

**Analytic memo for Horizon Research, Inc.**  
***K-5 Inquiry-Based Science Program, a Local Systemic Change Grant***  
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**Building Effective University/School District Partnerships for Professional Development**

**The Context of the LSC: A Powerful Leader Forms Strong Partnerships**

The *K-5 Inquiry-Based Science Program*, an award winning and nationally recognized program, is the legacy of a Local Systemic Change Grant Initiative funded in 1996 by the National Science Foundation. The project was originally based on a strong partnership with the University of Washington's Department of Molecular Biotechnology (MBT), the Boeing Company, the Fred Hutchinson Cancer Research Center, and the Seattle Public Schools. Dr. Leroy Hood, Chair of the MBT, and Valerie Logan Hood, and his wife, took the leadership in forming these partnerships. In the second summer of the project, the Physics Education Group (PEG) of the Physics Department at the University of Washington became an important partner and supported the needed science content courses. In the third year, the College of Education's K-12 Institute for Mathematics, Science and Technology and the Department of Biostatistics and Department of Medicine, Division of Medical Genetics became partners adding to the science content support. In 2000, Dr. Leroy Hood of the MBT left the University to form and become the CEO of the Institute for Systems Biology; he continued to be the leader of the partners. In later years, the Alliance for Education, the City of Seattle, the Seattle Aquarium, and the Homewaters Project joined the partnership. The success of the program was based on the strong foundation of partnerships from the beginning. Key stakeholders worked hard to maintain these partnerships.

**Schools for Science Consortium: District Leader Organized District and Parent Stakeholders**

On the educators' side, the initiative was developed and led from the grassroots rather than from high level district leaders. Parents in one school, supported by the Assistant Principal, were demanding that science be taught to their children. Almost no science was taught at the elementary level in the Seattle Public Schools before the initiative started. These parents and the administrator started the *Schools for Science Consortium* three years before getting the LSC in August 1996. They held, on the average, six meetings per year for those three years. Speakers were invited and through these sessions, the administrator helped to raise the awareness of interested teachers, principals, and parents. The *Schools for Science Consortium* helped to generate a critical mass of interested teachers and principals just before the LSC arrived. This forum contributed to the reform effort in that the sessions helped to prepare this small critical mass of educators to be excited about and

ready for the LSC. The administrator who was the leader of the *Schools for Science Consortium* eventually became the Project Director in the third year of the grant.

### **The LSC Leadership Team**

The LSC's Project Director led five to six Leadership Team Meetings per year. These meetings provided a forum for the various partners to regularly meet to provide input and advice and to help trouble shoot various issues. The Project Director used this input to guide the big picture of the program. The Leadership Team was composed of the Project Director, representatives from partner organizations, school and Central Office administrators, the All-City PTA Council representative, and a member of the Alliance for Education. The Alliance raises funds for the Seattle Public Schools and also convenes people to raise awareness of issues.

### **Advisory Committee for the Superintendent on Inquiry-Based Science**

When the LSC was almost finished, Dr. Hood had the vision to develop an Advisory Committee for the Superintendent on Inquiry-Based Science. He invited high level science leaders from the community to join. He finally guided the Alliance for Education into taking the leadership for this committee. After the first two years of this Advisory Group, he stepped out of the partnership to move onto other endeavors, but left the Alliance to be in a strong position to be the leaders in convening this group. The leaders within the Alliance have stepped up and have become strong advocates for high quality science instruction. The transition from the LSC Leadership Team to the Advisory Committee for the Superintendent on Inquiry-Based Science has been highly successful and is helping substantially to sustain the reform work of the project. In summary, some of the stakeholders went from meeting with the *Schools for Science Consortium*, a grass roots group, to the LSC Leadership Team, and finally, they now meet with the Committee for the Superintendent on Inquiry-Based Science. Each group has provided an excellent forum for communicating the reform work, and each group has inspired partners to move forward.

### **The District's Characteristics**

The Seattle School District is urban and multi-ethnic. There are approximately 1000 K-5 classroom teachers and 21,874 students in 70 elementary schools. Approximately 41% of the student population is on free or reduced lunch, and approximately 58% of the 46,416 K-12 students are ethnic minorities. Community activism and stewardship contribute to a very unusually supportive relationship between the school system and the community. The School Board and leaders of the district encourage the development of community partnerships to enhance student achievement and closing the gap.

### **The Partnerships Strengthen the Professional Development Opportunities**

Dr. Hood and Valerie Logan Hood took the lead in forging effective university and school district partnerships to support the professional development. The Project Director and Science Resource Teachers worked at nurturing and expanding these partnerships for the benefit of the teachers, students, and program. These partnerships center around two key areas: the development of science content courses and professional development and other

support for the professional development providers, the Science Resource Teachers (SRTs) who were 100% released from the classroom to work on this intensive project.

In the second year of the LSC, the project leaders realized there was not yet a plan for content courses. The project leaders sought the support of Dr. Lillian McDermott of PEG in the Physics Department at the University of Washington. A very strong partnership was developed. The LSC staff worked with Lillian and her lead staff to begin the process of developing the science content courses for the elementary teachers. The scientists worked with the LSC's SRTs. Each brought a different expertise. The SRTs had an understanding of the classroom, how the science units were working in the classroom, and how to address teachers. The scientists understood the content at a very deep level. They worked together over the years. In the third year of the project, PEG offered a university class to graduate students and scientists to help them understand how to plan for the science content courses. The LSC staff presented some issues around the purpose of the LSC and the needs of the classroom teacher and students. In the 5th and 6th year of the LSC, the Inverness Research Associates, Inverness, California, gave the highest score they had given to any LSC they evaluated at the time; they gave a five for the science content courses.

Dr. Hood recruited Dr. Ellen Wijsman, a world renowned statistical geneticist, who had developed with other statisticians, curriculum for professional development for elementary teachers with NSF and state funding. She took their published work and adapted it to Seattle Public Schools' elementary science curriculum adoption. With support from the SRTs, she and two of her colleagues offered a 24-hour class on Data Analysis which received rave reviews. Again, strong communication helped to support the partnership which resulted in a popular class. The teachers said their math scores went up after using the strategies from this class. We have not been able to research these results but would like to do that if we could find the funds.

Dr. Hood and a few others at the University of Washington helped to develop a K-12 Institute for Mathematics, Science and Technology. The director of this organization spent 25% of her time to identify and organize scientists for us to work with in the earth and life sciences during the LSC.

### **Strategies Leading to Success in Science Content Courses**

There are several intentional strategies we used that supported these partnerships with scientists for the purpose of developing science content courses that allowed the success:

- There were strong and open communications between the educators and scientists at all levels. The Project Director made intensive efforts to continually communicate with the stakeholders centered around the content courses and to nurture these relationships.
- We had the scientists (often graduate students) work in pairs in providing the science content courses to support their comfort level.
- Our SRTs helped the scientists understand the teachers, their role in the classroom, and the challenges they face.
- Each day of the content courses both the scientists and the SRTs took the

feedback from the teachers about the class very seriously. The first thing that was addressed each morning, after the first day, was the feedback from teachers. This helped to gain teacher buy-in and comfort level which in turn helped the scientists feel more successful.

- After the content courses were over, we held a debriefing session which was a working dinner at the home of Dr. Hood and Valerie Logan Hood. Once again, they provided incredible support. Going to their home was a perk for the scientists. The last time we had a debriefing dinner for content courses, it was not held in the Hoods' home, although Valerie Logan Hood came for part of it. The scientists still enjoyed the gathering and valued the opportunity to learn more about doing this kind of instruction. Having a relaxing evening together strengthens the partnership between the educators and scientists. We spent time after dinner to talk about the successes, challenges and possible solutions for those challenges which helped us strengthen the classes in the next year. This opportunity to debrief helped to keep the scientists interested and helped to strengthen their own strategies.

Now that we have smaller staffs, less funds, and less time, we have a debrief of about 45 minutes right after the content courses are over. We look at the Feedback Forms from the teachers and reflect on our own impressions of the work to look for the successes to replicate and the areas where a change is needed for the next time.

- We learned that when we provided the content courses with only the scientists as instructors without an SRT to help bring the classroom connections, the content courses were often not as successful. A big challenge here is capacity. It is difficult to have enough highly trained, full time SRTs available for this role. We found that classroom teacher leaders have not had enough time to develop their skills to be able to fill this role well.

### **Successful Support for the Professional Development Providers**

The second key area is where the partnerships supported professional development and other support for the SRTs so that they could become very strong professional development providers for the classroom teachers. The PEG Group offered a class just for the SRTs. Over a two year period, the SRTs received approximately 200 hours of professional development from the *Physics by Inquiry* Course. This aspect of the partnership with PEG supported all facets of the program and helped strengthen the SRTs science content understanding in physics. PEG was very generous to share so much.

The Inverness Research Associates of Inverness, California, our evaluator for both the LSC and our nationally recognized *Expository Writing and Science Notebooks Program*, became more than an evaluator early on. As the LSC funds were getting smaller, we applied for a much smaller grant from the Stuart Foundation. The grant paid for the continued work with Inverness, this time around for the *Expository Writing and Science Notebooks Program*. During this time which has become almost a decade, Inverness has

become a mentor and friend. They have helped us grow, and they have advised us well on our work. Without their mentorship, our program would not have been as strong. This is a different kind of partnership, but it was a vital one.

The Inverness Research Associates helped us to grow in another way. They connected us with other systemic change efforts in the nation where they thought we might learn. We were connected to reform leaders in both Las Vegas and El Centro. We connected with LSC staff from these locations to share and collaborate

We developed an informal partnership with the Institute for Inquiry at the Exploratorium in San Francisco. We found their courses on inquiry science to be extremely valuable. Each of our LSC staff attended about four different courses there. Each staff member strengthened their skills and their ability to develop inquiry science courses. We have continued to work with them and network with them on a limited basis even though our LSC is over. We strengthen our skills in providing professional development for our teachers by keeping this relationship alive. We were able to send four Lead Teachers this year to participate in a field test of professional development materials they are developing. Inverness Research Associates invited us and paid our teachers to go. This is a continued partnership with both our evaluator and the Institute for Inquiry staff which benefits our program.

#### **Smaller Partnerships Developed by LSC Staff**

Our staff developed three other partnerships which have provided various forms of support and professional development for our staff as well as for our classroom teachers. We forged a partnership with the Seattle Aquarium. They applied to the Howard Hughes Medical Institute for funds. They said in order to access these funds, they needed us as a partner. We said that in order to be partners, we needed their help (including funding) in providing the Initial Use and Science Content Courses focused on our 4th grade *Ecosystems* unit. They agreed to do this and wanted to add a Marine Content Course as well. Up to two years after the LSC, these funds still support professional development for our teachers. Along with these courses, they have provided free field trips, a parent component, and additional curriculum materials. A second partnership with the Seattle Public Utilities became very strong when a charge came from the mayor and the superintendent to align the long time, popular *Salmon in the Classroom Project* which had been developed a decade ago. The *Salmon in the Classroom Project* was not standards based, so we were to take the best components of this project and integrate them as extensions with our 5th grade *Land & Water* unit. We adjusted the best components and added the inquiry. After three years of work, the results were quite strong and now the new optional lessons are used by many of the teachers. Finally, the third partnership is with the Homewaters Project (formerly known as the Thornton Creek Watershed). Two of their scientists helped to develop a field trip connected to the *Microworlds* unit. They worked in collaboration with one of our SRTs. When that was finished, they went on to develop a class to prepare teachers for the field trip. Each of these partnerships continues, and each of these partnerships supports professional development for teachers. These

partnerships are sustained and formalized by strong communication and the nurturing of relationships.

### **Strategies Leading to Success in Developing the Professional Development Providers**

The SRTs benefited immensely from the collaboration and professional development provided by partners. Within these partnerships, we focused on a few of the most critical areas needing support: science content, pedagogy, and facilitation skills. The strategies that worked are:

- Taking professional development that is focused and specific to the work we do. Getting the professional development from those who are best in the field. Becoming friends with and building relationships with some of these providers to have on-going conversations.
- Taking classes that went into depth; the classes were provided over a number of days (e.g., physical science content, 200 hours; inquiry at the Institute for Inquiry, approximately ten days total for each SRT; WestEd on organizing the planning of professional development, 5 days; Cognitive Coaching, 9 days; and Adaptive Schools, 3 days).
- Debriefing the learnings with the whole team of SRTs. Deciding how to use and/or adapt the learnings.
- Practicing using the learnings with one another (SRTs).
- Keeping the same staff (SRTs) over time so that they have time to develop their skills and mature in their positions. The continuity has made all the difference in the world in our LSC and the legacy program. The very small staff of two SRTs now continually push to the edge, continually learn from the Lead Teachers'\* feedback and from observing in their classes, and they continually learn from the research. All the work continues to evolve at a very high level because of the continuity. We have kept everything we have gained over the nine years through these two SRTs, one of whom was there from the beginning. Having good funding partners helps sustain the staff in the positions over time. (Unfortunately, most of the positions are still funded on soft money. The good part is that there is more autonomy when privately funded.) Again, the Hoods were the leaders in finding the funds to sustain key positions.

\* Lead Teachers help us teach the Initial Use classes, and they teach full time; they are not released from the classroom duties.

### **Building and Formalizing Effective Partnerships to Sustain the Reform Activities**

The partnerships that helped us with our professional development have provided substantial strength to the courses. In having access to these resources over time, including the resources of the LSC, we have had time to reflect and to adjust and strengthen the professional development. We have taken teacher feedback seriously and built the program through the feedback, observations, newly developed best practices, and research. It is interesting how the very strong partnerships lead to stronger professional development. This is not necessarily obvious, nor is there a direct path from the partnership to the outcome. Each stakeholder along the way from the partnership forged by the higher level leaders to those who implement the program, such as the SRTs, needs to have high standards to ensure the best outcome. This project was fortunate to have strong leadership and vision at the most strategic levels: CEO, Project Director, SRT, and teacher. One parent stated, "All the right people came together." The LSC was "magical" because of this.

In the third year of the project, the CEO of the outside evaluation firm stated in his speech at the Annual Retreat, "You must continually build new partnerships. You must develop some strands that are funded beyond the LSC." He was right. We have to continually look for new partners as some will leave over time. The Project Director and SRTs worked at developing the later, smaller partnerships that have sustained beyond the LSC and have provided resources and funding. To be in a partnership, the two entities must have common visions, missions, and goals. An incredible partnership was developed with the Seattle Public Utilities toward the end of the LSC. In the early 1990's, the Seattle Public Utilities developed a *Salmon in the Classroom Project*. It was not standards-or inquiry-based. After four years into the LSC, both the mayor and the superintendent asked the Salmon Project leaders and our staff to bring the two programs together. For three years, we worked with the Seattle Public Utilities to take the best components from the Salmon Project and incorporate them as extensions for the 5th grade *Land & Water* unit. This was one of the best collaborations we experienced with one of the smaller partners. The Seattle Public Utilities and our program found the point where our partnership was strongest, and we strengthened both the science unit and the Salmon Project to enhance student learning and to promote the missions of both groups. The Seattle Public Utilities is still contributing to the 5th grade *Land & Water* and *Microworlds* units as both units address their mission. They purchase materials, equipment, and non-fiction books to support these units. They also pay for stipends for teachers to take the Initial Use and the Science Content Courses. This partnership was formalized in the three years of the work, and the partnership continues in a streamlined fashion with minimal communication but with some substantial support.

We will continue to seek partnerships both at the local and national levels to sustain the work. The key is to find the groups that have the same common vision, mission, and goals. Without this, the partnership cannot grow. Next, the stakeholders have to formalize times to meet such as we did with the LSC Leadership Team and as we do with the Advisory Committee for the Superintendent on Inquiry-Based Science. The relationships have to be nurtured. Work around certain areas has to be documented and celebrated.

We have been very fortunate in that we had a very visionary, world famous scientist and his wife take the lead on forming the key partnerships. Because of their tireless efforts and their extraordinary talents, the challenges were not so large in terms of community partnerships. (The biggest challenge was gaining buy-in from some of the continually changing high level district leaders. The Advisory Committee to the Superintendent on Inquiry-Based Science helped this. We now have a very supportive superintendent.) The work was to nurture and build on the relationships these two incredible leaders developed. They led the way. For the final report, the Project Director asked Dr. Hood what he learned from the LSC. He said, "It is all about leadership and support." The leadership develops the partnerships and the partnerships provide the support. Not too much would have been different if the stakeholders had known then what they know now. Powerful key stakeholders continued to forge ahead with skill; the support was enormous!