# Emerging Conceptions of Effective K-12-Higher Education Partnerships

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## Introduction

### *Partnerships in education reform*

The relationships between universities and schools have become a prominent feature of the educational reform landscape. In the last decade, many universities and schools have created partnerships intended to improve teaching and research in the schools and universities (Teitel, 1994). Research supports the idea that sustainable progress towards a vision of education reform and systemic change can best be made through comprehensive partnerships. In the reform setting, each stakeholder within the partnership has unique needs and vested interests that can motivate – or discourage – participation. Each has specific roles defined by the resources that they can offer and the needs they have. In a successful partnership, all of these stakeholders develop a common vision of what they hope to achieve through working together. Unified by that vision, each partner is motivated to leverage resources to address individual needs, while also serving the needs of the partnership as a whole.

In the case of the NSF-funded Math and Science Partnerships (MSPs), K-12 schools and institutions of higher education are the critical partnering organizations. Specifically, K12 teachers and higher education disciplinary science or mathematics faculty are the central stakeholders called to develop and implement activities to effect deep, lasting improvement in mathematics and science education. Although "partnership" is a central feature of the MSPs, it is surprisingly complex to define. The existing theoretical research base offers some insight into

critical characteristics of educational partnerships, including: (1) trust; (2) shared goals or mutual contribution of each others' goals; (3) mutual respect; (4) communication; and (5) common vision of teaching and learning. Three perspectives on these characteristics of partnerships and their potential role in fostering individual and organizational change provide a useful framework for examining the emerging partnerships formed in the MSPs.

Goodlad (1994) argued that if schools of education change their preparation of teachers without concurrent and comparable change in the schools, the effects will not last. On the other hand, if changes are made in the schools without comparable changes in the universities, the effects will be diminished. Changes in both must be made simultaneously and collaboratively. Much of this work has direct parallels with the partnerships funded by NSF. In both models, partnerships must: a) have clear purpose, b) have administrative support, c) facilitate trust, d) have avenues for communication, e) be built on mutual respect and, f) meet the needs of both groups (Essex, 2001). In the case of the MSPs, the partnerships often extend beyond university and school partners to include local area education agencies, science museums, state curriculum leaders and others. The university partners also focus on content faculty rather than just education faculty. The inclusion of multiple partners from diverse institutions, and the fact that these partners have had few prior interactions may make MSPs more complicated than traditional models of school-university partnerships.

Shared work between universities and schools represents just one form of partnership. Kingsley and Waschak (2005) assert that of all the models of partnership, education shares most in common with other public sector partnerships. Educational partnerships support a shared vision of how people learn that helps to shape teaching, includes cross-institutional support, and focuses on participant networks that address partnership goals and needs. These partnerships

extend beyond a structure and have become a central part of the reform movement. MSPs and other partnerships for reform are, "A form of inter-organizational relationship where the participants engage in reciprocal patterns of communication for the purposes of identifying shared vulnerabilities, developing shared goals, and a shared understanding of how they will pursue and achieve these goals" (Kingsley, 2002).

Still another perspective suggests that successful systemic reform initiatives more closely resemble social networks than linear, and often hierarchical, organizational partnerships (Reeves, 2006). In this model, trusting relationships among colleagues are central to initiating and maintaining change. Indeed, perpetuating the intended changes happens though "a distinctly nonlinear communication path of nodes, hubs, and superhubs." A node is any individual within the partnering organizations. A hub is a node with multiple connections to other nodes. Within a school, a hub might be a department chair or grade-level leader or a principal. A superhub is the rare node in a network to which an exceptionally large number of other nodes and hubs are connected. In many schools or universities this is not necessarily a person with positional leadership, but rather the one to whom colleagues go for advice. Successful partnerships identify these superhubs, leverage their potential, and cultivate more and increasingly complex connections among nodes, hubs, and superhubs. These partnerships build on peer-to-peer networks and establish structures for collaboration and networking. Through such networking, the intended reforms are extended.

Despite their popularity, educational partnerships remain a largely untested idea. They are based on a logical, though unproven, assumption that partners have mutual needs and goals to which both partners can contribute. There is little empirical data to validate that the characteristics described in the theoretical models correlate with those achieved by systemic

reform efforts. The lack of empirical data also means there is little research describing what is needed to establish authentic partnerships between and among K12 teachers and higher education faculty or their impact on the individuals and their institutions.

***Research Context and Question***

The North Cascades and Olympic Science Partnership is an MSP located in the northwest corner of Washington State. NCOSP includes five higher education institutions, including four two-year colleges, and 28 school districts distributed over a large geographic area. At the core of this partnership are 150 Teacher Leaders, one from each school in the 28 participating districts and 25 disciplinary science faculty from the five institutions of higher education. Each year, six Teacher Leaders are chosen (two from each geographic area) to take a leave of absence from the classrooms and serve full-time on the grant as Teachers on Special Assignment (TOSAs). The primary goal of the partnership is to improve learning in science at all levels. NCOSP is focused on engaging disciplinary science faculty and K12 teachers in collaboratively exploring new approaches to teaching science courses that address meaningful and relevant content, making explicit connections to research on the development of student thinking, and implementing instructional practices consistent with research on how people learn.

As a Math and Science Partnership, NCOSP is committed to designing a partnership that contributes to systemic reform of science education in the region. Because of the potential importance of the partnership itself in this work, considerable effort has been spent analyzing existing research on educational partnerships and emerging NCOSP data relative to the findings reported in the literature. Here we describe the attributes of a developing K12-Higher Education partnership, identify the actions that contributed to its development, and define the impact of the partnership on the participating Higher Education faculty and Teacher Leaders. Our evidence

suggests that stakeholders from both K12 and higher education recognize and describe a common set of attributes central to the partnership with some consensus on how those attributes were developed. In addition, the data suggests that the partnership includes a series of "sub-networks" that function in semi-independence of other sub-networks that coexist within the partnership as a whole.

## Data Collection and Methods

Since many current topics in teacher education research involve the reform of complex organizational relationships and contextual factors, case study research has become a prominent method (Yee & Yarger, 1996). The issues and organizational relationships of this study suggested the use of a case study approach. Yin (1989) defined a case study as "an empirical inquiry that: investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (p. 23). Since this study involves a contemporary multi-organization school partnership with many individuals (teachers, administrators, undergraduates, university faculty, and others) who represented several institutions, we employed case study methodology.

### *Sources of Evidence*

Since this research is within the context of a Math Science Partnership, we had access to extensive data sets. These data sets were collected for a variety of evaluation purposes, only one of which directly addresses the description and evaluation of our partnership. Even though some of the data were collected for other explicit purposes, much addresses either directly or indirectly, aspects of the health, growth and maintenance of the partnership.

Multiple lines and points of evidence were used. A number of different people were interviewed. These included teachers on special assignment (TOSAs), teacher leaders, principals, and community college and university faculty. They were interviewed once or twice at different points within the project. The TOSAs also participated in focus groups. Both the interviews and focus groups were conducted by members of the evaluation team.

A variety of different documents were examined. These included the grant proposal, annual reports, and special reports and summaries of data such as surveys completed at different points. These materials were approached according to the process described in the next section.

***Data analysis and quality assurance***

Our data are exclusively qualitative. While we had some preliminary constructs of the features of a partnership, the constructs had to be tested with the option of identifying new ideas and constructs. For that reason we employed the processes of grounded theory (Strauss and Corbin, 1998). The research questions and propositions suggested the construction of categories in the process of "selective coding" (Lee, 1999). First, we segregated the information by group: TOSAs, university faculty, community college faculty, or Teacher Leaders. The TOSAs and Teacher Leaders were also disaggregated into regional groups (there are three distinct geographic regions within this project: Whatcom County, Skagit County, and the Olympic Peninsula). Second, we read through the surveys, interview transcripts, focus group transcripts, and other documents. As we read through the material, we coded the relevant information into initial categories suggested by the data. After we had categorized all of the relevant data, we went through each group (Teacher Leader, TOSA, community college or university faculty) in order to identify any patterns or themes, or contraindications.

Validity was an important consideration in a study of such complex issues. We maximized validity by establishing clear research questions, propositions, and logical inferences. A systematic effort was made to identify the types of evidence to be studied. Evidence from a reading of the relevant literature provided suggestions about the types of evidence to expect. As the documents and transcriptions were read new lines of evidence became apparent. At each of these times, we established the logical connection of the data to the category. Validity was also strengthened through the use of multiple data sets and sources. Data came from a host of documents, focus groups, and interviews. In addition, these sets of data were shaped by many different people -- from the authors of documents to the focus group facilitators, and interviewers. Each of these lines of evidence was used to check the consistency of the data. Finally, some members read a draft and were asked to make comments on the validity of our interpretations. They verified the details of our logic and interpretation. Reliability was maximized through maintaining clear records with a thorough description of how they were analyzed.

This type of research project involved several difficulties. The fact that many of the people discussed in this study are colleagues injected a need to be both honest and diplomatic. Other studies of education have reported similar conflicts and may have led some researchers to emphasize the positive (Yee & Yarger, 1996). One feature that served as a check is the fact that much of the data were collected and summarized by the evaluation team, not by us. If participants' comments to the leader of the focus group, who is someone unknown to them, corresponded closely to other sources of information, then it can be assumed that the information is accurate. There was still the danger that participants would be cautious with the evaluation

team as well since it is part of the project. Given the structure of the project evaluation and this research project, however, this was unavoidable.

## Analysis

### *Partnership attributes*

During the third year of the partnership, 132 Teacher Leaders and 23 Higher Education faculty were asked to describe the characteristics or attributes of NCOSP. The surveys were analyzed and the results validated and refined through interviews with 12 Teacher Leaders and 5 Higher Education faculty. The attributes identified included: (1) focus on shared vision; (2) shared knowledge grounded in research; (3) safe learning environment; (4) distributed leadership; and (5) respectful relationships. Significantly, these attributes were consistently described regardless of grade level (elementary, middle, high), institution (K12 school, two year college, or four year university) or geographic region (Whatcom County, Skagit County, Olympic Peninsula).

*Focus on shared vision*

Participants described the partnership as having a shared vision or a common philosophy. In interviews, the vision was commonly articulated as "improving teaching and learning in science". Though this broad statement may have different meanings for different participants, what seemed important was the sense of belonging to a like-minded community with shared beliefs. Participant comments frequently referenced "all" in claims such as "all agree there is a problem", "all believe that things need to get better", "all believe that where we are is not good enough", or "all agree to work together on ways to improve teaching and learning".

*Shared knowledge grounded in research*

In addition to establishing a shared vision, participants overwhelmingly described the presence of a common body of knowledge. Participants described the partnership as "research-based, rather than the idea of the month." Both Higher Education faculty and Teacher Leaders described developing new knowledge and commitment to learning as central to the success of the partnership. There was a clear sense that all participants were learners and that the newly developed, shared knowledge was equally relevant to Higher Education faculty and Teacher Leaders.

*Safe learning environment*

Descriptions of a safe learning environment were consistently provided by both Teacher Leaders and Higher Education Faculty. Participants described the partnership as trusting, safe, supportive, open to risk, comfortable and transparent. During interviews, this particular feature was repeatedly described as fundamental to the partnership. Comments included, "Feeling safe while sharing our developing understandings was very important" and "The trust needed to be there or nothing would have happened."

*Distributed leadership*

This category emerged as a result of comments describing the collaborative nature of interactions among partners and a sense of shared-decisions making. Responses described a sense that all input was considered and valued and a sense that all were "a part of the solution." Though some acknowledged that they themselves had not necessarily assumed leadership roles, the opportunity for them to do so was available, encouraged, and supported. Participants indicated that in workshop settings there was "little distinction between instructors and learners" and described a sense that all were learning from one another, "not hierarchical or authoritarian."

One Higher Education faculty commented that "the Summer Academy was definitely a collaborative effort. I learned as much (if not more) than the teachers who were the technically the students." One Teacher Leader stated "NCOSP didn't say here's what's wrong with education and here's how we're going to fix it. Rather NCOSP said here's what we know about How People Learn, let's work on this together and see what we find out. We weren't just being told something, we were a part of something."

*Respectful relationships*

The nature of the relationships that formed among participants was described as respectful, collegial, and egalitarian. Teacher Leaders indicated that never felt "talked down to" or "treated as less than." Teacher Leaders and Higher Education faculty described a sense of "a level playing field," of "functioning as peers", and of "a mutual understanding of others." Both groups indicated that the partnership promoted a sense of professionalism. Though there was no consensus on any one attribute being more important than others, for many respectful relationships were described as "foundational." Still others indicated that without the presence of respect the partnership wouldn't have been able to develop the other attributes.

In describing relationships, both Teacher Leaders and Higher Education faculty offered interactions between these two stakeholder groups as examples of this attribute in practice. Both Teacher Leaders and Higher Education faculty most frequently cited their experiences during content immersion experiences provided summer professional development session (Summer Academies) where higher education faculty and Teachers on Special Assignment serve as facilitators. In interviews with higher education faculty following these Summer Academies, many commented that the opportunity to work with and learn from Teacher Leaders was the

highlight of the experience for them. It is important to note that the Summer Academies are the primary time when Higher Education Faculty and Teacher Leaders work together.

More often, however, Teacher Leaders and Higher Education faculty cited interactions with like groups when providing examples of respectful relationships. For example, Teacher Leaders described the relationships they had formed with other Teacher Leaders developed through the Summer Academies or professional development experiences provided by NCOSP during the academic year. Higher Education faculty described interactions among their higher education counterparts developed through their work on undergraduate course reform.

Teacher Leaders did express some regret for not following up with Higher Education faculty during the school year, but explained that their needs were different during the academic year. Teacher Leaders felt that during the summer they were focused on their own learning and the Higher Education faculty were great resources for that purpose. During the academic year when the Teacher Leaders were concerned about making their learning relevant and effective for young students, they felt their Teacher Leader colleagues across the partnership were the more appropriate resource. Similarly Higher Education faculty described the intensity of working on the undergraduate course reforms during the academic year. The comments and feedback they received from Teacher Leaders during the summers was highly valued and served as the "fodder" for many conversations the faculty would have among themselves in their efforts to improve the undergraduate courses. Though the features of the relationships (e.g. respectful, collegial, egalitarian) were consistent regardless of the stakeholder groups involved, the frequency of interactions varied by time (e.g. summer, academic year) and the stakeholder groups involved in interactions (e.g. K12 or higher education) depended on purpose or need.

For both groups, a lack of time was cited as another reason they did not communicate more frequently. One community colleage professor stated it directly, “My regret is not getting back to the [K-12] classroom but there is no release time for that.” Another said that he would have liked to had more experiences and conversations with Teacher Leaders during the summer academy but got “sucked into worrying about my next step – being prepared for the next session.” Several faculty would like to be involved Teacher Leaders but cited the lack of time and scheduling conflicts as obstacles. Another Higher Education faculty expressed disappointment that continuing connections with Teacher Leaders were not structured into the grant.

***Partnership actions***

We also inquired into participants perceptions of actions, conditions, or events that contributed to the growth and development of the attributes of the partnership. Though for many this question elicited a very personal or individual response, two significant trends that could be generalized and connected to specific partnership design elements emerged.

*Clear expectations of change*

Though some models of partnership are simply about exchanging goods or perhaps developing a product, in the case of partnerships for reform, they are about change. In both surveys and interviews, participants commented on the expectations the partnership created for “doing things differently.” Significantly, they noted that the partnership wasn’t about just changing one thing, but about many things: changes in teaching practices, the culture of teaching, the way we view teaching, and the way we view learning. One participant described the partnership as creating a “paradigm shift for everybody.” In a related series of comments,

another Teacher Leader clarified that "Everybody means everybody. The higher education faculty are working on doing things differently too."

The design of learning experiences developed within NCOSP was repeatedly described as fundamental to building a partnership committed to change. Through the use of classroom videos and data analysis, the partnership was able to provide compelling evidence to participating Higher Education faculty and Teacher Leaders that the current system is not meeting the learning needs of students. The videos were mentioned by many as "eye opening" or "transforming." Many also valued the opportunity to acknowledge these failings of the system with others. Some said they always knew changes were needed, but the isolation of teaching left them feeling powerless. Confronting the challenges in a group made them believe that perhaps they "could make a difference."

The partnership then turned to *How People Learn* as a research-based theory of learning to help participants face the challenge of improving the learning outcomes of students. Higher Education faculty and Teacher Leaders in NCOSP examined three recommendations from *How People Learn* as a common framework for thinking about teaching and learning. In brief, those recommendations included: (1) Attention must be paid to preexisting student ideas, (2) Students need a deep foundation of factual knowledge stored in a conceptual framework that is accessible, and (3) Students need to develop metacognitive skills to become independent learners. Facilitators modeled instructional strategies consistent with these recommendations to allow participants to see what this theory might look like in practice. Those experiences were discussed and debriefed so that participants could link their learning to the instructional design and also consider the implications of that design for their own teaching and their own students. Teacher Leaders and Higher Education faculty alike commented on the significance of

experiencing and witnessing authentic learning take place. Seeing instruction modeled and learning something new was another area that many described as "transformational." For many, this design of the learning experiences was what brought the partnership together in terms of clearly defining its purpose and creating a sense that the purpose could be realized.

*Values and beliefs consistent with practice*

Partnerships for reform have often succeeded in making the case for change, but fall short in building a partnership that can work together to embrace and implement the intended change. Participants in NCOSP made clear that knowing what we needed to do differently was important, but how NCOSP functioned as a group or "learning community" set it apart from previous collaborative efforts. When asked how this learning community was fostered, participants described the respectful and collegial setting, the connections to research, and the participation of everyone as learners. The descriptions all returned more to the partnership attributes themselves, rather that to discrete events or actions taken by the partnership to foster them in the first place.

A striking correlation between the partnership attributes described by participants and a set of core values and principles developed by the partnership suggests that these principles played an important role in the development of the partnership. Early on in the project, the partnership leadership team developed the Principles of the Partnership to describe the values and beliefs that provided the foundation for the work of NCOSP. These values and beliefs were intended to be fundamental and would be "visible" in all the work that the partnership would do. The partnership developed five principles: (1) organization principle; (2) learning principle; (3) research principle; (4) collaboration principle; and (5) equity principle. Definitions and clarification statements for each were written to foster a shared understanding of each. These

principles were developed by the leadership team, presented to Teacher Leaders and Higher Education faculty for comments, and subsequently revised by the leadership team.

In NCOSP, members of the leadership team serve as facilitators of various working groups within the project. These leaders introduced the principles to their working groups and discussed their implications for interactions within the group, products they were creating, or events they were supporting. The evaluation team developed an observation protocol aligned to the principles to allow these groups to assess the extent to which the principles were upheld. NCOSP Teacher Leaders were introduced to the principles in professional development settings and asked to monitor and comment on the extent to which the programs reflected the principles.

A deep working knowledge of the Principles of the Partnership is still held by only a small number of participants in the partnership relative to the whole. Regardless of whether individual participants can point to or recite the principles themselves, their description of the partnership attributes demonstrates that they experienced the principles and perceived them as significant to the quality of the partnership. This overlap of the partnership attributes described by participants and the principles of the partnership suggests that the principles were influential in shaping a set of norms that were important for the development of the partnership. NCOSP participants in roles of leadership and influence, who understood the norms, were able to effectively implement them with the group, creating a sense of community among all participants. The perceived significance of these norms makes clear that not only is it important for partnerships to define their work, but also to ensure that the work is done in ways that are consistent with the values and beliefs of partnership members.

***Partnership Impact***

The original grant proposal outlined explicit goals and learning targets for different stakeholders within the partnership which are monitored and assessed by the evaluation team. A full discussion of the impact of the partnership on each of these areas is outside the scope of this study. Here we will highlight outcomes that were most likely achieved as a consequence of the partnership between and among K12 teachers and higher education faculty.

*Recognition of a K-20 teaching professional continuum*

Both Teacher Leaders and Higher Education faculty increased their understanding of the K-20 continuum as a consequence of interactions that took place within the partnership. Prior to the existence of the project, Higher Education faculty and Teacher Leaders had little contact with each other. Those relationships that did exist most commonly arose out of traditional settings where the content experts were the authority and the teachers were the "empty vessels." As a consequence of NCOSP, Higher Education faculty increasingly began to recognize Teacher Leaders as experts in their own field (K-12 education). This knowledge was viewed as valuable because it provided insights into what preparation and experiences students from high school would bring to college. Faculty also valued the knowledge of instruction held by Teacher Leaders. Faculty actively sought feedback from the Teacher Leaders on their curriculum as well as the instructional strategies they were using. Faculty recognized that the Teacher Leaders had expertise with a wide range of students and instructional strategies that were equally relevant to the undergraduate setting. One community college professor stated, "What works with an English language learner in third grade might work for my ELL college students."

Teacher Leaders also developed new relationships with Higher Education faculty as peers with shared professional knowledge. One Teacher Leader commented, "…just having that

partnership was phenomenal…They didn't look down on us for not knowing." Teacher Leaders also came to recognize that many of the issues they face are shared with their Higher Education peers. Another Teacher Leader summed it up this way, "They are doing the exact thing we are trying to do – align their curriculum with what students know and need to know". Teacher Leaders also developed a broader understanding of their K12 peers who teach grade levels different than their own. This quote is representative of the many comments consistent with this new understanding, "I had no idea what was going on in middle schools and elementaries. And I think I understand [how the emphasis on] reading and math is taking away from science."

This increased understanding and appreciation of the professional knowledge present at all levels developed with respectful boundaries. Despite the consistent remarks by Higher Education faculty that they learned a lot about the K-12 environment and their own students' previous experiences from the Teacher Leaders, they emphasized that they themselves were not prepared to teach K-12 students. "I hardly know anything about teaching young children. I selfishly hang with teachers because I enjoy their mindset – thinking about learning." When directly asked, each Higher Education faculty member denied that they served anything like a "mentor" role and emphasized the collegiality of the relationships.

*Understanding and appreciation of educational research*

Before the partnership began, both the Higher Education faculty and Teacher Leaders were largely unaware of the cognitive research findings reported in *How People Learn*. Teachers often feel that educational research is out of touch and irrelevant to the "real world" (Ohana, 2002). In NCOSP, Teacher Leaders had the opportunity to link the research findings with explicit experiences where those findings were modeled to support their learning. Gradually Teacher Leaders grew in their respect for the applicability of this educational research

to their classrooms. They began to integrate the phrase "how people learn" into their ongoing conversations about teaching and learning. For example, in an interview about his transition back to the classroom, one TOSA said, "[My practice] has changed. I think more in terms of how people learn…It definitely takes more time to do that and kids struggle…but they are learning."

Similarly, while the Higher Education faculty were experienced researchers in their discipline, they had little experience with educational research. Though few have developed research projects within NCOSP, most have become "consumers" of educational research. When asked to describe what "research-based curriculum" means, most reference *How People Learn* by name, or indirectly through its principles. In a series of interviews, the higher education faculty expressed a desire for increased input from the evaluation team to document if and how the new undergraduate curriculum they developed and implemented worked. There is now increased interest in developing and implementing research studies of their own in the context of teaching the reformed undergraduate courses.

*Implementation of common practices*

As described earlier, *How People Learn* served as a foundational text for developing a common approach to teaching and learning based on cognitive science research. Both Teacher Leaders and Higher Education faculty cite aspects of this work to in connection with progress they were making in changing their classroom practice. As a consequence of participation of both Teacher Leaders and Higher Education faculty in the Summer Academy, many professional development strategies were also learned and subsequently implemented by both groups.
In the second year of the partnership, Lesson Study was introduced to Teacher Leaders as a professional development strategy. Higher Education faculty and TOSAs worked collaboratively to present the protocols for this strategy and support Teacher Leaders in

implementation. Teacher Leader lesson study groups have flourished in many cases and even led to an on-line blog.

Many Higher Education faculty wanted to learn more about the practice of Lesson Study and invited a group of Teachers on Special Assignment to help them learn the associated protocols. The Higher Education faculty were interested not only establishing Lesson Study groups among themselves to study their own curriculum, but also in participating in Teacher Leader Lesson Study groups. The tradition of exploring common practices together continued in the third Summer Academy as both Higher Education faculty and Teacher Leaders explored the use of protocols for examining student work as part of a collaborative team focused on student learning.

*Deprivatization of practice*

Another shared value that helps to link Teacher Leaders with Higher Education faculty is a desire to be less isolated from peers. One community college professor noted, "Its been amazing watching us interact over the last few years… at times it was the worst experience…then people came together and began working as a team, finally getting to know each other well enough to trust and be confident in each others' abilities and know each others' strengths and weaknesses and be able to work as a team." Higher Education faculty have reveled in the opportunity to have time to work on a common curriculum. Interestingly, they also want to spend more time in each other's environments. One community college professor stated, "I would love to work in a middle school science class for a quarter. I would learn a lot about teaching and I hope the students would learn from me. I would also love to have TOSAs come to my classroom and help me evaluate my class. I think we have incredible resources in each of us that could spill over if we weren't so separated in our work."

*Increased focus on student learning*

While the target audiences differ, both the Teacher Leader and Higher Education faculty have come to place increased value student learning. They are each personally invested in the learning of their own students. One indicator of this focus on student learning comes from reports from both Teacher Leaders and Higher Education faculty on changed views of student assessment. Many Higher Education faculty said they are changing their forms of student assessment to help them understand the conceptual knowledge of their students. Both groups responded to an interview prompt about how they would know if a curriculum worked and how would they make changes to a curriculum when indicated and both groups based their answers on assessment data. While assessment data has always been used to assess students, Higher Education faculty and Teacher Leaders are both starting to use assessment to evaluate the quality of their instructional practices and the ability of their curriculum to help students learn. Not only are the types of assessments changing but so is the purpose and timing. One TOSA commented, "I think I'm paying a lot more attention to progress instead of just assessment at the end. Now I am checking before, I am checking during, and checking at the end to see what things they learned".

Ultimately, we recognize that all of these changes must be manifested in both documented practice and student achievement. Evaluation efforts are underway to collect such evidence. We selected a sample of Teacher Leaders and Higher Education faculty to observe in pracatice. Trained evaluators have conducted classroom observations in over 25 classrooms using the classroom observation protocol developed by Horizon Research. We are also collecting evidence through assessments in K-20 classrooms. Since the data have not yet been analyzed, the evidence cited here is based on self-reported data. While there are dangers in

assuming that new ideas about teaching will be translated into practice, the data still provide evidence about dissatisfaction with current practices and a desire to change.

**Summary and Conclusions**

For three years, NCOSP has paid significant attention to the development and maintenance of an authentic partnership. This preliminary report was developed to initiate a discussion of how NCOSP and other MSPs may be similar to or different from existing theoretical partnership models and the implications of those findings for MSP implementation efforts and NSF policy on partnerships.

We offer a preliminary description of the partnership attributes achieved by NCOSP based on comments provided by participating Teacher Leaders, Teachers on Special Assignment and Higher Education faculty at the end of the third year of the project. These attributes share many similarities to those offered in the literature for other school-university partnerships or public section partnerships, including focus on shared vision, trust and respect. The significance of being grounded in a research base was an important nuance described by NCOSP participants but not seen in the published theoretical models. This may be a trend in contemporary partnerships with the increasing focus on standards and research. Alternatively, this feature may be of higher value within the MSP communities because of the importance placed on being evidence-based. Similarities with models of social networks also appeared. NCOSP participants described the importance of relationships within the partnerships. The ability to influence change in participants knowledge and beliefs was strongly influenced by the nature of the relationships among stakeholders. Moreover, participants described communication patterns in ways that were consistent with a “node-hub-superhub” structure. These data suggests that the

MSPs may benefit from a careful examination of both these models of partnership to maximize the potential benefits of partnership to participating stakeholders and their institutions.

The attributes described in this report were not present prior to NCOSP and took three years to foster. This study included a very preliminary exploration of possible actions or events that aided in the development of these features. Though no one, single program or activity could be identified as "turning point", two significant insights emerged. Consistent with existing theoretical models of partnership, having a clearly stated vision or goal was important. In the case of NCOSP, this vision was understood in a very broad and generic sense: improving science learning and teaching based on the recommendations described in "*How People Learn*". There is no doubt a great deal of variation among participants in how this would be achieved. However, in terms of establishing an identity as a partnership, simply having a broad common vision appeared to be a sufficient first step. A surprising, but important second step, was to clearly define the values and beliefs of the partnership to further develop the partnership identity. Not only was it important for the partnership to establish a shared vision, but also to move toward that vision in ways that were consistent with a guiding set of values and beliefs.

In the final section of the analysis we report on a set of outcomes achieved because of the presence of the partnership. The lesson learned here is straightforward: Time invested in developing and maintaining the attributes of an effective partnership will pay off in significant and lasting benefits to participants.

This analysis examines the partnership from the perspective of participating Teacher Leaders and Higher Education faculty. But, as described earlier, MSPs are complex partnership inclusive of many diverse stakeholders. School and district administrators are not addressed in this study despite their central role in reform efforts. Parents, community members, regional

education agency partners are examples of other stakeholder groups important for sustainable regional partnerships. Future investigations may need to address the perceptions these groups have of the partnership attributes, how the partnership can build stronger and meaningful relationships with these groups, and the potential impact those relationships would have on partnership outcomes.

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