Was there anything about this collection of people and experiences that did not work especially well?
- 12e. Was there anything about this collection of people and experiences that worked particularly well?

(Conclusion)

- 13. Is there anything else that I should know about your partnership that would be important to consider in improving partnership outcomes in relation to leadership?

Appendix F

Figure 1. Distributed Leadership, Example A

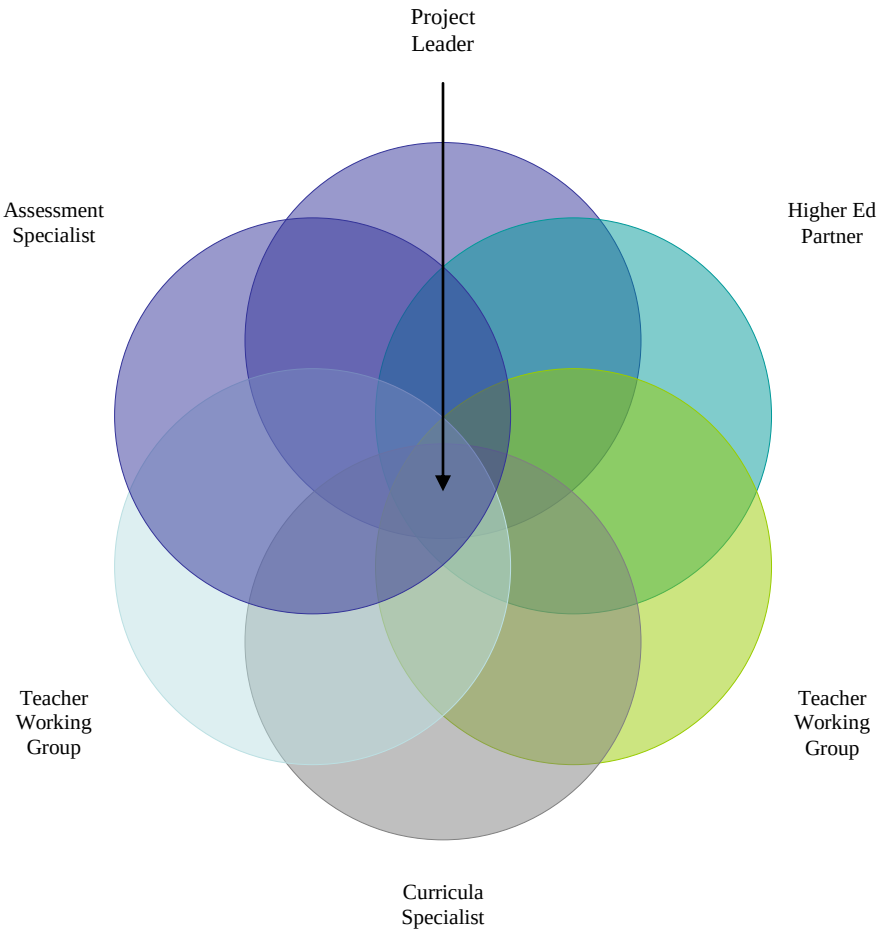


Figure 2. Centralized Leadership

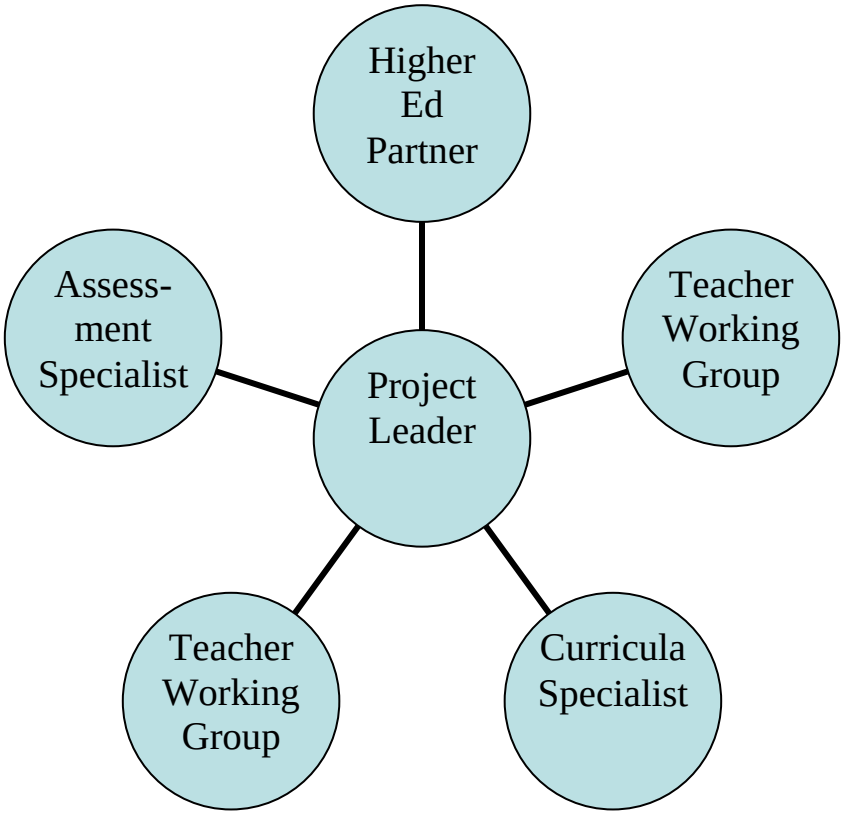


Figure 3. Distributed Leadership, Example B

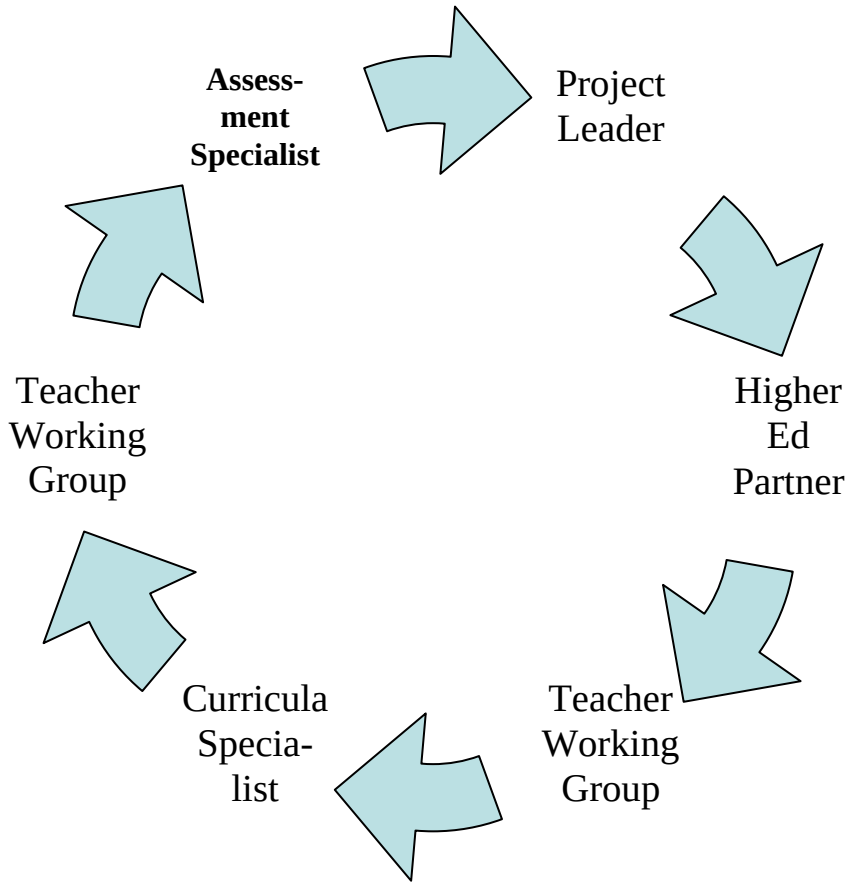
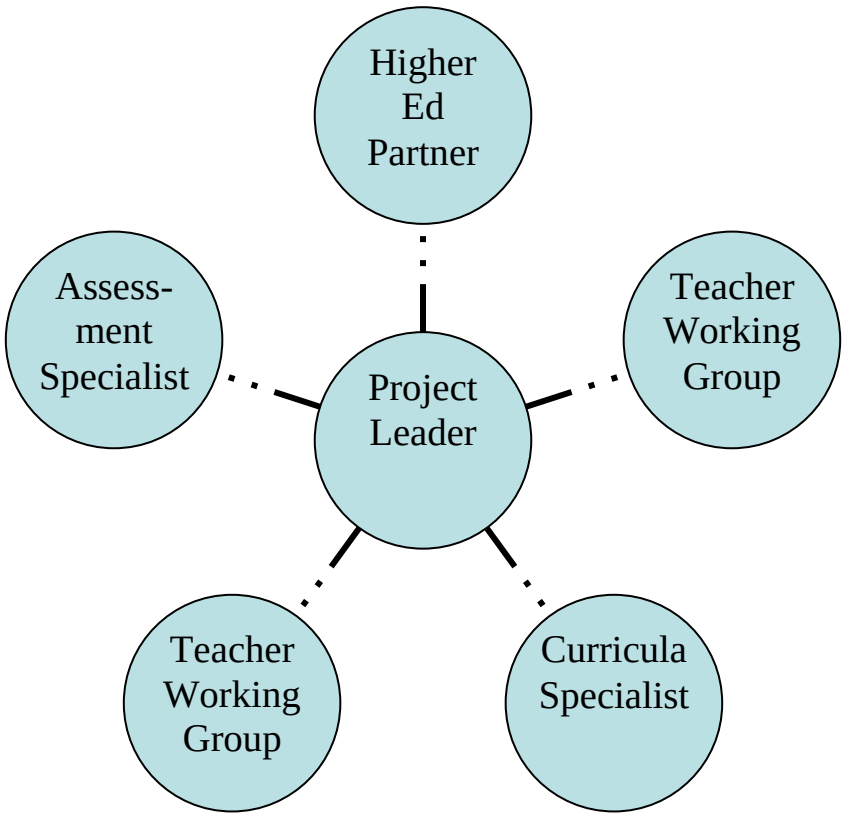


Figure 4 Loose Coupling



Appendix G
Coding Scheme - Leadership Characteristics

Data coding of the interviews took into account leadership characteristics in terms of the following 6 coding criteria (see below).

Leadership Coding Criteria:

- ownership/authority
- risk taking, experimentation
- collaboration
- communication
- organization or role clarity
- environment or distraction management

Using these above six categories as the principal components of our definition of leadership, the data from interviews of the seven participating PEPs were analyzed and coded to determine their predominant leadership characteristics.

The following tables illustrate how leadership characteristics were defined in relation to the three categories of assignment: distributed, loosely coupled and centralized.

Table 1 Distributed Leadership Coding Criteria

Distributed Leadership Coding Criteria	
ownership/authority	high degree of ownership by non leaders/leader plays down his or her role
risk taking, experimentation	sufficient experimentation and risk taking
collaboration	high levels of interconnected and voluntary collaboration
communication	communication is frequent, rich (from both leaders and followers)
organization or role clarity	clear organization but overlapping roles
environment or distraction management	distractions are minimized due to strong networks and cooperative participation strategies

Table 2 Loosely Coupled Leadership Criteria Characteristics

Loosely Coupled Leadership Coding Criteria	
ownership/authority	not one clear leader or set of leaders
risk taking, experimentation	risk taking is extreme, no oversight
collaboration	collaborations are sporadic and disorganized
communication	communication is confused and infrequent (from both leaders and followers)
organization or role clarity	no clear organization, no overlapping of roles,

	factionalization (egg carton analogy)
environment or distraction management	high level of unmanaged or unmanageable distractions (e.g., turnover, testing)

Table3 Centralized Leadership Criteria Characteristics

Centralized Leadership Coding Criteria	
ownership/authority	one/few person making all decisions, initiating action
risk taking, experimentation	minimal risk taking or experimentation
collaboration	collaboration is minimal and prescribed
communication	communication is infrequent and mostly top down
organization or role clarity	clear organization and leader/follower roles
environment or distraction management	distractions are minimized by leader/authority

Appendix H
Coding Scheme – Structural Conditions

Structural Conditions. As a way to analyze the key structural conditions of the partnerships, interviews covered questions about the evolution of the partnership, how different people got involved and what their motivations were (see six categories below).

- Embeddedness – the extent to which partnerships were already formed within pre-existing relationships and partnership structures and the nature of how they evolved.
    a. not embedded
    b. embedded
    c. saw notice about it
    d. evolved by going to AMSP other events
    e. evolved from a local need and organization

- Need – the degree to which all partnership participants derived benefits from the partnership. For this study, particular emphasis was paid to the need for the higher education partner and the benefits HE partners received.
    a. students benefited
    b. teachers benefited
    c. HE partner benefited
    d. mutual needs were met
    e. HE partner did not benefit
    f. schools did not benefit from HE partner

- Goals – whether goals were perceived as adequate or required a change in focus. Analysis of this characteristic was supplemented with written material from project proposals to further analyze the scope of the work proposed and the nature of the overall objectives.
    a. goals were adequate and successful
    b. goals needed to change
        1. have fewer participants
        2. be more comprehensive (all grades)
        3. be top down (ends dictating the means)
        4. allow for more planning and implementation time
        5. other

- Communication – the degree to which communications and resolutions were formal or informal
    a. formal
    b. informal
    c. both formal and informal

- Complexity –Due to research design constraints, this structural condition was simplified to a question concerning the desirability of additional expertise. Interviews focused on what additional personnel they would have liked to add to the project, if any.
    a. curriculum specialist (software or program)

b. more administrative support
c. more oversight/mentorship/assessment from AMSP
d. more teacher leaders
e. more money/programs
f. more oversight from principals
g. none
h. content specialist

Appendix I
Coding Scheme – Success Indicators

Success Indicators. The third part of the interview dealt with general outcomes as well as key limitations or future considerations. Success indicators are listed below and interviews were coded and analyzed according to these criteria.

General Success or Outcomes - identifies general accomplishments and obstacles

a. achieved goals
b. better student education
c. better teacher preparation
d. better atmosphere
e. learned how to lead
f. higher ed partnership developed
g. higher ed partner is seeing the inside of a classroom, learning how real classrooms work
h. teachers are collaborating/talking to each other
i. integration of curriculum
j. development of teacher leadership

General Obstacles

a. no time
b. testing
c. principals/superintendents not involved
d. not enough money
e. distance/travel issues
f. life issues/health
g. higher ed involvement
h. resistance to change
i. turnover
j. AMSP involvement/grant issues
k. state standards

#2 Institutional transformation – extent to which institutions supported projects and changed as a result of project

a. cost sharing
b. overall encouragement and support
c. creation of new support roles
d. new awareness

#3 Sustainability – extent to which project will be continued in some form or to which the project encouraged additional programs

a. other grants
b. district programs
c. other programs/partnerships
d. continuation or expansion of same program

#4 participation – the level of "buy-in" and the reach of the program (Participation was particularly difficult to assess in relation to other partnerships due to the tremendous structural differences among partnerships and so was omitted from the overall evaluation.)

#5 networking/community – the extent to which the project solidified partnerships or built new collaborations

a. cementing of working relationships
b. development of a working community
c. colleagues become friends
d. developed HE relationships