A STUDY OF A MUSEUM-SCHOOL PARTNERSHIP

DISSERTATION

Presented in Partial Fulfillment of the Requirements
For The Degree Doctor of Philosophy in the
Graduate School of The Ohio State University

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ABSTRACT

Partnerships between museums and schools never have been more important than they are today. Schools, especially urban schools, are facing challenges, including low student achievement and difficulty obtaining funding. Partners can help schools overcome these challenges by sharing educational and financial resources. Nearly 11,000 American museums spend more than $1 billion annually to provide over 18 million instructional hours for k-12 educational programs such as professional development for teachers, guided field trips, and staff visits to schools. Museums would seem like natural partners for challenged urban schools. Yet museums and schools struggle to establish and maintain effective partnerships.

This study examined a partnership between a science center and an urban elementary school to provide additional knowledge and resources for those in the field to overcome these challenges in order to create relationships that help students. Using qualitative methods with interpretive descriptive purposes (Erickson, 1986; Glesne, 1999; Lincoln & Guba, 2000), the research design is based on several methods of data collection, including face-to-face, semi-structured interviews; observations; written text; and field notes. Participants in this study included students, parents, teachers, school
administrators and museum educators. In addition, adult representatives of community organizations were interviewed to determine the impact of the partnership on the community.

The study found that an effective partnership will have four basic elements: mutual goals, communication plan, key leader support, planning and research, and four interpersonal elements: personal responsibility, honesty, communication at the intimate level, and trust. Partners may have difficulty developing these to their fullest extent due to time limitations.

No partnership is perfect. By creating strong interpersonal relationships, partners can mitigate challenges caused by limited basic elements and increase the likelihood that their partnership will be effective.
In memory of Mark Tokarz, my partner for 20 years.

After we had been together for 15 years, a friend received a lovely anniversary ring from her husband. I asked Mark when he was going to get me an anniversary ring, he smartly replied: “I am paying for your Ph.D. It will cost more, but you are worth it.”

I am sorry you can’t be here with me now, but I so appreciated your love and understanding as I pursued my degree.
ACKNOWLEDGMENTS

They say it takes a village to raise a child, I think it takes a village to get a child through graduate school. When I entered the Ph. D. program at The Ohio State University, I was a child in the village of research. Several people helped me understand the importance of research in my practice, and several just supported me. I would like to acknowledge these individuals here:

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I could not have completed my research without the faculty, students, and families of SP Elementary School. I thank all those who answered my questions and allowed me into their homes to learn more about them as people and what was important to them. I thank my colleagues at COSI who supported me as I pursued my research. I could never have done this without their support.

Finally, I thank my friends and family, who helped me in so many different ways; I cannot list them all here.
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PUBLICATIONS


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CHAPTER 1

INTRODUCTION

Partnerships in public education are not a luxury; they are a necessity, according to Joseph Petner, a public school principal who worked with Harvard University’s Project Zero to develop Art Works for Schools, a program that teaches higher-level thinking using the arts (Marshall, 2002). Educational partnerships have benefits, including networking opportunities for teachers and administrators that ultimately facilitate information and resource sharing (Walter and Westbrook, 2001). In addition, according to nonprofit organization leaders, partnerships are more likely than single-entity initiatives to be funded. Laura Dell, quoted in Digital Alliances: Partnerships in Public Service, states, “The name of the game is partnerships. Funders are not as interested in stand-alone projects as they used to be. A much more powerful grant application can be made if you can show community resources are working together for an educational goal” (Benton Foundation, 2001, p.26).

Partnerships with informal learning environments can help educators by creating and sustaining cost-effective programs to meet the needs of American students. To benefit students and teachers, informal educators must recognize two significant shifts in formal education: (1) the impact of high-stakes testing, and (2) the shift in science pedagogy, moving from inquiry-based, hands-on learning to didactic content acquisition to ensure students perform well answering knowledge-based questions on high-stakes
tests. During the early 21st century, the American education system was highly scrutinized. Schools were often in the news due to funding challenges and low student achievement in all subject areas on high-stakes tests. The No Child Left Behind Act (NCLB), signed by President George W. Bush in 2002, is an unfunded mandate that calls for increased accountability for schools, particularly low-performing schools, with a strong emphasis on reading (United States Department of Education, 2002). In Ohio, schools were being graded by the Ohio Department of Education and these “report cards” were published in newspapers and posted on the Internet. With education clearly in the public eye, school administrators and teachers felt pressured to ensure that students scored well on high-stakes tests. Due to accountability measures tied to NCLB, high-stakes test scores in reading and mathematics were the only ones scrutinized; therefore, teachers focused their efforts on reading and mathematics.

In addition, there was concern among scientists that American students were underperforming in science and mathematics compared with students in other countries. Some of America’s greatest scientific minds were concerned that the United States would lose its economic superiority because its students were not prepared for careers in science and technology, according to Rising Above the Gathering Storm, a report released by the National Academies of Science (2007). This report included an overview of the importance of science and technology to the nation’s prosperity and its status in science and technology compared with other countries and cites the following alarming statistics about our country’s elementary and high school students:

- Twelfth graders recently performed below the international average for 21 countries on a test of general knowledge in mathematics and science.
• Fewer than one-third of fourth and eighth grade students performed at or above a level called *proficient* in mathematics; *proficiency* was defined as the ability to exhibit competence with challenging subject matter. Alarmingly, about one-third of the fourth graders and one-fifth of the eighth graders lacked the competence to perform basic mathematical computations.

• In 1999, only 41% of our eighth grade students received instruction in math from a teacher who specialized in mathematics, considerably lower than the international average of 71%.

To increase student interest and achievement in science, technology, engineering, and mathematics (STEM), the committee who wrote the *Rising Above the Gathering Storm* report made a number of recommendations, including educational programs that would help teachers increase their knowledge, understanding, and ability to teach STEM; however, funding for these initiatives was limited.

In addition to this report, the 2007 “Trends in International Mathematics and Science Study” [TIMMS] was statistically unchanged compared with 1995, illustrating that American students were not demonstrating an increased knowledge of science and mathematics as measured by this high-stakes test. Francis Eberle, executive director of the National Science Teachers Association [NSTA] discussed her concerns regarding the results of American students’ science scores on this test. Although she was discouraged by the low scores by American students, she was not surprised. “What is truly appalling,” she said, “are the low scores posted by minority students, especially African American students” (NSTA, 2009). African American students scored 79 points lower
than their white classmates in fourth grade, and the gap grew to nearly 100 points in eighth grade.

Urban schools tend to have high concentrations of minority students. Hourston, Hollis, Clay, Ligons, and Roff (1999) believe urban schools exist in a climate of low expectations, and experience high dropout rates and above-average teacher and student mobility. Students with the greatest need usually had the least-qualified teachers. NCLB stressed the basics of reading, writing, and mathematics; therefore, teachers in low-performing schools focused on these subjects, often omitting science. Reasoning that if students could not read, they would not be able to pass the test, one urban district’s science supervisor said her district spelled science as “R-E-A-D-I-N-G” (Letts, 2002).

With elementary and middle school teachers in low-performing schools struggling to ensure that every student could read and write, science was not a priority; but if America was going to maintain its status as an economic leader, teachers had to encourage students’ interests and understanding of STEM. In the past, high school graduates were able to get decent wages working in factories, but high-wage assembly-line positions were being eliminated. In a world where technological developments are in the news daily, students need to be technologically literate to secure high-wage positions.

Valli (1999) believes that to accomplish positive change, especially in urban schools, all public institutions have the responsibility to work together. Finding cost-effective programs to help teachers in urban schools teach science is essential. School districts need to partner with other institutions to provide effective programs that increase students’ interest and understanding of STEM.
Potential partners to assist schools’ development of students’ interest and knowledge in science are informal education sources including museums, science centers, zoos, and historical sites. In this context, the word “museum” is used to describe all informal learning settings, including zoos, nature centers, and science centers. Museums are collection-based institutions with public access and educational missions (American Association of Museums [AAM], 2007).

Museums have a long history of providing services to schools, paralleling the rise of public schooling (Rubin, 2006). According to the AAM (2007), nearly 11,000 American museums spend more than $1 billion annually to provide over 18 million instructional hours for k-12 educational programs such as professional development for teachers, guided field trips, and staff visits to schools. In addition, 87% of Americans say museums are a trustworthy source of information among a wide range of choices (AAM, 2007).

Science museums and schools are both educational institutions with educational missions, and because museums invest time and money toward developing educational programs, it would seem natural for museums and schools to work together to create educational programs using museum collections to benefit students. But museums often struggle to develop and maintain effective partnerships, especially with urban schools that are focused on student achievement as measured by high-stakes test scores. A white paper produced by participants at a symposium of informal education practitioners and researchers entitled “In Principle, In Practice” identified issues that impact museum-school partnerships including stereotypical assumptions of teaching methods and

This research will examine museum-school partnerships to provide museum and school educators’ additional knowledge and resources to overcome these challenges in order to create effective partnerships that ultimately help students. It will examine the elements necessary for an effective museum-school partnership and the impact of how teaching and learning, constructed across context; affect a museum-school partnership.

Originally guided by two questions, the research will add to the body of knowledge regarding partnerships by examining:

1. How does each group perceive the partnership in general (e. g., goals, expectations, etc.)?
2. How are expectations about teaching and learning constructed across context and partnership roles?

During data analysis, question one became two questions, differentiating between goals (something to strive for, a target to reach) and expectations (obligations that were considered reasonable and necessary). Additionally, a third question arose from the data; therefore, the data were analyzed around the following four questions:

1. How does each group perceive the goals of the partnership?
2. What does each group expect from the other partners and from the experiences provided within the partnership?
3. How are expectations about teaching and learning constructed across context and partnership roles?
4. How has the partnership changed over time?
Using qualitative methods with interpretive descriptive purposes (Erickson, 1986; Glesne, 1999; Lincoln and Guba, 2000), the research design is based on several methods of data collection, including face-to-face, semi-structured interviews, observations, written text, and field notes. Participants in this study include representatives from each partner group, including students, parents, teachers, school administrators, and museum educators. In addition, adult representatives of community organizations were interviewed to determine the impact of the partnership on the community.
CHAPTER 2

REVIEW OF LITERATURE

This research poses four questions.

1. How does each group perceive the goals of the partnership?

2. What does each group expect from the other partners and from the experiences provided within the partnership?

3. How are expectations about teaching and learning constructed across context and partnership roles?

4. How has the partnership changed over time?

Several bodies of literature informed this research and will be reviewed within this chapter. First, multiple definitions, interpretations, and patterns of implementing partnerships will be explored. Second, definitions, examples, and elements of museum-school partnerships will be examined. Third, definitions, elements, and challenges of operating university-school partnerships will be considered. Finally, the common connections between museums and schools will be explored.

Definitions of Partnerships

The definition of the word partnership depends on the context. An Internet search found several definitions describing the word in a business context. The Internal Revenue Service (2007) defines a partnership as a relationship existing between two or
more persons who join to carry on a trade or business. Each person contributes money, property, labor, or skill, and expects to share in the profits and losses of the business.

The Merriam-Webster Dictionary (2007) defines a *partnership* in the context of a business, as a legal relation existing between two or more persons contractually associated as joint principals in a business. Using these business definitions as a guide, this research will draw upon nonprofit partnership initiatives for guidance, defining the word *partnership* as a durable relationship between two or more parties, having common and compatible mission and goals, who agree to work together to achieve a common goal, sharing both resources and rewards (National Assembly of National Voluntary Health and Social Welfare Organizations; 1991; Mattessich and Monsey, 2001).

In their book, *Collaboration: What makes it work*; Mattessich and Monsey (2001) suggest that partnerships exist on a continuum, with cooperation on one end and partnership on the other. This continuum has been adapted and modified for this inquiry. See figure 1.

As the figure suggests, cooperation involves two or more organizations interacting on an as-needed basis; the relationship is informal, and representatives get together infrequently, if at all, to plan together. In the business literature, cooperation usually involves individuals or organizations in their traditional role, working together to achieve a common goal or joint interest. Rewards do not have to be reciprocal (Dierking, Falk, Holland, Fisher, Schatz, Wilke, 1997; Mattessich and Monsey, 2001).

Partnership, on the other end of the continuum, includes many of the same essential elements of cooperation, but on a deeper level. Partnerships are more durable relationships, built upon a common mission and/or goals, to create a mutually-created
product. Together these organizations share resources and information, and commit to joint planning and decision making (Dierking et al., 1997; Mattessich and Monsey, 2001; National Assembly of National Voluntary Health and Social Welfare Organizations, 1991)

Figure 1: Cooperation-Partnership Continuum (adapted from Mattessich and Monsey, 2001)

In general, the nonprofit partnership literature indicates there are four elements necessary for effective partnerships. They are (1) shared goals; (2) strong communication plan; (3) skilled leadership, and (4) sufficient resources (Dierking et al., 1997; Mattessich and Monsey, 2001). Using this basic definition of the word *partnership*, with an understanding that partnerships may exist on a continuum, this information will now be applied to research focused on partnerships that include at least one museum.
Museum-School Partnerships

The research literature describing partnerships between museums and schools is limited. Some articles that did cite partnerships between schools and museums provided only cursory references to the partnership. In an article in *The Elementary School Journal*, titled “Hands-On Biology: A Museum-School-University Partnership for Enhancing Students’ Interest and Learning in Science,” the authors state, “The partnership had reciprocal benefits for all participants and serves as a model for other communities” (Paris, Yambor, and Packard, 1998, p. 268). The statement is powerful, but the article does not tell us what the reciprocal benefits are or why this partnership would serve as a model. Used here to illustrate the challenge of finding any substantial research on educational partnerships within the science center and museum community; instead of discussing the partnership, this article goes on to describe the product of the partnership: a biology curriculum. In addition to this superficial reference to a partnership, other early pieces of literature used the word partnership in their titles, but were truly curriculum guides produced by teachers and museum educators who chose to work together (O’Brien, O’Farrell, and McShea, 1991), or articles that shared examples of programs created by partnerships (Ault and Herrick, 1991; David and Mathews, 1995; Hodgson, 1986), without discussing specifics about the partnership.

Two early documents that discussed museum-school partnerships profiled successful ones and identified the conditions the organizations attributed to their success. The documents, written by Sheppard (1993) and Hirzy (1996), were booklets that provided museum staff with examples of successful museum-school partnerships and guidelines for initiating and maintaining successful partnerships of their own. The
partnerships described in these booklets involved classroom teachers and museum educators who developed and implemented educational programs for students and teachers. These programs benefited museums and schools: teachers and students received educational programs while museums received much-needed funding for providing these programs.

In the early 21st century, several authors published research about museum partnerships, some focusing on educational programs that were produced through partnerships (Danko-Mcghee, 2004; Keating and Howe, 2004; Mather, 2000; Melber, 2003; Rahm, 2006; Shields, 2001; Zinicola and Devlin-Scherer, 2001), while others delved into the workings of museum-school partnerships (Benton Foundation, 2001; Marshall, 2002; Sheppard, 2000; Sheppard, 2007; Walter and Westbrook, 2001). Although much of the work focused on logistics, some went beyond logistics to discuss the complicated nature of partnerships. Marshall (2002) discussed collaboration as a “creative process”; the Benton Foundation (2001) described the professional ethics involved in partnerships; and Sheppard (2000) identified the importance of connecting museum resources with community support to ensure the lifelong learning required for everyone in the Information Age.

To better understand the complicated nature of museum-school partnerships, this review will first provide a definition of an effective museum-school partnership; then it will examine examples of effective museum-school partnerships. Finally, it will consider the logistics involved in the development and maintenance of partnerships as it relates to the formation of partner perceptions.
Definition of an Effective Museum-School Partnership

Sheppard (2007) defines an effective museum-school partnership as partners from two or more diverse organizations who come to the table with their strengths and weaknesses and with a desire to create something new that benefits not only each partner, but the community. This definition is similar to the traditional business definition of a partnership in that it involves two or more organizations joining to create something new. It is different from the general partnership definition in that the common goal will benefit not only the partners, but the larger community.

Examples of Effective Museum-School Partnerships

Several articles share examples of programs created by effective partnerships without sharing information about how the partnerships work. Ault and Herrick (1991), Danko-Mcghee (2004), David and Matthews (1995), Hodgson (1986), Mather(2000), and Zinicola and Devlin-Scherer (2001) describe professional development programs between museum and school district educators, primarily using museum resources to meet the teachers’ needs.

For example, the Philadelphia Alliance for Teaching Humanities in the Schools (PATHS) was a partnership between the Philadelphia City schools with area museums. In this partnership, museum curators shared artifacts and information about how they did their jobs with area teachers, infusing teachers with their passion for their specialties or collections (Hodgson, 1986). Teachers who participated in Teacher Internship Program for Science (TIPS) — a partnership between the Museum of History and Science and Jefferson County Public Schools in Louisville, Kentucky — had the opportunity to use museum resources and practice teaching science in the museum. Research indicated that
these teachers taught science almost twice as often as non-TIPS teachers and employed interactive lessons more often (David and Matthews, 1995).

Partnerships also exist between universities and museums, allowing university pre-service teachers to practice teaching in museums. Seton Hall University pre-service teachers build a foundation in science while practicing their teaching skills with diverse populations at the Liberty Science Center (Zincola and Devlin-Scherer, 2001). University of Toledo pre-service teachers learn about the graphic and aesthetic development of young children and how best to nurture this process in developmentally appropriate ways by teaching a popular art class at the Toledo Art Museum (Danko-McGhee, 2004). Ault and Herrick (1991) describe a partnership in which pre-service teachers worked with museum-exhibit designers to evaluate exhibits. This mutually beneficial partnership provides pre-service teachers with science content and inquiry facilitation skills, while museum-exhibit designers receive valuable feedback regarding their exhibits.

In the Digital Age, museums are also partnering with school districts to provide professional development by using technology. The Miami Museum of Science connects with Florida teachers using the train-the-trainer model. Teacher trainers attend institutes that prepare them to conduct workshops for other teachers within their districts on topics including Web navigation, online research, and the logistics of creating their own homepages (Mather, 2000).

Museum partnerships that provide professional development are generally appreciated by teachers who welcome the opportunity to use museum resources and interact with experts. Teacher participants in museum-based professional development
programs are encouraged to manipulate objects and observe phenomena the way museum curators do (Chenoweth, 1989). In addition, because museums are nonthreatening, they can create safe learning environments for teachers who have little science knowledge to ask questions and do experiments. Frank Oppenheimer, founding director of the Exploratorium, was quoted saying, “No one ever flunked a museum” (Semper, 1990).

Articles that share examples of museum-school partnerships provide museum educators with ideas for potential partnerships, but they do not go into detail about how to develop and maintain effective partnerships. Many museum educators would like to create and maintain effective partnerships, but they are unsure about how to proceed.

Elements of Effective Museum-School Partnerships

For a partnership to function, each organization must maintain an accurate perception of the partnership. This is easy to say but difficult to put into practice. The literature identifies several logistical elements that can provide partners with the tools to manage perceptions. See Figure 2.

Those mentioned most often in the literature include:

1. Mutually agreeable goals and objectives (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001)
2. Clear communication (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001)
3. Develop trust (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 2007; Walter and Westbrook, 2001)
4. Understand and acknowledge that potential collaborators must be different enough to stimulate change in each other (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 2007; Walter and Westbrook, 2001)

5. Desire to improve effectiveness (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001)


Each of these elements will be examined in the following paragraphs to gain an understanding of how they might be incorporated into partnerships.

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<td>Clear Communication</td>
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<td>Develop Trust</td>
<td>✓</td>
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<tr>
<td>Understand and Acknowledge Differences</td>
<td>✓</td>
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<td>Desire to Improve Effectiveness</td>
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<tr>
<td>Ongoing Evaluation</td>
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Figure 2: Managing Partnerships: Necessary Logistical Elements by Author
1. Mutually Agreeable Goals and Objectives

All researchers who discussed partnership development and operations identified mutually agreeable goals and objectives as essential to effective partnerships (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001). This can be challenging when museums partner with schools, because although both are educational institutions, they might have different missions, education philosophies, and expectations for a partnership. Participants in effective partnerships understand each other’s goals and expectations and work together to create something neither organization could establish on its own (Benton, 2001; Marshall, 2002; Sheppard, 2007).

Marian A. Godfrey, Director of Culture Programs for the Pew Charitable Trusts believes that determining the goal(s) of the partnership is the most difficult part of partnership development (Marshall, 2002). As the goal of the partnership is developed, partners need to determine what, if anything, they can provide to the partnership and what, if anything, they will receive in return. If there is not a true mutuality of interests, the partnership is less likely to be effective (Marshall, 2002).

Early museum-school partnerships were simple, because teachers mostly wanted educational resources and logistical support when they brought their students to museums on field trips (Sheppard, 1993). Students wanted to touch things, to be able to see artifacts and exhibits, to be able to talk with each other about the artifacts and exhibits, and to have fun (Sheppard, 1993). Museum staff usually was able and willing to meet these expectations.
This is not the case with the current emphasis on high-stakes testing in public schools. Museum learning experiences are highly scrutinized by school administrators to ensure that they relate to content about which the students will be tested and which will contribute to students’ ability to pass the test. In order to partner with schools, museums must be aware of this expectation and align goals accordingly. An example of this can be found in Walter and Westbrook’s (2001) work to establish a partnership with the Science Teachers Association of Texas. Understanding a school’s needs for academic achievement, the initiative purposively focused on “school improvement by bridging the ‘science-rich’ resources of Texas’ free-choice science-education community to schools” (p.175). By matching the schools’ needs with museum resources, an effective partnership was created.

Marshall (2002) suggests that there might be awkwardness in the beginning; however, if no one ventures to begin a partnership, no partnership will form. By identifying a common goal and communicating that goal to all potential partners, partners may determine for themselves if they have anything to contribute to the partnership.

2. **Clear Communication**

Goals are important, but if they are not communicated to all partners, they will not be realized. This is why clear communication also was identified as an essential element of an effective partnership by all researchers who discussed museum-school partnership development and operations (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001). While the benefit of a partnership is the collection of different voices, this may also be a challenge, as each partner might speak using different jargon or in a different style (Marshall, 2002).
Communication challenges identified among partners included the use of different languages, communication methods, and communication tools.

Partners might use different jargon or protocols to describe their reality, which may initially confuse an issue (Marshall, 2002), especially when different partners use different words or protocols to describe similar situations. Museums educators and school teachers each have their own jargon, using different terms to describe similar but different professional practices (Sheppard, 2007). Creating a glossary that defines partner jargon will benefit understanding and, ultimately, the partnership.

Communication methods may differ between partners. For example, Carol Larson, leader of Wisconsin Public Television’s partnership with a local history museum, shared an experience where she asked both staffs via written memorandum for written opinions on a programming idea she was formulating (Benton Foundation, 2001). The historians were angry, because in their organization, when an idea was written down, it marked the end of a discussion, not the beginning. This initially stifled the conversation and the partnership. Janet Hatano, in Hirzy (1996) points out that museum time differs from school time. Museums take time to plan exhibitions, while teachers usually implement curriculum programs swiftly. Understanding a partner’s language, communication practice, and timeline increases effectiveness.

In addition, partners need to have access to the same communication tools (Benton Foundation, 2001), including telephone, voice mail, e-mail, instant messaging, and/or videoconferencing. Beyond access, partners need to understand how to use the technology (Benton Foundation, 2001). This was not considered often prior to the 21st century partnerships, when communication methods were limited to meetings, letters, and
telephone conversations; but with new communication methods rapidly being developed, such as instant messaging, Twitter, Yammer, and Ning sites, operating within the same communication platforms will be important to 21st century partnerships.

Some partnerships find that a written communication agreement is beneficial to ensure effectiveness (Benton Foundation, 2001; Marshall, 2002). The Benton Foundation (2001) suggests a communication plan that identifies an overview of the project, a timeline, and points of contact will accomplish this. The document might also include a dictionary or reference guide specific to the partnership. Given the intricacies of partnerships, it is important to identify communication basics to avoid misunderstandings.

To ensure that all partners are aware of partnership activities, all involved should receive written project updates on a regular basis. The team members working directly on the project most likely would receive frequent updates, while those not working on the project, including board members, would receive quarterly updates (Benton Foundation, 2001).

Honest communication builds trust among partners. Partners who share their hopes and reservations honestly are more likely to develop trust; ultimately creating effective partnerships.

3. Developing Trust

Museums might develop partnerships with several different and distinct entities, including schools, scientists, and public broadcasting corporations (Benton Foundation, 2001; Hirzy, 1996; Rahm, 2006). Each may bring a different perspective to the table. An
effective partnership requires that partners understand what each brings to the table and trust that all will do their best to make the partnership work effectively.

Harold Kramer of Connecticut Public Broadcasting described the development of a partnership as a “courtship” (Benton Foundation, 2001). To develop trust, museum staff suggests taking partners to lunch. The conversation during the meal can be used as a platform to develop understanding and address differences, limitations, and fears (Marshall, 2002; Sheppard, 2007).

Partnerships need time to develop trust (Benton Foundation, 2001; Marshall, 2002; Sheppard, 2007). Time is needed for each partner to gain an understanding of each other’s staffs, programs, facilities, etc. (Sheppard, 2007). When partners trust each other, they will honestly articulate their expectations and concerns (Marshall, 2002). James Steinbach of Wisconsin Public Television, quoted in a Benton Foundation report (2001), advises partners to be frank with themselves and their partners about what it is they want out of the partnership and what they’re willing to commit in terms of time and resources.

Most partnerships will encounter difficulties. Effective partnerships are anchored by trust so that when difficulties arise, they are able to weather the storm (Marshall, 2002; Sheppard, 2007).

4. Understand and Acknowledge That Collaborators Must Be Different Enough to Stimulate Change in Each Other.

As mentioned, museums form partnerships with a variety of collaborators, including school teachers, scientists, artists, musicians, universities, and public-broadcasting organizations. These collaborators bring a different perspective to the museum staff’s work. Examples of these collaborations include:
A traditional art museum curator may work with a local modern artist to create an exhibit that combines traditional art juxtaposed with the local modern artist’s work. For example, Sheppard (2007) describes an art exhibition that placed a lynched body of a black man, fashioned from glass beads, directly above Rodin’s *The Thinker*.

Marshall (2002) described a partnership between composers and art curators that resulted in an exhibition that combined art with music, sharing the music of the artist’s time with his paintings.

Working with scientists, museum staff, teachers, and students have the opportunity to work with real and complex equipment, be part of a team of scientists, and better understand the scientific process (Rahm, 2006). Additionally, these partnerships may provide students with a positive view of science and scientists (Rahm, 2006).

The Wing Luke Asian Museum in Seattle invites community members to become part of the staff, adding authentic stories, perspectives, and community concerns to the traditional skills of the museum staff (Sheppard, 2007).

To develop partnerships with different collaborators to enhance museum exhibits or educational programs, museum staff must be willing to engage those who have perspectives different from their own. Partnership elements previously identified (mutual goals, communication, and trust) are essential to developing understanding and working relationships with collaborators who are different enough to stimulate change.

When developing partnerships James McNutt, president of the Witte Museum, believes that organizations need to “think beyond what they had been doing” (Benton
In museum-school partnerships, Hirzy (1996) points out the museum’s need to be aware of the school’s differences, especially a school’s need to meet curriculum and state education standards. By looking to collaborators who are similar, yet different, partnerships will expand their reach and dimension, serving a greater community (Sheppard, 2007).

5. **Desire to Improve Effectiveness**

All of the research that focuses on partnership fundamentals cites a desire to improve effectiveness as a key reason for museum-school partnerships (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002; Sheppard, 1993; Sheppard, 2007; Walter and Westbrook, 2001). Partnerships are able to solve problems and improve effectiveness because they “link a ‘means to a means’” (Marshall, 2002, p. 15).

Partnerships should result in either an organizational efficiency or a new product (Benton Foundation, 2001; Marshall, 2002; Sheppard, 2007). Partners can help each other do business better by discovering new ways to operate, sharing financial resources, leveraging grants, or developing fundraising activities. Partners can help each other programmatically by creating and producing educational programs that engage new audiences, develop new understandings and meanings, and/or extend public access to resources (Benton Foundation, 2001; Marshall, 2002; Sheppard, 2007).

Small museums might not have the skills and resources necessary to survive in the 21st century. As our world becomes increasingly complex, needed skills and resources may no longer reside in a single institution (Sheppard, 2007). Museums may need to partner with other organizations to have access to information technology, human resources, and/or accounting support.
Museums can partner to provide educational materials and programs, including professional development and relevant curriculum materials, so that teachers can create high-quality learning experiences for their students (Hirzy, 1996; Sheppard, 1993). Educators, students, and their families may use these educational materials; thus viewing the museum as a resource (Sheppard, 2007). These programs can create public awareness and increase the value of museums as learning institutions.

Partnerships are not just about the joint delivery of a product; at their best, they are about sharing and shaping an essential experience in concert with the very community and audience they wish to serve (Sheppard, 2007). They are not self-serving; they build on the strengths of all involved to overcome limitations (Marshall, 2002). They bring organizations together to accomplish something they could not do alone (Marshall, 2002; Sheppard, 2007).

6. **Ongoing Evaluation**

Sheppard (2007) relates partnerships to friendships. Partnerships, like friendships, begin positively, usually because of shared interests or experiences, and might go on untroubled for a long time. Eventually something happens to shake up the relationship. One partner can become demanding or feel overwhelmed, causing other partners to increase the amount of energy and effort they are putting into the partnership. Evaluating a partnership throughout its lifespan identifies the positives and negatives.

Evaluation is especially important for museums in the 21st century, where business models have become the norm. Resources are scarce, and expectations are high; therefore, it is important to identify successes through nonbiased assessment (Sheppard,
Although museum professionals may assume that a partnership benefits a museum, they must prove what they assume is true (Marshall, 2002).

Marshall (2002) suggests that partners evaluate the reasons they join a partnership. Museums typically join or create partnerships to benefit the public good, and these types of partnerships create high expectations, usually with limited resources. It is important for museums to analyze the risks, goals, and motives of all agencies involved to determine if they are acceptable.

In a partnership, it is important to recognize that if one partner fails, the partnership will fail (Sheppard, 2007). This is why it is important to evaluate the partnership at agreed-upon points throughout its existence to determine if the original goals and outcomes are being met (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002, Sheppard, 2007). A variety of quantitative and qualitative measures may be used to evaluate the impact of the partnership (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002), as long as multiple viewpoints are captured to gain the best understanding of the successes and challenges (Marshall, 2002). The data acquired must be continuously analyzed and fed back into the system to refine processes (Marshall, 2002).

Whatever methods are used, evaluation must account for all resources and impacts. As more and more museums adopt business practices, museum leaders are examining partnerships for a return on investment (Marshall, 2002).

Partnerships should evaluate the following:

- Problem addressed by the partnership (Is it the right one?)
- Vision and goals (Are they appropriate?)
• Strategy (Are there other means that may be employed?)
• Implementation (Is this the right plan?)
• Impact (Was the desired outcome achieved?)

(Marshall, 2002; Sheppard, 2007)

In museum partnerships, it is important to evaluate the effects and impact of the partnership separately from the project or program developed by the partnership (Benton Foundation, 2001, Hirzy, 1996). Partnerships might not create the perfect educational program, but they can create unintended efficiencies. Marshall (2002) suggests that evaluation must be flexible to measure the complexities of a partnership. If, or when, something changes, the evaluation method must be revised to capture the data necessary to measure the change.

Conclusion

The research on museum-school partnerships provides several examples that illustrate how museums have partnered with schools to create successful educational programs for teachers and students. Additionally, the research suggests that effective museum-school partnerships contain the following elements: mutually agreeable goals, clear communication, trust among partners, collaborators with different strengths, a desire to improve efficiencies, and ongoing evaluation.

The amount of research about museum-school partnerships is limited; therefore, it is important to examine partnerships from a similar, but different perspective. In the next section, the research that explores university–school partnerships will be examined for similarities and differences.
University-School District Partnerships

Another form of educational partnership, similar yet different from museum-school partnerships, is the university-school partnership. This section will examine the research that focuses on partnerships between university and school staff in order to define the essence of an effective university-school partnership; examine the differences between university and school environments, identify the elements necessary for a successful university-school partnership, and note two challenges that research has identified as affecting these partnerships.

Definition of a University-School Partnership

To understand if a university-school partnership is effective, it first must be defined. Goodlad (1990) offers an inclusive definition of an effective partnership between a university and school as one that includes school and university educators joined in a mutually beneficial enterprise, usually to reinvent education through pre-service of new teachers, professional development for practicing teachers, curriculum reform for young learners, and research. This definition is similar to the general partnership definition and the museum-school definition in that all involve multiple partners working together to create something new. University — school partnerships are similar to museum — school partnerships in that both want to create something that will ultimately benefit the larger community.

Research indicates university-school partnerships may consist of k-12 school principals and teachers who partner with university faculty. Faculty may reside in several content areas, including the sciences, arts, and humanities, although usually at least one education faculty member is included in the partnership (Burnaford, 2001; Erickson and
Christman, 1996; Harris and Harris, 1994; Lewison and Holliday, 1999; Marlow and Nass-Fukai, 2000; Pugach and Johnson, 1995; Richmond, 1996; Su, 1999).

Goodlad’s definition states that successful partnerships need to be mutually beneficial. Hourston, Hollis, Clay, Ligons, and Roff (1999) believe that k-12 teachers can benefit from university-school partnerships when universities place enthusiastic adults (scientists, student teachers, etc.) in a classroom. Teachers might also benefit from in-service workshop opportunities and the opportunity to learn from research conducted at their school (Pugach and Johnson, 1995; Valli, 1999; White, Rainer, Clift and Benson, 1994). University education faculty can assist teachers with teaching strategies that support increasingly complex instruction methods, increases in teacher responsibility, and diverse student population achievement, including students with disabilities (Pugach and Johnson, 1995). These partnership benefits are increasingly important to teachers due to the accountability created by The No Child Left Behind Act (Hourston et. al., 1999). University faculty benefit from university-school partnerships through access to real-world research sites, practical knowledge from teachers, and student-teacher placements (Burnaford, 2001). In general, partnerships between universities and schools are beneficial to both faculties; university faculty can provide insight into both content and pedagogy, while teachers provide practical applications and day-to-day experience. These partnerships also benefit the greater community through their impact on student learning.

There are several similarities between universities and schools, because both are educational institutions. However, much of the research ignores the similarities. The
research does go into some detail about how university and school faculty and environments are different, and how these differences affect partnerships.

*Differentiating Between University and School Environments*

Although schools and universities evolved to support educational pursuits, today they serve different functions and, therefore, exist in different environments (Burnaford, 2001). Two key differences between universities and k-12 schools are: (1) k-12 education is compulsory, while university attendance is not; and (2) k-12 teachers are considered a success if their students pass standardized tests that are reported to the community, while university faculty are measured by their student evaluations (which are not reported to the community) and scholarly pursuits. These daily realities can create different work environments, as identified by Burbules and Rice (1991) in Table 1.

<table>
<thead>
<tr>
<th>K-12 Faculty</th>
<th>University Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student attendance is compulsory</td>
<td>Students attend willingly</td>
</tr>
<tr>
<td>Focus on teaching</td>
<td>Teaching combined with research</td>
</tr>
<tr>
<td>Rigid daily schedule</td>
<td>Flexible daily schedule</td>
</tr>
<tr>
<td>Isolated from peers, working with students most of work day</td>
<td>Interact with peers throughout work day</td>
</tr>
<tr>
<td>Success measured by state report cards shared with school district community</td>
<td>Success measured by scholarly pursuits shared with scholarly community</td>
</tr>
<tr>
<td>Practitioner</td>
<td>Researcher</td>
</tr>
</tbody>
</table>

Table 1: Common differences between k-12 and university faculty
K-12 teachers, working with students who are required to attend, spend a significant amount of their day in the classroom with students, and are focused on classroom management. They must motivate students who might not wish to be in school at that particular moment. In the elementary grades, teachers may teach several completely different subjects; in grades 6–12, they can teach the same subject, such as science, throughout the day, but be focused on different content with each period (for example, life sciences first period, earth sciences second period, etc.). Teachers follow the district curriculum, usually teaching a wide spectrum of content, some of which might not interest the teacher. Spending so much time isolated from other adults, working alone in their classrooms with their students, teachers are motivated to learn practical applications that facilitate student learning and to attend workshops that provide information about new teaching tools, lessons, and methods.

While teachers focus on facilitating student learning, they must also focus on student assessment and data analysis, using the data to improve student learning and, ultimately, student test scores (Hourston et al., 1999). Society wants to know how well students do utilizing basic skills on high-stakes tests, and teachers are judged by how well their students score on high-stakes tests.

The researcher has taught in k-12 classrooms and at the university level, and in general, she spent less time focused on classroom management with her university students. This might be because k-12 education is required and higher education is not, or it may be because college students pay tuition for the privilege of attending class, thus eliminating students who do not believe that education is worth the cost. It might also be
because the administrative framework of k-12 education provides numerous behavior guidelines and consequences, while the university focuses only on the most significant behavior infractions.

At the college level, professors teach in their areas of expertise (Burbules and Rice, 1991), and although they usually teach several classes, professors can tailor a class to their interest when they create the syllabus and select classroom readings. University faculty are less isolated from colleagues (Burbules and Rice, 1991) due to their teaching schedule, which usually includes time to converse with colleagues, write journal articles, and facilitate research studies.

Finally, university faculty members are not judged by state-required high-stakes tests, and although they want their students to learn, they are not evaluated by student mastery of classroom topics. University faculty members are evaluated by their students and need to maintain respectable scores on these evaluations, but these evaluations are not shared with the community, unlike high-stakes test results. However, faculty members are not judged solely by their teaching. Tenure-track professors must juggle teaching, research, and service to secure tenure at a university.

Although educational partnerships are created to facilitate change, due to the different environments, educators could have different views about how to precipitate change. Valli (1999) sums up how university faculty and k-12 teachers view educational change using the firing-line commands of “ready, aim, fire.” In k-12 schools, Valli believes that the focus is on fire, as administrators and teachers implement new strategies relatively quickly to improve learning. She believes that universities, on the other hand, focus on ready, with their emphasis on research. This analogy is supported by other
researchers, including Grundy, Robison, and Tomazos, 2001; Marlow and Nass-Fukai, 2000; Pugach and Johnson, 1995; and Richmond, 1996.

Organizations working together can provide services or benefits that neither could achieve individually; however, differences must be acknowledged before university and school faculty can partner. Stephens and Boldt (2004) believe that partnerships between k-12 school and university faculty can simultaneously rejuvenate all involved, but to receive these benefits, several elements must be in place to bridge the gap between the different cultures involved in the partnership.

Elements of Effective University-School Partnerships

The research identifies several elements that support an effective education partnership between a k-12 school and a university. Those mentioned most often in the research include:

1. Mutually agreeable goals and objectives (Erickson and Christman, 1996; Grundy et al., 2001; Harris and Harris, 1994; Lewison and Holliday, 1999; Marlow and Nass-Fukai, 2000; Pugach and Johnson, 1995; Richmond, 1996; Su, 1999)

2. Communication plan (Erickson and Christman, 1996; Grundy et al., 2001; Lewison and Holliday, 1999; Noffke, Clarck; Palmerio-Santiago, Sadler, and Shujaa, 1996; Pugach and Johnson, 1995; Richmond, 1996; Stephens and Boldt, 2004; Su, 1999)

3. Developing trust (Burnaford, 2001; Erickson and Christman, 1996; Grundy et al., 2001; Lewison and Holliday, 1999; Marlow and Nass-Fukai, 2000; Noffke
et al., 1996; Pugach and Johnson, 1995; Richmond, 1996; Stephens and Boldt, 2004; Su, 1999)

4. Commitment to democracy and avoidance of hierarchical relationships
(Erickson and Christman, 1996; Grundy et. al., 2001; Harris and Harris, 1994; Lewison and Holliday, 1999; Marlow and Nass-Fukai, 2000; Noffke et al., 1996; Richmond, 1996; Stephens and Boldt, 2004; Su, 1999)

5. Acknowledgement that potential collaborators must be different enough to stimulate change in each other (Erickson and Christman, 1996; Grundy et. al, 2001; Harris and Harris, 1994; Richmond, 1996; Stephens and Boldt, 2004)

6. Communities of inquiry (Burbles and Rice, 1991; Burnaford, 2001; Erickson and Christman, 1996; Grundy et. al., 2001; Lewison and Holliday, 1999; Noffke et al., 1996; Richmond, 1996; Stephens and Boldt, 2004)

1. Mutually Agreeable Goals and Objectives

Researchers studying university-school partnerships agree that, for a partnership to function effectively, all partners need to share a commitment to common goals (Erickson and Christman, 1996; Grundy et al., 2001; Harris and Harris, 1994; Lewison and Holliday, 1999; Marlow and Nass-Fukai, 2000; Pugach and Johnson, 1995; Richmond, 1996; Su, 1999). Marlow and Nass-Fukai (2000) described a successful partnership to integrate inquiry-based teaching methods into the school science curriculum. They believe that the partnership between university faculty and primary and secondary teachers from 20 Colorado school districts, and museum educators was successful because they focused on mutual goals.
Yet common goals might be difficult to reach because of the different needs of k-12 teachers and university faculty. Although universities, museums, and schools are all educational institutions, each could have different goals for a partnership (Burnaford, 2001). Pugach and Johnson (1995) found that some university faculty believe that partnerships with schools exist to provide research sites or placements for student teachers, while school administrators view university faculty as professional development providers. University-school partnerships founded on dissimilar beliefs tend to fail.

As university and school faculty face different pressures, each probably will have different goals for a partnership; k-12 teachers look for practical benefits, while university faculty look for research benefits. Although the research acknowledges the importance of goals, it does not share how goals are developed between partners.

2. Communication Plan

In addition to creating goals, the research indicates each member of the partnership must understand and articulate them to ensure that all partners are vested in the partnership's success. Su (1999) studied a partnership between a university and several schools and found that partners did not have a common understanding of the partnership goals. Findings from analyzed interview data indicate that approximately half of the university faculty, graduate students, and school teachers, including members of the steering committee, were unaware of the partnership’s goals. When administrators in these institutions conceived the partnership, they drafted written goals, but failed to share this information with the participants.

After the creation of common goals, research indicates that partners must establish effective communication methods (Erickson and Christman, 1996; Grundy et
al., 2001; Lewison and Holliday, 1999; Noffke et al., 1996; Pugach and Johnson, 1995; Richmond, 1996; Stephens and Boldt, 2004; Su, 1999). Communication can be difficult because of the different environments within which k-12 teachers and university faculty members exist. Partners might use different terminologies to describe similar experiences, communicate using different technologies, or have different availability in which to schedule face-to-face meetings. These factors must be considered to ensure effective communication.

Richmond (1996), Erickson and Christman (1996), Burbles and Rice (1991), Grundy et al.(2001); and Marx, Honeycutt, Clayton, and Moreno (2006) found that university and school faculty members use different words to convey the same messages. These researchers agree that the authenticity and value of collaboration lie in the ability of participants to communicate effectively across their different cultures. When Noffke et al. (1996) found that university and school faculty defined words differently, thereby creating tensions within the group, they observed meetings to determine the cause of the communication breakdown. For a partnership to succeed, a shared set of terms must be developed, as well as an environment that fosters discussions and analysis, respecting differences in perspective and values (Grundy et al., 2001; White et al., 1994).

Due to the demands of all partners’ schedules and the distance between the university and school, k-12 teachers and university faculty might find it difficult to schedule face-to-face meetings with all partners (Hourston et al., 1999; Marlow and Nass-Fukai, 2000). To overcome this obstacle, partnerships have used electronic communication, including e-mail and video conferencing, to share information (Hourston et al., 1999), which, in addition to being convenient, was status-equalizing (Marlow and
Nass-Fukai, 2000), because no one was forced to travel a great distance to attend a meeting at the lead partner’s office at the end of a long school day. When face-to-face meetings were held, Marlow and Nass-Fukai (2000) found it important to alternate gatherings between the university and the school to equalize status. In addition, they believed that partners needed to enter each other’s worlds on occasion so that they could be comfortable within each other’s work environment.

Maintaining open lines of communication between all partners is the building block upon which many of these researchers established their partnerships (Burbules and Rice, 1991, Erickson and Christman, 1996; Marlow and Nass-Fukai, 2000; Marx et al., 2006; Noffke et al., 1996; Richmond, 1996). To ensure effective communication, partners might consider sharing a communication cycle developed by Pugach and Johnson (1995) with all members. The communication cycle includes a sender, receiver, channel, and environment. The sender sends the message to the receiver, who provides feedback that the message was received and understood. The environment may contain distracters that obstruct the message. Because university-school partnerships must transcend at least two different environments, several distracters may obstruct messages. Partners can role-play the communication cycle to determine significant distracters that may obscure effective communication.

To resolve communication issues within a meeting, Erickson and Christman (1996) suggest having “friendly outsiders” analyze the communication at a meeting to identify obstacles. In their research they found that participants were unable to identify exact moments that precipitated plans for new action. Through the help of “friendly outsiders,” this became visible. University researchers can play the role of “friendly
outsider” and help teachers document their actions and, through reflection, assist in strengthening a school’s capacity for collaboration (Erickson and Christman, 1996).

Once the communication process at a meeting is successful, Grundy et al. (2001), Lewison and Holliday (1999), Noffke et al. (1996), Richmond (1996), Stephens and Boldt (2004), and Su (1999) believe that partnerships should establish a formal communication plan, including a timeline for key actions that identifies those who must provide input to ensure the success of those actions. A communication plan might indicate the preferred communication technology, timeliness of messages, and meeting time availability.

Effective communication among partners must go beyond rhetoric, to a more intimate level (Stephens and Boldt, 2004). Communication at the intimate level involves difficult conversations about real people with real issues; it might also include personal information. Sharing personal information helps build camaraderie. For a partnership to be effective, partners must be able to communicate at the intimate level. To help partners reach the intimate level, Lewison and Holliday (1999) found the following communication strategies useful in moving partners from autonomy to collaboration: create a space so that partners can interact socially; establish and reinforce communication guidelines; and encourage leaders to share their thoughts with all involved.

Communication is central to an effective partnership. Partners must be able to share at a personal and professional level to develop trust. Partners are able to build trust and develop strong partnerships when they can speak the same language, use electronic
communication technology to facilitate meetings when time and distance are obstacles, and create effective communication plans.

3. Developing Trust

As previously discussed, k-12 teachers and university faculty have different educational priorities, and this could prompt partners to create stereotypes of each other. These stereotypes can inhibit the development of trust. White et al. (1994) found that teachers and university faculty did not always view an issue through the same lens; each brought a different value system to the discussion. University researchers might view schools as “sources of data” or “tools to carry out the universities’ agenda”; and they may vilify teachers by presenting their work as mediocre (Grundy et al., 2001; White et al., 1994). Teachers can malign university faculty as talking heads with little practical knowledge, perceiving the work of university faculty as “irrelevant” (Lewison and Holliday, 1999, p. 65).

To develop trust, partners must let go of the stereotypes that each carries about the others (Pugach and Johnson, 1995). For a partnership to succeed, all members must become aware of each other’s distinct interests, moving beyond the preconceived stereotype, and begin to trust each other (Burbules and Rice, 1991; Burnaford, 2001; Grundy et al., 2001; Marlow and Nass-Fukai, 2000; Richmond, 1996; Stephens and Boldt, 2004).

Marlow and Nass-Fukai (2000) have studied a partnership that includes university, school, and museum partners. They believe that university — school collaborative efforts are characterized by tensions due to different cultures; adding a museum adds a third culture and agenda, increasing tension. For a partnership to be effective; they
believe that trust must be established; this is achieved through ongoing professional interactions where each member is treated as an equal and respected for his or her own contribution to the established goals.

Marlow and Nass-Fukai (2000) believe that *kuleana*, a Hawaiian word for responsibility and/or accountability, is necessary to build trust in educational partnerships. They found that *kuleana* is best achieved through informal contacts, such as before or after planned meetings, during meal breaks, or before sharing logistical information on the telephone. By encouraging *kuleana*, partners feel a strong commitment to support each other in realizing their mutual goals.

Noffke et al. (1996) found that partnerships were strengthened when key leaders worked through tensions created by their different points of reference to form similar points of reference on which to strengthen their partnership. They found that individuals who trust each other are better able to work through these tensions.

4. **Commitment to Democracy and Avoidance of Hierarchical Relationships**

Partnerships may take different routes in moving from development to implementation. These routes can be developed by key leaders (Stephens and Boldt, 2004) or can be initiated by those who are actively leading specific activities, gaining key leader support later (Connell, Peck, Buxton, Kilburn, 1994). In either case, perceptions of hierarchical relationships that begin with a partnership may challenge it.

Su (1999) found that school staff felt that they were “token” members in their school-university partnership; 75% of the teachers felt that the “university talks the talk but doesn’t always walk the walk” and that the university was in charge of the partnership. Teachers in Su’s research used the phrases “talks the talk” and “walk the
walk” to indicate that the university told the teachers what they wanted to hear, but they did not follow through on what they told the teachers they would do. Research by Marlow and Nass-Fukai (2000) indicates that the teachers in their study believe that university faculty members reside in an “ivory tower” and that the teachers are “second-class citizens” in comparison. While developing a partnership between a university and an urban school; an assistant principal shared with Burnaford (2001) that he had been advised not to partner with a university. He implied the university faculty would make his project their project, and although he would be getting some data, it might not be the data he wanted.

Although the majority of research found teachers to feel minimized, Su’s (1999) research also found that university faculty felt that they were minimally involved in making decisions. This can be because many partnerships begin as arrangements between key leaders: school superintendents and college deans. These administrators may or may not delegate responsibilities (Stephens and Boldt, 2004), thereby fostering a hierarchy. In addition, those who have had few opportunities to work with partners as equals unintentionally might create a hierarchy to retain control.

Many times partners, accustomed to functioning in their traditional work environment, do not realize that other groups work differently. Richmond (1996) found that her university colleagues dealt with conflict differently than her high school teaching partners. Her university colleagues strengthened their position by engaging in persuasive discourse or challenging others, while her high school colleagues were more egalitarian and listened to each other’s ideas. By handling conflict resolution differently, partners could unintentionally create a hierarchy.
To equalize partnerships, Lewison and Holliday (1999) use the following strategies: voluntary participation, building structure for choice, and providing multiple ways to participate. To create mutually beneficial partnerships, Lewison and Holliday (1999) believe that there must be connective and ongoing relationships with reciprocal influence and equally expanding power. Erickson and Christman (1996) assert that collaboration involves sharing power across lines of institutional turf, professional status, and personal identity. Meetings of equals, in safe environments, where members are respected for their own unique contributions, make for effective partnerships (Marlow and Nass-Fukai, 2000).

5. Acknowledgement That Potential Collaborators Must be Different Enough to Stimulate Change in Each Other

By avoiding hierarchy and sharing power, partners are better able to acknowledge each other’s differences and value the growth that results from the collaboration. As a university science professor, Richmond (1996) chose to immerse herself as a science-resource person and team teach a high school science course. As a scientist, she felt that she brought the necessary content knowledge to the course, and she deferred to the experienced high school teacher to help her navigate the high school culture. Having taught at both the university and high school level, Richmond (1996) shared that team-teaching differed between high school and university levels. At the university level, it was like “running a relay race”; each professor took certain class dates and lectured the class on their area of expertise, never interacting or commenting on each other’s content or teaching techniques. Team-teaching in the high school meant teaching class together and dissecting each other’s teaching at the end of the day. Her partnership was successful.
because the curriculum designed was the best combined thinking of a high school teacher, university scientist, and a university education professor.

Partners must acknowledge and honor the creativity generated by working with others, be willing to share recognition for accomplishments, and value growth as a result of the collaboration (Pugach and Johnson, 1995). Partnerships are successful when all partners feel that they are gaining something new from everyone’s participation in the effort (Stephens and Boldt, 2004).

6. Communities of Inquiry

University faculty tends to create communities of inquiry as part of their partnership efforts. In the research reviewed, several research methods were used to study partnerships, but in each case, the research benefited the larger education communities’ understanding of partnerships.

Burnaford (2001) focused on collaborative action research between school and university researchers. He believes that an effective research partnership exists when:

- Researchers collaborate on defining the question.
- The questions are focused on school-based issues.
- Findings are jointly reported.
- School faculty develop research skills while university faculty develop field skills.
- All involved are professionally rejuvenated.

Grundy et al. (2001) conducted inquiry through reflection. Reflection was used to interrupt common practices and encourage exploration. By taking nothing for granted,
the researchers were able to identify and understand everyday procedures and make changes that benefited everyone involved in the partnership.

In the research reviewed, many partnerships involved the teachers as co-researchers, and that presented opportunities and challenges (Erickson and Christman, 1996; Grundy et al., 2001; Noffke et al., 1996; Stephens and Boldt, 2004). Teachers in the classroom have first-hand knowledge of the impact of the treatment on their students; however, they may not have the time to write and reflect upon detailed field notes. This flabbergasted the research-orientated university faculty, who did not understand why teachers could not take time from their schedule to write and reflect upon field notes (Erickson and Christman, 1996; Noffke et al., 1996).

Effective partnerships are complex, and they demand time, energy, and effort from all involved. Although reflecting upon a partnership while developing and implementing one can be difficult, the larger educational community benefits from the research.

*Common Elements of Museum-School and University-School Partnerships*

After examining the research on museum-school and university-school partnerships, several similarities became obvious. In both, partners might come to the table with different goals based on their institution’s specific mission. To ensure an effective partnership, both identify these five essential elements for a partnership:

1. Mutually agreeable goals and objectives
2. Clear communication
3. Developing trust
4. Acknowledgement that potential collaborators must be different enough to stimulate change

5. Ongoing evaluation or communities of inquiry

The research identifies two differences. Museum-school partnerships have a desire to improve effectiveness as an essential element of a partnership and university-school partnerships do not. University-school partnerships include a commitment to democracy as one of the essential elements, and museum-school partnerships do not.

Even though the research makes the case that these elements are necessary, partnerships appear to exist without one or more of these five elements. This raises questions about these elements, such as: Is a partnership doomed if it does not include each element? Is it possible for a partnership to be effective when it focuses on one element? Is it possible that, like the continuum between cooperation and partnership explored earlier in this chapter, each individual element exists on its own continuum?

Challenges to Effective University-School Partnerships

As there are common elements that increase a partnership’s effectiveness, the research also identifies common issues that challenge a partnership. Partnerships may be difficult because each one is a completely new experience. Therefore, all challenges that could arise cannot be considered in advance (Stephens and Boldt, 2004). Two challenges that an effective partnership must overcome are: (1) funding (Harris and Harris, 1994; Hourston et al., 1999), and (2) time (Harris and Harris, 1994; Hourston et al., 1999).

1. Funding

Although Hourston et al. (1999) found that collaboration requires no additional funds, they did concede that it requires time and commitment, which, some might argue,
cost money. Funding is important because there are tangible and intangible costs associated with school-university partnerships.

Harris and Harris (1994) conducted a cost/benefit analysis of a partnership between Brigham Young University in Utah and several area public-school districts. They were able to assign dollar values to each of the variables and determine a cost for the partnership. The costs amounted to $565 per university student and $69 per k-12 student.

Funding was needed to cover tangible and intangible costs. Harris and Harris (1994) studied the following partnership costs: time; services; facilities; understanding and adapting to each other’s culture; communication; and control. The major tangible cost was time spent in both formal and informal partner meetings, while the greatest intangible cost was understanding and adapting to each other’s culture (Harris and Harris, 1994).

Funding was not discussed at length in the research; but in reality, the researcher has found securing funding to be an essential pre-requisite for a partnership. The researcher believes that the goals of the partnership must be agreed upon first, but in order to secure funding in today’s economy and business-oriented education culture, funding most likely needs to be secured before any partnership programs begin.

2. Time

Each of the elements in the previous section required time. Time is needed to carry out partnership responsibilities, including joint planning (White et al., 1994) to identify common goals, create communication plans, and develop trust. Once the
partnership is established, time is necessary to complete the tasks of the partnership, including taking field notes and teaching additional courses (Noffke et al., 1996).

While university faculty may have a flexible schedule, classroom teachers are confined to a classroom throughout the school day. Scheduling convenient times for all partners to meet when k-12 teachers are tied to their classroom during the day is also a challenge (Burnaford, 2001). Teachers find it difficult to find time to communicate, either by telephone or e-mail, to partners throughout the traditional workday. Neither group believes enough time exists to accomplish every task (Burnaford, 2001).

In addition to establishing a partnership, time is also needed to determine the impact of a partnership. Change is usually a slow process (Pugach and Johnson, 1995) and in today’s fast-paced, results-oriented society, university-school partnerships can be difficult to maintain because the goal of the partnership might not materialize immediately.

In the fast-paced world in which we live, time is a rare commodity for teachers and university faculty. Teachers must focus on students during the school day, than spend the rest of their workday planning lessons and grading papers. University faculty must prepare for classes, teach, and conduct research. In addition, work responsibilities must be balanced with family responsibilities.

Making time to manage a partnership effectively was not discussed in the research literature. Time is necessary to negotiate the demands of the different environments—including different areas of expertise, work styles, and reward systems—and can also impact the partnership.
To ensure an effective partnership, the research indicates that certain elements must be present. It also identifies several challenges, including different cultures, funding and time. In addition to understanding the elements of a partnership, those involved in an educational partnership must also understand how the expectations about teaching and learning are constructed across context and partnership roles.

Common Connections Between Museums and Schools

The simplest example of a cooperative relationship between a teacher and museum educators is the field trip. Many students visit museums only on field trips with their teachers. There are several reasons why teachers take students to museums. The National Science Education Standards encourage teachers to take students on field trips to museums and science centers, stating that these visits “can contribute greatly to the understanding of science and encourage students to further their interests outside of school” (National Resource Council, 1996; p. 45). Salmi’s (2003) research of university students found that 85% of university students with a natural-science major had visited the local science center before entering college. He believes that science centers have the potential to create positive attitudes toward science among young people, concluding that informal learning experiences seem to have a much stronger impact on academic career choices than has been recognized. Nazier cited by Knapp (2000), found that scientists attribute their childhood visits to museums as a motivating factor to pursuing their careers. These statements suggest that there is value to students visiting museums on field trips for affective, as well as cognitive reasons. However, as high-stakes testing increases teacher accountability for student learning, teachers need to ensure that field trips to museums result in cognitive learning gains.
While learning theory in formal classrooms has a long history, learning theory in museums is relatively recent (Mayer, 2005). The first theories to describe learning in museums (Falk and Dierking, 1992, 2000; Hein, 1998) were developed in the 1990s; prior to that time, museums were primarily focused on evaluation of specific educational programs. Therefore, teaching and learning in museums will be examined for affective and cognitive benefits to the learner. In this section, the two main theories about learning in museums will be reviewed, then the body of research that focuses on teacher and student experiences in museums will be reviewed to develop a better understanding of the connections between museums and schools.

Theories on Learning in Museums

Learning may be viewed differently by classroom teachers and museum educators. There are two theories about how visitors learn in museums: (1) Falk and Dierking’s (2000) Contextual Model of Learning (CML), and (2) Hein’s Museum Education Theories Model (1998). These theories adapted formal learning theories developed for the classroom and applied them to learning in museum settings.

Falk and Dierking (1992) originally created the Interactive Experience Model with three overlapping contexts: personal, sociocultural, and physical. This model was revised in 2000 to include a fourth element—time—and renamed the CML, see Figure 3. In the CML, learning is the process/product of the visitor’s interactions between these three contexts within a period of time. Falk and Dierking (2000) build upon Dewey’s constructivism and Vygotsky’s sociocultural theory, reasoning that a school field trip to a museum can provide students with strong memories in two contexts: cognitive and sociocultural.
In the CML, visitors bring their personal context, including their prior knowledge and motivation to explore various exhibits. The museum presents cultural content that the visitor usually experiences with other visitors — usually friends or family who are exploring the museum together — thus creating a sociocultural context. The physical context of the museum includes the building, as well as everything in it, including exhibits, bathrooms, gift shop, and café.

Kisiel (2003) examined the CML in relation to students visiting museums on field trips. He found eight factors that influence learning:

1. Motivation and expectations (visitors visit museums for a variety of reasons, and these reasons can shape the learning experience).
2. Prior knowledge, interests, and beliefs (visitors are drawn to exhibits where they have personal knowledge).

3. Control and choice (learning is optimal when the learner has control over which exhibits they visit).

4. Sociocultural mediation within groups (visitors within small groups mediate learning for each other).

5. Facilitated mediation by others (museum staff help make meaning with visitors).

6. Orientation and advanced organizers (visitors use a museum map or list of key concepts to guide learning).

7. Exhibit design (exhibits may engage a variety of learning styles).

8. Outside experiences that reinforce the museum experience (visitors continue the learning by finding books or websites that relate to the museum exhibit).

Kisiel (2003) believes that it might be difficult for teachers to take these factors into account when planning for field trips, as this is not how traditional teachers teach.

The second theory on learning in museums was proposed by Hein, (see Figure 4) in his book, *Learning in the Museum* (1998). Hein’s theory proposes four domains for learning in museums: traditional, behaviorist, constructivism, and discovery learning.

Hein bases his ideas of the traditional museum education on Gagne’s Instructional Design Principles. Gagne, Briggs, and Wager (1992) believe that learning tasks should be organized in a hierarchy from simple to complex. In the traditional museum, curators believe that their exhibitions represent the truth, and arrange their truth in the exhibits
sequentially. Exhibits include labels that describe pertinent information. Examples of traditional museum programs would be lectures or docent-led gallery tours.

Hein appears to have adapted his behaviorist domain from behaviorist psychologists such as Skinner (2001), who believes that given the right conditions, students will learn. Operant conditioning, as explained by Skinner (2001), involves reinforcers, or rewards. Reinforcers are provided to students when they do something correctly, creating an observable change in behavior. Museums use behaviorist principles with individual interactive exhibits and exhibition areas that elicit planned responses. For example, at COSI there is an eye-surgery exhibit that directs visitors to use a laser to cauterize a tumor. Visitors who do this correctly are rewarded with an audible phrase such as, “Good job, doctor, you got another one.” Examples of behaviorist museum programs would be a series of hands-on activities where students are rewarded by correctly completing prescribed tasks.

Hein’s discovery-museum education theory describes learning as an active process, physically and mentally, with one “right” answer to be learned. Museums that favor the discovery domain must carefully choreograph exhibitions that promote exploration, accommodating a wide range of active learning modes with labels prompting questions, all leading to the “correct” interpretation. School programs would include hands-on experiences that guide students to one correct conclusion; programs for adults might offer expert testimony and other forms of evidence for contemplation and consideration, but would finish with the “correct” conclusion.
Hein’s constructivist-museum education theory appears to build on Dewey (1997), who believed that learning is an active process, physically and mentally, where learners co-construct meaning. Constructivist museums provide multiple points of entry and involve a wide range of active learning modes. There are no specific paths through exhibitions because there is no one “right” answer to be found. These museum exhibits enable visitors to connect with objects through a range of activities, encouraging them to reflect and build upon their personal experiences. School programs would focus on the process skills of science, rather than one “correct” answer. Adult programs might offer expert testimony for contemplation, leaving visitors to consider multiple answers.

Even though learning is typically defined as a cognitive gain or a conceptual change, Schauble, Beane, Coates, Martin, and Sterling (1996) remind us that learning in a museum context “includes outcomes like an expanded sense of aesthetic appreciation, the
development of motivation and interest, the formation and refinement of critical standards, and the growth of personal identity” (p. 24). Griffin (2004) believes that Schauble, et al.’s (1996) description of learning is consistent with Vygotsky’s (1978) sociocultural view in which social interaction, cultural norms, and a range of tools and methods are used when assimilating ideas and information. The CML builds on constructivist and sociocultural education theories and assumes that students are central to learning and that they are active learners responsible for acquiring their knowledge. The CML is the theory referred to most often in the literature and appears to be the accepted model for student learning in museums in the current research; therefore, it will be used as the basis for further discussion regarding learning in museums.

Although the CML has adapted formal learning theories to explain learning in museums, teaching in a museum is different from teaching in a classroom. For example, museum educators tend to teach the same set of lessons to different children, while classroom teachers teach different lessons to the same set of children (Tran, 2006); and museum educators tend to use artifacts and exhibits when teaching, while teachers tend to use textbooks and videos. In light of these differences, it is likely that museum educators and classroom teachers would have different goals and expectations for a learning experience in a museum, and these differences may create challenges when teachers bring students to museums. Therefore, it is important to understand teachers’ motivations and agendas for bringing students to museums for field trips.

*Teacher Motivation and Expectations for Science Field Trips*

Teachers tend to believe that students benefit from field trips to museums. Anderson and Zhang (2003) found that 90% of teachers surveyed recognized field trips
as highly valuable educational experiences. Studies of field trips have shown that they can have lasting impacts on students, with strong memories of cognitive and sociocultural contexts (Falk and Dierking, 1997; Henry, 1992; Wolins, Jensen, and Ulzheimer, 1992). While classroom teachers find field trips valuable, and research has indicated that field trips can have lasting impacts, the fact remains that these teachers have little training in planning, conducting, and integrating field trips into their curriculum (Kisiel, 2003; Storksdieck, 2001).

Few, if any, university education programs discuss how to integrate a field trip to the local museum with classroom curriculum. In fact, Griffin and Symington (1997) suggest that the majority of teachers are intimidated by even the thought of a field trip to a museum; they are more concerned with the logistics than the learning because of the change in environment. Researchers have found that taking field trips requires teachers to do additional work to arrange the logistics, including obtaining parental permission, arranging for chaperones and transportation, and obtaining administrator support (Carter, 2001, Kisiel, 2001; Kisiel, 2003). Teachers taking students on field trips to museums should be viewed as “well-intentioned novices” (Kisiel, 2001, p.23), most likely using their prior museum experience — possibly from their visits to museums when they were in grade school — to inform their practice.

To help classroom teachers facilitate learning experiences for their students, museum educators need to understand the classroom teachers’ motivation and agenda for field trips. Kisiel (2005) studied teachers who took their classes to the Los Angeles Natural History museum, identifying eight teacher motivations for taking students on field trips:
1. Connect with the classroom curriculum
2. Provide a general learning experience
3. Encourage lifelong learning
4. Enhance interest and motivation
5. Provide exposure to new experiences
6. Provide a change in setting or routine
7. Provide enjoyment
8. Meet school expectations

Researchers support Kisiel’s individual findings, with several supporting the motivation of connecting with the classroom curriculum (Anderson and Zhang, 2003; Tal, Bamberger, and Morag, 2005) and enjoyment (Griffin, 2004; Rennie and McClafferty, 1996). Teacher advisors to COSI echo the need to connect with the classroom curriculum in light of high-stakes testing, stating “Everything must be tied to the standards” (Retterer, 2008). In addition to motivation, teachers have their own agendas for the field trip experience, which also impacts the students’ experience.

Falk and Dierking (2000) were the first to describe how museum visitors’ agendas impacted their learning. They found that the visitors’ agendas for visiting a museum — formed from a combination of motivation, interests, and prior experiences — sets their expectations for the visit. Kisiel (2003) found that teachers most often have one of two agendas: survey or concept. Teachers with a survey agenda want students to sample as much of the museum as possible, while teachers with the concept agenda want students to focus on one concept during their visit. Griffin and Symington (1997), Kisiel (2005) and Lucas (2000) have found that teacher agendas for the field trip impacts student learning.
Lucas (2000) investigated one teacher’s agenda for a class visit to a science center. Using a survey agenda, the teacher brought her class of 12-year-old boys to explore the science center, so they could use the exhibits to learn more about science and technology in a fun learning environment. To fulfill her agenda, students prepared and demonstrated their own exhibits prior to the visit, she later engaged students in lessons that reflected on the exhibits. Reflecting on the students’ assignments, the teacher believes that her students met her agenda.

Anderson, Kisiel, and Storksdieck (2006) investigated teachers’ perspectives of field trips in the United States, Canada, and Germany, and found three commonalities: (1) teachers believed that field trips are educational; (2) teachers understood that pre- and post-visit lessons would enhance learning but did not demonstrate this practice; and (3) teachers faced logistical challenges when planning field trips. One dichotomy of this study was that teachers gained legitimacy for their field trips by linking them to the curriculum; however, field trip experiences rarely were integrated in the school curriculum, and there was a lack of evidence that curriculum was actually guiding the field trip.

Teachers’ expectations regarding the museum educator’s role in a visit also have been studied. Tal and Steiner (2006) found very little collaboration between museum educators and teachers. Although the teacher that Lucas (2000) studied was satisfied that her agenda was met during her visit to a museum, she was dissatisfied by one interaction she observed between a museum educator and students at one exhibit, in which the museum educator stifled the students’ learning. The museum educator’s narrow focus denied students the chance to conduct additional inquiries about the exhibit. Tal,
Bamberger, and Morag (2005) found that teachers whose students went on guided field trips were concerned about the amount of time devoted to lecture compared with the amount of time available for free-choice investigation.

Research indicates the need to clarify the roles and responsibilities of classroom teachers and museum educators in museum settings (Anderson, Kisiel, and Storksdieck, 2006; Anderson and Zhang, 2003; Tran, 2006). Current research indicates classroom teachers believe that it is the museum educator’s responsibility to plan and implement all of the educational aspects of a field trip, allowing them to relinquish their teaching responsibilities (Anderson, Kisiel, and Storksdieck, 2006; Griffin and Symmington, 1997). When students were having difficulty understanding the link between school and museum work, teachers commented that the exhibits were at fault and should be modified to meet the school curriculum (Griffin and Symmington, 1997).

Teachers visiting museums are not the only ones with unfulfilled expectations. Tran (2006) found that museum educators had expectations of teachers who brought their students to museums on field trips. Museum educators expect teachers to maintain the role of disciplinarian when they brought students to the museum for a field trip.

Field trips to a science museum typically occur only once a year, therefore the potential for misunderstanding between museum educators and classroom teachers is great. Taking a moment to establish a clear understanding of each other’s roles in advance of the field trip could greatly improve the learning experiences during the field trip (Tran, 2006). Museum educators must be aware of teachers’ agendas and expectations to develop a field trip that will facilitate student learning and satisfy the
teacher’s agenda and expectations while carefully stating their own expectations for classroom teachers.

*Museum Field Trip Strategies*

Teachers use various strategies to organize field trips depending on their agendas, opting for structured, semi-structured, or unstructured visits. Kisiel (2005) found that 44% of teachers were more likely to select structured student field trips (docent-led tours, field trip workshops, scavenger hunts, etc.), and 22% had an unstructured student strategy (students explored exhibits, reading the labels, making their own connections between exhibits and their curriculum). Researchers have studied several types of field trip learning experiences at museums, including:

1. Formal museum lectures (Bamberger and Tal, 2006; Tal, Bamberger, and Morag, 2005)
2. Experimental demonstrations and models (Knapp, 2000; Tal and Morag, 2007)
3. Docent-led tour of exhibits (Cox-Petersen, Marsh, Kisiel and Melber, 2003)
4. Worksheet and/or scavenger hunts (Cox-Petersen et al., 2003; Griffin and Symington, 1997; Kisiel, 2005; Kisiel, 2006; Mortenson and Smart, 2007; Tal and Morag, 2007)
5. Students as expert (Hidi and Harackiewicz, 2000)
6. Free exploration among the exhibits (Bamberger and Tal, 2006; Botelho and Morais, 2006; Kisiel, 2006).

Of these six types of field trip experiences, the most structured are lectures, demonstrations, and docent-led tours. Formal museum lectures typically involve the
curators for an exhibition area lecturing to an audience for 45–90 minutes about their collections. Typically this involves the curators showing slides of artifacts and sharing personal insights. Experiment demonstrations are different in that these involve a museum educator, not a curator, using larger-than-life props to illustrate a concept or theory. Docent-led tours involve a volunteer who is trained to lead a group of students through a particular exhibition area, sharing facts and information about the collection. Teachers who want to link the visit to their curriculum and ensure that all students experience the same educational content tend to opt for structured field trip experiences.

Teacher’s who want to connect the museum experience with the classroom curriculum, while providing students with an opportunity for free exploration, use worksheets to semi-structure their field trip experience (Cox-Petersen et al., 2003; Griffin and Symington, 1997; Kisiel, 2005). Kisiel (2003) compared teachers’ agendas with their worksheets, finding that teachers with a survey agenda design worksheets with more lower-level, knowledge questions while teachers with a concept agenda develop worksheets with fewer questions, but which encourage higher-level thinking and provide students with some level of choice.

Worksheets can either encourage or discourage learning. Rennie and McClafferty (1995) and Kisiel (2003) found that teachers believe that worksheets, when used as advance organizers, encourage learning by helping student’s focus. Griffin (2004) found that teachers and students indicated that worksheets were “necessary” on field trips. She interviewed one student who did not like to use worksheets, but who also stated “you wouldn’t learn anything if you didn’t.” She believes that teachers and students believe that learning does not occur unless there is a written record.
In contrast, Price and Hein (1991) believe worksheets discourage learning, stating worksheets “impede student learning by inhibiting true observations, preventing students from formulating their own questions” (p.515). Parsons and Muhs (1994) concur. Their research of school groups touring the Monterey Bay Aquarium found that while filling in worksheets, group members spoke less to each other and spent less time looking at exhibits. They believe that worksheets interfere with social interactions and hypothesize that their use may negatively impact sociocultural aspects of the learning experience. Kisiel (2003) found that teachers who design their own worksheets reduce exhibits to textbooks. He examined several teacher-designed worksheets and found that the majority focused on lower-level knowledge questions that could be answered by reading the museum labels.

Museum educators support worksheets that encourage student inquiry. These include questions focusing on exhibits, not exhibit labels, and include a variety of question types and opportunities for students to interact with peers (Griffin, 2004). Mortensen and Smart (2007) used the CML to develop a worksheet that harnesses the free-choice aspects of a museum visit. They found their worksheet increased the number and diversity of curriculum-related conversations among students within a school group, potentially positively impacting learning derived from sociocultural learning experiences.

The “student as expert” and “free exploration of exhibits” learning experiences offer students the most freedom and may be employed by teachers who are using field trips as a socialization experiences. Hidi and Harackiewicz (2000) gave students the opportunity to become experts of one exhibit of their choice during a visit to a science
museum. They believe that this method allows students to demonstrate their competence to peers and might help them develop stronger interests in specific scientific concepts.

Free exploration of exhibits allows students to explore an exhibition area or the entire museum with no direction or assignments (Bamberger and Tal, 2006; Botelho and Morais, 2006; Kisiel, 2006). Of all field trip types, this is the most student-centered. Kisiel (2006) found students to be engaged during this time, looking at exhibits and making meaning by discussing the exhibit with their friends; however, he observed that students could stray off-task if allowed to explore on their own for long periods of time. Brooke and Solomon (2001) found that free exploration was best for students with severe learning difficulties, largely because they were allowed to persevere with tasks that intrigued them.

Teacher motivation and agenda set the expectation for field trips. By sharing their motivation, agenda, and thoughts on student learning with museum educators and students prior to field trips, a teachers’ expectations of student learning can be met. Successful field trips meet everyone’s expectations, including teachers, students, and museum educators.

*Elements of a Successful Field Trip*

To determine if a field trip is a success, it must be evaluated by the teacher’s motivation and agenda for the field trip. Kisiel (2005) found that teachers have several criteria for a successful field trip, including:

1. Students have a positive experience.
2. Students demonstrate new knowledge.
3. Students connect museum exhibits/experiences to the classroom curriculum.
4. Students have an increased motivation or interest in the topic.

5. Students exhibit good behavior.

6. Students return to school safely.

Although research indicates that a primary motivation for teachers who take a class on a field trip is to connect the visit with the classroom curriculum (Anderson and Zhang, 2003; Tal, Bamberger, and Morag, 2005; Kisiel, 2005), there is little evidence that teachers link student experiences during the museum visit to classroom lessons (Griffin and Symington, 1997; Kisiel, 2005; Mortensen and Smart, 2007).

Additionally, Griffin and Symington (1997) found in their research that half of the teachers expressed the purpose of their field trip in terms of learning, while another 45% reported that the purpose of the field trip was task completion only (e.g., complete worksheets). Only 50% of the teachers who wanted their students to learn something during the field trip provided students with specific learning activities prior to the field trip. Knapp (2000) found that students who have done work on a topic at school prior to the field trip appear to learn more from their experience than those who do not.

Even if no specific pre-visit learning activities are conducted, it is important to reduce the novelty of the field trip experience to increase learning. To reduce the novelty, Falk and Balling (1982) recommend providing students with a basic orientation to the field trip site (bathrooms, gift shop, etc.). Their research found that students who had a basic orientation learned more than students with no orientation.

Measuring the cognitive impact of a field trip can be difficult for several reasons. Rennie and Johnston (2004) posit that learning takes time. Learners need to make links to, or between, previously separate ideas. Learning involves time for reflection to
process new information in order to assimilate and integrate experiences into new ways of thinking. Little research has been conducted on student learning several months after a field trip. One researcher, Knapp (2000), found that after 18 months students could not recall specific activities used to teach science concepts during a field trip; however, students did have fond memories of the field trip site. He believes that post-visit lessons, which were not completed after the field trip, could have enhanced student understanding and retention of the science concept.

Another challenge in measuring cognitive impact of a field trip may be students’ views on learning. Students might believe that learning happens only in a classroom, where they complete worksheets and take tests. Researchers asked students what they have learned during their museum visit and found that students did not believe they were learning because they were not completing a worksheet (Falk and Dierking, 1992; Griffin and Symington, 1997). This would make measuring the cognitive impact of a field trip difficult unless students completed worksheets during their visit.

If researchers are to measure student learning during a field trip, they need to explore nontraditional assessments. Visual observation of students during field trips may not be an effective method to determine how much they are learning. For example, Griffin, Meehan, and Jay, cited in Griffin (2004) describes students visiting a museum exhibit in Australia who were observed moving around an exhibition area, not spending much time at any particular exhibit. Based on observation, it appeared they were not learning much. However, the students were asked to carry tape recorders and lapel microphones to record their conversations during the visit. The recordings were coded for learning and non-learning conversations. As students moved freely between exhibits,
80% of their conversations were learning-related, linking what they saw to prior experiences and discussing similarities and differences between exhibits. Only through this rather complex study was evidence of student learning discovered.

As these examples indicate, the type of learning that occurs in museums may be difficult to measure immediately after a field trip visit (Mortensen and Smart, 2007); and in this era of education standards, teachers are required to justify how a field trip will help students meet state standards (Retterer, 2008). The challenge will be for museum educators and researchers to find and implement effective research methodologies that illustrate what students learn during a field trip in ways that classroom teachers can appreciate.

Toward a Field Trip with Measurable Increases in Student Learning

Although museums and schools are educational institutions, they both are characterized by different learning experiences. In addition, museum educators and classroom teachers view their roles in student learning differently. Museums encourage students to explore and discover (Falk and Dierking, 2000; Griffin, 2004; Griffin and Symington, 1997), while students in a classroom follow a rigid daily schedule (Burnaford, 2001).

Storksdieck, Werner, and Kaul (2005) developed a quality field trip model as part of their assessment of the LEAD program, which examined field trips at several Cleveland, Ohio museums. Characteristics of a quality field trip include:

1. Engaging experiences that capitalize on what the museum offers and involve learning and thinking that are developmentally appropriate for the students.
2. Splitting students’ time evenly between free-choice and structured opportunities.

3. Providing pre- and post-visit lessons to the classroom teacher so that the field trip experience can be embedded within the classroom curriculum.

Anderson, Kisiel, and Storksdieck (2006) suggest that museums can add structure to a school group’s visit by providing demonstrations, field trip workshops, or worksheets that link to their curriculum. Kisiel (2005) believes that structure can be obtained by providing teachers and students with advanced organizers. The purpose of an advance organizer is to provide support for new knowledge acquisition by strengthening the organization of pre-existing knowledge (Ausubel, 1977). Kisiel (2005) suggests that museums might consider creating explicit advance organizers for different exhibition areas or demonstrations. Through observational data, he found that when an advance organizer was present, teachers tended to make use of it. In addition, Kisiel (2005) suggests that museums develop and implement teacher training, a Web-based guide, or museum signage to emphasize how museum exhibits connect to classroom lessons.

To ensure that teachers meet their goals and objectives, including content and behavior management, they must ask museum educators for specific programs. The challenge will be for museum educators to design programs that provide the content that teachers need to cover while maintaining the free-choice aspects of museum education.

Conclusions

Researchers have found that field trips to museums have a positive impact on students’ affective and cognitive learning. The main theory that describes learning in museums, the CML, suggests that learning in museums is the process/product of a
visitor’s interaction between three overlapping contexts — personal, sociocultural, and physical — within a certain time period. Students visiting a museum on a field trip have an additional overlapping context: the teacher’s motivation and agenda for the field trip. Researchers have found that a teacher’s primary motivation for taking students on a field trip is to connect the visit to the classroom curriculum, yet there is little evidence that teachers link student experiences during the museum visit to classroom lessons.

Learning in a museum is difficult to accurately measure for three reasons: (1) learning in a museum tends to look different than classroom learning, (2) learning takes time and students spend a limited amount of time at a museum, and (3) traditional learning assessments are designed to measure classroom learning, not museum learning. The inability to measure learning in museums is a challenge for teachers who are required to justify how museum field trips contribute to student learning and connect to state standards.

Focusing on the issues identified in this review of literature, this inquiry employed qualitative methods to examine a museum-school partnership. Interviews of participants and partners were conducted to determine if the critical elements of a partnership identified in the research exist in this partnership. In addition, classroom teachers and museum educators were queried to determine whether the programs developed by this partnership met their expectations for appropriate teaching and learning.
CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this study is to explore a partnership between COSI, a science center and SP, an urban elementary school (identified as SP to ensure confidentiality and anonymity) in a major Midwestern city. To further understanding of the elements of this partnership and to better understand teaching and learning constructed across context, this research study was guided by the following four questions:

1. How does each group perceive the goals of the partnership?
2. What does each group expect from the other partners and from the experiences provided within the partnership?
3. How are expectations about teaching and learning constructed across context and partnership roles?
4. How has the partnership changed over time?

The study explored these questions with members of four key constituent groups:

1. Grade 3, 4, and 5 SP students
2. Parents/guardians of grades 4 and 5 SP students
3. Grade 3, 4, and 5 SP teachers and administrators
4. COSI staff who worked with SP students, parents, and teachers.
In addition to these four primary constituent groups, adult members of community and business organizations that impact the neighborhood were interviewed to determine their knowledge, if any, of the partnership and its impact on the community. Members of the following organizations were interviewed:

1. SP Civic Association
2. Chase Bank
3. City Year
4. University Partners

Employing qualitative methodology with an interpretive descriptive purpose, the study investigated the partnership between COSI and SP, including administrators, teachers, parents, students, and community members. The main premises of the study are: (1) partnerships are socially constructed based on the needs of the partners; (2) the goals and expectations of formal and informal educators differ and impact student learning experiences; and (3) partnerships are fluid and change based on the goals and expectations of key leaders in the partnership. Based on these premises, documenting lived experiences of partners can delineate their goals and expectations of the partnership, including teaching and learning.

This chapter consists of five sections. First the theoretical framework of the study is explored; second, the context of the partnership; third, the role of the researcher; fourth, the methods that were used to collect data, and fifth; the methods utilized for data analysis.
Theoretical Framework

This research was grounded in qualitative methods with interpretive descriptive purposes (Erickson, 1986; Glesne, 1999; Lincoln and Guba, 2000) and drew upon methods common to these traditions. A qualitative approach is best suited to answer the research questions, because coming to understand the perspectives of the multiple stakeholders within the partnerships requires methods that allow the researcher to develop insight into the ways in which different people make sense of the world (Denzin and Lincoln, 2000), and, in particular, make sense of this partnership. Qualitative research includes the following characteristics:

1. It occurs in a natural setting.
2. It is descriptive, making the setting visible.
3. Researchers make meaning by attempting to make sense of, or interpreting, the phenomena they are observing.
4. The participants being observed contribute to the interpretation, or meaning.
5. “Meaning” is an essential concern (Bogden and Biklen, 1992; Denzin and Lincoln, 2000).

Qualitative research occurs within natural settings because researchers believe that human behavior is influenced by environment. This research will occur in two natural settings: SP, the elementary school, and COSI, the science center. Actions lose significance when taken out of context; therefore, the researcher was embedded within the setting to develop an understanding of the words and actions of the participants (Bogdan and Biklen, 1992; Glesne, 1999).
This research is descriptive; data collected are in the form of words rather than numbers (Bogdan and Biklen, 1992). Using ethnographic methods, data came from observations, interviews, field notes, and document analysis. Quotes from the participants will be included in the data analysis to illustrate and substantiate the research.

Qualitative researchers make meaning by attempting to make sense of, or interpret the phenomena they are observing. During data analysis, one question was refined into two questions, and an additional question presented itself.

Drawing upon the interpretivist tradition for data analysis, the researcher co-constructed meaning with the participants. Each participant experiences his or her own reality, and the goal of the interpretivist researcher is to not only capture the action, but to understand the reality of the participant (Schwandt, 2000). It is the researcher’s job to present the meaning accurately.

As the goal of the research was to understand the multiple participant perspectives of a partnership between a science center and an elementary school and how teaching and learning is constructed across different contexts, the researcher enlisted the aid of a critical friend, a retired science teacher within the district, to ensure that the perspective of the school faculty was correctly interpreted. To move beyond her personal and idiosyncratic reality of the partnership, the researcher sought to understand the reality constructed by the numerous participants and to represent an understanding of what each group perceives as the value of this partnership (Glesne, 1999).

The Context of the Partnership

The partnership between the SP elementary school and COSI began in the spring of 2006, when principal one and Mrs. P, the lead science teacher of SP elementary
school, contacted COSI. One of only two year-round schools in the large urban
Midwestern school district, they wanted to increase their students’ science opportunities,
especially during inter-sessions—two-week blocks between quarters that provide
additional learning experiences for students. The president and CEO, who had started at
COSI that spring, valued partnerships with the local schools. Shortly after his arrival,
COSI’s Management Team decided that COSI needed to partner with several urban
schools. As a result of several meetings and many conversations throughout the spring
and summer of 2006, a partnership was developed between COSI and the SP elementary
school. Services the science center would provide were defined, and a contract was
drawn up, stipulating costs, approximate dates for services, and science content
(Appendix A).

As partnerships go, this one is in its infancy. Relationships like this involve an
investment of human resources, time, and money. To continue this partnership, COSI
has received funding from an outside source to pay for years two and three.

The Partners

Four key partner groups in this study are directly impacted by the science center-
school partnership:

1. Grades 3, 4, and 5 SP students
2. Parents/guardians of grades 4 and 5 SP students
3. Grade 3, 4, and 5 SP teachers and administrators
4. COSI staff who worked with SP students, parents, and teachers
In addition to these key constituent groups, the researcher interviewed adult members of community and business organizations in the community surrounding SP to determine the impact of this partnership on the larger community. These ancillary groups included:

1. SP Civic Association
2. Chase Bank
3. City Year
4. University Partners

Each of these groups has a unique role in the SP community, and all have a vested interest in the success of the students at SP elementary school.

Basic knowledge of the science center and the school — the two main partners — is necessary to begin understanding the different perspectives involved in this partnership.

*COSI: The Science Center*

COSI is a hands-on science center in Ohio’s capital city that for the past 45 years has helped children, families, and educators understand and learn more about their world. It exists to provide an exciting and informative atmosphere for people of all ages to discover more about our environment, our accomplishments, our heritage, and ourselves. The science center staff engages the community in exhibits, demonstrations, and a variety of educational experiences to increase the public’s understanding of science, industry, health, and history. The facility offers seven discovery-based, themed exhibition areas; an outdoor science park; and the only high-wire unicycle within a science center. Multiple exhibition areas — Gadgets, Life, little kidspace, Ocean, Progress, and Space — provide engaging experiences for all age levels.
To promote science literacy, the COSI team creates learning experiences within its facility and beyond the building through traveling exhibits and outreach programs that serve students, teachers, and parents across the state. A variety of educational programs tailored to support the science curriculum in schools is available to help students and teachers. These offerings include: *COSI On Wheels* — an outreach program serving elementary and middle school students across Ohio and into neighboring states; *COSI Academy* — an annual, eight-month program for high school students who aspire to be scientists and engineers; *Electronic Education* — a variety of distance learning programs that use videoconference technology to connect multiple classrooms of students with researchers and science education programs they otherwise would not be able to access; and *Camp-In* — an overnight learning experience that encourages girls to explore science.

The partnership developed between COSI and SP elementary school included several elements of these standard programs, including COSI On Wheels, Camp-In, and field trips. Additional programs were developed, based on the recommendations of the SP teachers, to meet the needs of the SP students, parents, and teachers, including the two listed below.

*Process Skills Night:* By focusing on the process skills of science, this family night provides parents with concrete ideas that reinforce science process skills they can do at home with their children.

*Co-Teaching Experience:* Pairs SP science teachers with a COSI team member, to teach the school’s science curriculum using inquiry-based teaching methods (COSI, 2007).
The Elementary School

The SP elementary school is part of a major urban district that serves 56,151 students. At SP, 97% of the students are black, 2% are white, and 1% are Hispanic; 96% of the students are eligible for free or reduced-price meals. The school’s mission is to provide a secure environment where everyone can grow. The focus is on strong instructional leadership, quality time, and high expectations to assist the students in meeting the challenges of the 21st century. The faculty members believe that a quality and content-driven curriculum, combined with treating all students with dignity, will allow all students to be successful.

SP is a year-round school that offers a traditional curriculum of reading, language arts, math, science, social studies, health, art, music, and physical education. Technology skills are interwoven throughout the core curriculum. More than 50% of all of the school’s teachers have master’s degrees and average more than six years of teaching experience. Faculty and staff believe that this school is outstanding, because they have programs to explore intervention with students in conflict situations, and a full-time guidance counselor is on staff.

The school benefits from a number of partnerships. Students can participate in a variety of after-school activities, hosted by a number of community partners, including after-school tutoring services, Girl Scouts, and a fathers’ club (Columbus Public Schools, 2007).

To improve the school buildings, the district is involved in a district-wide building reconstruction program. SP elementary went through construction during the first year of this partnership, and during that time, the students began the school year in a
building approximately two miles from its brand new building. The new building opened after the winter break in January 2007.

**The Role of the Researcher**

In addition to drawing upon qualitative methods with an interpretive descriptive purpose, practitioner–research will be incorporated into this study. The researcher occupies a unique position within this partnership; she is employed by COSI, and her role in this partnership is as COSI’s point person for this project. As point person, she is responsible for working with the SP faculty to ensure that COSI provides programs that meet their needs, writing the agreement that spells out the service that COSI provides for SP, ensuring that all services are provided, and that payment is received for services rendered. In addition, she leads the co-teaching efforts for all grades, with an emphasis on grades 3, 4, and 5. This puts her in classrooms for an extended period, working with teachers and students on a series of lessons focused on one science topic. She is very much a participant in this partnership, and during this research project, she assumed the role of practitioner-researcher as a passionate participant, which limited her objectivity.

In addition, this research is influenced by prior experience within the informal education sectors, graduate class experiences, relationships with COSI team members, and with the faculty and students of SP. The results of this research will ultimately influence and improve the practice of the researcher, who is a museum educator, and ultimately enhance COSI’s partner relationships and education offerings to all urban elementary schools.

Prior to involvement within this partnership, the researcher had been involved in a partnership between community-based organizations and the science center in 1996. The
science center was getting ready to move into a new building, and funding became available to reach out to the community. At that time, the science center chose to partner with six local agencies that provided services to families with financial need.

To learn more about the partners, the science center’s staff spent an afternoon with one of the community organization’s program directors, who took the staff on a tour of the neighborhood that her agency serves, stopping at a food bank, pointing out the local religious organizations, and touring the agency center. She outlined the services that the agency provides for the neighborhood.

After that four-hour introduction to the agency and the community it serves, those in charge of this partnership decided that the science center would offer three pre-existing programs to the community agencies. The science center would provide outreach assemblies and activities at the community agency. The school-age children taking part in programs at the community agency would visit COSI on a field trip, and the families would visit COSI on a Sunday afternoon for a special family program.

From COSI’s perspective, these programs were not well attended by the families served by the community agencies. The community agency’s staff was happy with the turnout; but the COSI staff, accustomed to larger numbers for their programs, was disappointed that more families in these neighborhoods were not taking part in these programs.

Different experiences within the free-choice learning community and graduate classes at the university made the researcher wonder about this early partnership. The science center was a collaborator, not a partner. It retained its traditional role, providing services previously developed. These services did not meet the community agencies’
needs, and the science center did nothing additional to accommodate them. This prior experience influenced her role and behavior within this current partnership and also impacted this research.

Finally, the researcher is a member of the Center for Informal Learning and Schools (CILS) collaborative. She has attended meetings with other museum educators on a regular basis to discuss how to better understand the impact that informal, or free-choice, learning institutions such as museums, have on learning. At one meeting in 2004, a small breakout group discussed the challenges faced by museums and science centers. The most significant challenge, according to the group, was the inability to foster partnerships within communities they served. The seed for this inquiry was planted at that meeting.

Within this role of practitioner, the researcher examined the partnership from an insider’s perspective, gathering the data necessary to describe how the different constituent and community group members perceived the partnership and their expectations about teaching and learning. As a participant within the partnership, she was an active agent and, therefore, a part of the process (Jones, 2002). Practitioners do not have the opportunity to sit in a corner of the classroom and takes copious notes; therefore, the researcher’s field notes include only the salient points from interactions with students, teachers, and COSI team members.

Max Weber, as cited by Christians (2000), believed that personal, cultural, moral, or political values impact what social scientists choose to investigate, and that was definitely the case of this researcher. The researcher is very committed to ensuring that all children receive a quality science education and to being an effective partner to
schools that collaborate with the museum. Therefore, instead of being a detached observer, she claims the position of practitioner-researcher invested in ensuring learning and success (Clarke and Erickson, 2003; Arhar, Holly, and Kasten, 2001).

Stenhouse, quoted in Arhar et al. (2001), describes practitioner research as “systematic self-critical inquiry made public.” This research will be made public in two ways. First, it was shared with critical friends to ensure that the researcher’s understanding of the situation was correct. Second, this research will be shared with the larger museum and education field upon completion, in hopes of helping other museum educators establish and maintain effective partnerships with school administrators and teachers.

This inquiry fits the qualifications of practitioner-research because of the researcher’s intention of using the knowledge gained to improve her practice. It relies on purposeful action and observation, as well as theoretical reflection.

Data Collection Methods

Rationale

The rationale for using qualitative research methods to answer this research question is to thoroughly understand each constituent’s perceptions of this science center-school partnership. “Clearly, how data are collected influences what can be known, experienced, and told by the researcher” (Jones, 2002, p. 467). The research design is based on several methods of data collection, including face-to-face, semi-structured interviews, observations, written text, and field notes. Through observations, interviews, and written text analysis, the data can be triangulated, and the elements that are important
to the partnership and the individual partners can be inferred, including the expectations about teaching and learning that are constructed across context and partnership roles.

**Recruitment and Selection of Participants**

All teachers, principals, COSI team and community leaders were recruited during personal conversations with the researcher. All of these partners accepted the interview request. To recruit students and parents, 149 letters and consent forms went to all parents of all students in grades 3, 4, and 5 students via the typical school distribution system. Thirteen students returned consent forms, for a 9% return rate. Interviewing the students was mediated through the teachers as instructional time could not be used. In the end, the researcher had access to only five students, and these students were selected by the teachers. Although 11 parents returned consent forms, it proved impossible to arrange for interviews despite many attempts. In the end, three parents were interviewed for this research.

**Face-to-Face, Semi-Structured Interviews**

“Interviews are not neutral tools of data gathering but active interactions between two or more people leading to negotiated, contextually based results.” (Fontana and Frey, 2000, p. 646). Face-to-face interviews are one-on-one meetings that allow for a detailed conversation on a series of topics. Semi-structured interviews provide a framework that allows for focused, conversational, two-way communication. Semi-structured interviews, with a combination of partially open and open-ended questions were used, starting with more general questions or topics, before focusing on the pertinent issues. Not all questions are designed ahead of time; some questions might be created during the interview. As a researcher in the qualitative tradition using an emergent design, these
questions were used to frame the interview; but individual interviews varied, based on the answers and comments of the participant.

Although each interview was designed with a specific intent, a semi-structured interview allows participants the freedom to contribute information not previously considered by the researcher (Fontana and Frey, 2000). The interview proceeded in stages: Stage I included social questions, unthreatening questions used to establish trust; Stage II included questions that were relatively easy to answer and required a low level of trust; Stage III included questions that required a moderate-to-high level of trust, including questions that focused on the differences of each of the partners. Each interview closed by providing time for the interviewee to share additional information or ask the researcher questions, concluding with a request to follow up for clarification if necessary (Rubin and Rubin, 2005).

Interviews were conducted with a total of five grade 4 and 5 students, three parents, three teachers, one principal intern, two principals, 10 COSI team members, and four community partners. Data collected from the leadership intern, parents and neighborhood leaders were read, analyzed, and coded, but these three groups, given limited access to the partnership itself, were not able to speak about this partnership, therefore data collected from these groups did not contribute to the research questions and will not be included in this discussion of findings. The parents were very positive about the partnership and said they were pleased that their children were enjoying the science experiences. Three of the four community partners were unaware of the partnership; the fourth was funding the partnership. All were pleased that COSI was reaching out to the community.
Having personal relationships with many of the teachers and COSI team who were interviewed for this inquiry, the researcher was able to move beyond the rhetoric to the real, and in some cases, to an intimate level of conversation (Stephens and Boldt, 2004). Interviews with the teachers diverged slightly from the original plan to allow teachers to share what was most important to them. The researcher’s goal was to ensure that the relationships begun in this partnership were maintained throughout the years (Wyschogrod, as cited by Christians, 2000; Glesne, 1999). Interviews conducted with students were the most diverse, as the grade 4 and 5 students exhibited youthful exuberance and wanted to share additional information on a variety of topics during the interviews. The questions that framed each of these interviews are in Appendix B.

All interviews were audiotaped to allow the researcher to concentrate on the interview, not on taking notes. Shortly after each interview, the audiotapes were transcribed verbatim. Because the interviews occurred over three-months, and since the researcher was the primary transcriber, interview questions were refined throughout the process.

Observations

Observations were an important part of understanding the partnership, and, in particular, teaching and learning as it is constructed across contexts (Mead ([1928] 1973). Glesne (1999) sets observations on a continuum and notes that the role of researcher might vary from mostly observer to mostly participant. Researchers as participants are more active in the partnership, regularly assuming roles in the daily operations (Glesne, 1999).
Since the researcher was an active participant in partner meetings and teaching classes at SP, her perspective was unique. Observations of experiences working with the students, parents, and teachers were documented in field notes immediately after the experience. Observations were completed using a two-column method: column one included actual observations in as much detail as possible; column two included initial interpretations, including feelings and thoughts.

“There is no value-free or bias-free design…. As we try to make sense of our social world and give meaning to what we do as researchers, we continually raise awareness of our own beliefs” (Janesick, 2000, p. 385). Sustained, multifaceted reflection is critical to making meaning within an interpretivist tradition, allowing for rich interpretation of the data.

**Written Text Analysis**

Documents constitute a significant communication channel in the daily life of organizations and are active elements of the material culture (Hodder, 2000). This study includes collection and analysis of several organizational documents and artifacts.

Documents that were analyzed include:

- E-mail regarding the partnership and partner activities from the COSI team and the SP teachers and administrators
- Contract for school services
- Student assignments
- School Web pages
- Information packets sent to parents regarding this partnership.
Document analysis can be incomplete. Hodder (2000) writes that the original makers and users of the document might give only a partial picture of the meaning of the document as it is used and reinterpreted through time. Therefore, documents were secondary sources of data, informing other forms of data collection and data analysis in this study.

**Trustworthiness**

At the Bay Area Institute, then Assistant Director of the Education and Human Resources Directorate, National Science Foundation, Judith Ramaly (2003) spoke to the group regarding her criteria for evaluating research. One criterion she shared was, “Is it trustworthy?” Lincoln and Guba (2000) define trustworthiness in terms of methodological and interpretative rigor.

Trustworthiness of this research study was established through systematic collection and analysis of the data, triangulating the data sources and perspective (Janesick, 2000), and use of a critical friend. “Multiple sources of information are sought and used because no single source of information can be trusted to provide a comprehensive perspective” (Patton, 1990, p.244). Data sources included semi-structured participant interviews, observations, and document analysis.

Erickson (1986) found several threats to the validity of qualitative methods, including lack of data to warrant the assertions, lack of variety in the data, faulty interpretation of the data, and disconfirming evidence. Through the use of multiple sources of data, multiple perspectives were obtained to ensure variety. As a member of the partnership, the researcher was familiar with the partners; this helped her to understand the data and use them to make valid assertions. Systematic data analysis was conducted through multiple rounds of reading and coding interviews and observations.
critical friend (Arhar et al., 2001), a retired teacher from the large Midwestern urban
classroom in which the partnership existed, reviewed all analyzed data, helping the
researcher understand the reality of today’s classroom teachers.

In qualitative research, researchers create a representation of the researched
universe through the theoretical lenses through which they choose to look.
Complications can arise, because the main instrument in the qualitative study is the
researcher, whose perceptions and ways of seeing the world are filtered through culture,
gender, age, race, class, and other components of the researcher’s identity (Peshkin,
1988). Thus, research experience in qualitative studies is a subjective process that
researchers cannot possibly avoid. Therefore, they must acknowledge their subjectivity
through reflexive practices, such as keeping a researcher’s journal and checking
preconceived assumptions against the data through vigorous analysis. Researchers’
journals maintain the research as a reflexive process, thus guarding against researcher
bias to protect the trustworthiness of the study. By writing memos throughout the
fieldwork and data analysis to keep track of assumptions and positionality,
trustworthiness is assured.

Data Analysis

Several strategies were used to analyze the data collected throughout this project
including: (1) an extensive recurring reading of the data collected, (2) the coding of
emerging categories, (3) the development of assertions, and (4) the development of
theory.

The process of carefully reading through the data corpus involved reading and re-
reading field notes; cataloging and reviewing audio recordings, as well as reading,
examining, and re-examining the content of documents and artifacts that the researcher collected from communications with SP students, parents, teachers, and COSI team members. The documents and artifacts included e-mail, flyers about COSI programs at SP, and internal COSI documents regarding the partnership with SP.

Due to the volume of interview data, transcription of the audiotapes was completed by the researcher and a paid transcriber. The researcher transcribed eight key participant tapes. The paid transcriber transcribed tapes of the remaining participants, usually within two weeks of an interview. When the paid transcriber returned the audiotape and her transcription, the researcher would listen to the interview and read the transcription, making corrections and changes to the transcriber’s interpretation as necessary.

Realizing that each retelling of the original is somewhat less authentic, the researcher was cognizant of maintaining the original voice and intentions of the speaker. However, each time the researcher listened to an audiotape or re-read an interview transcript, she saw patterns emerge and was able to begin to organize and interpret the data. The extensive re-reading of data began with open coding, and this coding coalesced into categories of findings.

Open coding, as defined by Corbin and Holt (2005), involves opening the text and breaking it apart under intense scrutiny. Reading and re-reading the data, the researcher noticed that certain words were included in several interviews. The researcher also noticed that these words varied in meaning and importance from participant to participant. Therefore, the initial coding focused on examining the phrases that contained certain words or terms; upon interpretation, these were used to develop emergent codes.
that the researcher shared with her advisor. This coding prompted the researcher to form new perspectives about her data.

Although most of the codes emerged from the patterns discovered through the reading and re-reading of interview transcriptions and field notes, several originated from the literature review. Codes representing the museum culture, school culture, and their intersections were derived from the literature review, including the impact of the No Child Left Behind Act [NCLB] on the classroom and the free-choice versus structured learning environments. Although more familiar with the museum culture, the researcher had formal education experience as a middle-school classroom teacher and was aware of the impact of the NCLB and the paradigm between free-choice learning and the formal education system. She was not aware of the impact that a change in key personnel would have on the partnership; this was revealed during the analysis of interview transcriptions, e-mail, and field notes.

Throughout the coding process, data reduction occurred. Interpretation occurred throughout coding, and the categories that emerged within this framework were multi-layered, enabling the researcher to make connections between categories and constituent groups. These interpretive actions supported the interpretivist framework of this study.

The emergent findings led to the development of assertions. One of the basic tasks of data analysis, according to Erickson (1986), is the inductive construction of empirical assertion. The researcher supported each assertion with an evidentiary warrant. Evidentiary warrants were established after reviewing field notes, audio recordings, and other documentation. Empirical assertions are one of the nine essential elements of a data report, as identified by Erickson (1986). These elements — including key quotes,
synoptic data reports, interpretive commentary, and theoretical discussion — provide the reader with the opportunity to “function as a co-analyst” (p.145) of the inquiry. The researcher’s goal is to provide readers with the opportunity to situate themselves within the context that is described, to examine the evidence on which the author’s interpretive analysis is based, and to consider the author’s perspective (Erickson, 1986).

The findings presented in chapter four represent the researcher’s interpretation of the data. These findings are supported with key quotes found within interview transcripts and e-mail, field note observations, and the researcher’s interpretive commentary. Through these elements, the reader has the opportunity to experience the perspective of the participants and survey the evidence (Erickson, 1986).

The two main goals of a data report are to make clear to the reader what is meant by the different assertions and to display the evidentiary warrant of these assertions. Clarification is achieved through what Erickson (1986) defines as “interpretive commentary.” Interpretive commentary “frames the reporting of particular and general description” (p.152), setting the context for theoretical discussions. Interpretive commentary helps the reader understand the meaning of the researcher’s interpretations and the theory developed.

Conclusion

This research is in response to museum and science center educators’ need to better understand partnerships, especially educational partnerships with urban schools. The research study is grounded in the review of supporting literature. This chapter presented the data collection methods that will be used to answer the research questions. The following chapter will present the data and detail its analysis.
CHAPTER 4

FINDINGS

The purpose of this study was to investigate a partnership between a free-choice learning institution, a science center, and a formal learning institution (an urban elementary school). In this chapter, a summary of the data is presented. In the following chapter, the data are abstracted with the relevant literature regarding educational partnerships.

The central questions that guided this study were:

1. How does each group perceive the goals of the partnership?
2. What does each group expect from the other partners and from the experiences provided within the partnership?
3. How are expectations about teaching and learning constructed across context and partnership roles?
4. How has the partnership changed over time?

The presentation and discussion of interview data in this section are primarily based on a summary of the major findings that have emerged from the responses to interview questions. Comparisons and contrasts will be made among the multiple perspectives across different groups of participants within the partnership. Within this chapter these questions are investigated through the lens of the four primary constituent
groups: (1) students, (2) teachers, (3) principals, and (4) the COSI Team. Data collected from the leadership intern, parents and neighborhood leaders were read, analyzed, and coded, but these groups, given limited access to the partnership itself, were not able to speak about this partnership, therefore data collected from these groups did not contribute to the research questions and are not be included in this discussion of findings.

Question One. How Does Each Group Perceive the Goals of the Partnership?

Among the four constituent groups, 10 different goals were identified, with each partner contributing between two and six goals (See Figure 5, Perceptions of Partners Goals of the Partnership). Several goals were shared by more than one partner, with only one goal, supporting student learning, mentioned by all four partners.

<table>
<thead>
<tr>
<th>Goals Mentioned During Interviews</th>
<th>Students</th>
<th>Teachers</th>
<th>Principals</th>
<th>COSI Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun</td>
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<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Support Student Learning</td>
<td>X</td>
<td>X</td>
<td>X (1,2)</td>
<td>X (I, VP)</td>
</tr>
<tr>
<td>Support teaching</td>
<td></td>
<td>X (1, 2)</td>
<td>X (I, VP)</td>
<td></td>
</tr>
<tr>
<td>Provided Field Trips</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Development</td>
<td>X</td>
<td>X(1, 2)</td>
<td>X (I)</td>
<td></td>
</tr>
<tr>
<td>Science Resource</td>
<td>X</td>
<td>X (1, 2)</td>
<td>X (I)</td>
<td></td>
</tr>
<tr>
<td>Motivate Students</td>
<td>X (I)</td>
<td></td>
<td>X (I)</td>
<td></td>
</tr>
<tr>
<td>Provide opportunities for those who might not otherwise have them</td>
<td>X (1)</td>
<td></td>
<td>X (I, VP)</td>
<td></td>
</tr>
<tr>
<td>Encourage careers in STEM</td>
<td></td>
<td></td>
<td>X (I)</td>
<td></td>
</tr>
<tr>
<td>Support the Community</td>
<td></td>
<td></td>
<td></td>
<td>X (VP)</td>
</tr>
</tbody>
</table>

1 = Principal 1
2 = Principal 2
I = COSI Integrated Providers
VP = COSI Vice President

Figure 5: Partners’ Perceptions of Goals for the Partnership
**Students’ Perceptions of the Goals of the Partnership**

Students involved in the partnership participated in lessons led by the COSI team at their school and visited the museum with their teachers and families. Although the partnership was never formally announced to the students, those involved in the research had a range of responses regarding their perception of the goals of the partnership. Overall, the students demonstrated an enthusiastic appreciation for the opportunities that the partnership provided. Analysis of interviews with five SP students and observations of the students on field trips to COSI and during COSI-led lessons at their school generated two goals the students held for the SP-COSI partnership:

1. To have fun.
2. To learn something.

**1. To Have Fun**

During each interview, students were asked how they felt about COSI field trips and COSI-led classroom lessons. In each conversation, students used the word “fun” to describe some aspect of COSI, usually an exhibit at the science center or a lesson led by the COSI team in their classroom. Throughout the dialogue, one thing was certain: the students associate COSI with fun.

During her interview, D. C. listed three exhibits/shows found at COSI as “fun”: the Generotor in Big Science Park, the 3-D Dinosaur Imax movie, and the Black Hole exhibit in the Space exhibition area (Student Interview #2, 12/13/07). A. J. shared during her interview that the Progress exhibition area was her favorite because “it is really fun getting to go back in time” (Student Interview #1, 12/17/07).
COSI is unique among informal learning institutions in the city because visitors are encouraged to interact with exhibits. When comparing COSI with another local museum, M. S. said, “I think that it’s more fun at COSI because you can touch stuff and you can really learn what the astronauts did” (Student Interview #4, 12/11/07).

The SP students appear to appreciate fun. When comparing science class at school to a field trip to COSI, A. J. said, “sometimes it’s not fun in science class but it’s always fun at COSI.” (Student Interview #1, 12/17/07)

2. To Learn Something

While students were having fun at COSI, they were establishing the foundation for understanding complex science concepts, which they were eager to discuss. Although their learning might not represent fully developed concepts, they did grow in their conceptual understanding.

During his interview, R. R. enthusiastically described a demonstration he observed at COSI during a previous visit. He shared his account of a clear liquid, which he thought was water, that froze objects on contact. He reported that when the COSI demonstrator “poured it on the ground, I jumped on it, and I felt it. It was cool” (Student Interview #5, 12/11/07). R. R. was referring to a demonstration he observed during a COSI visit that uses liquid nitrogen to illustrate states of matter. His understanding was incomplete. The clear liquid he thought was water was liquid nitrogen, and the temperature was not 1,000 degrees but rather -320 degrees Fahrenheit. He did describe a clear liquid that froze objects, which represents the beginning of understanding the scientific concept of states of matter.
D. R., a fourth grader, learned about simple electric circuits during a COSI-led classroom lesson. He shared his understanding of a simple circuit:

Well Mr. COSI, he came to school and he told us about how all you need is a light bulb, two wires and a battery. So you put the one light bulb on the battery. You put two wires on the side of the battery and then it works (Student Interview# 3, 12/17/07).

This awareness and understanding is significant because D. R. is in grade 4; simple electric circuits are not part of the SP science curriculum until grade 5. D. R. is demonstrating an understanding for science concepts that he has not studied in the classroom.

D. R. remembered a lesson taught by COSI team to his third grade class the previous year. In this lesson, students studied force and motion by making paper airplanes and modifying the weight and size to determine the impact on flying distance. He said:

We used to make [paper airplanes] and we used to change it to see what’s wrong because we all make mistakes and we learn by them….like if I put too [many washers]... it’s too heavy it might pull the airplane and go down. But if I had to get two [washers] I would balance it in the middle of the airplane so it could be balanced (Student Interview #3, 12/17/07).

D. R. is describing the formation of his third grade understanding of motion in relation to aerodynamic design.

When asked if he preferred school science class or COSI science class, D. R. responded, “COSI, because they teach more and they know a lot more and have a lot of gadgets” (Student Interview #3, 12/17/07). In his own words, D. R. captured the feelings of those who developed the partnership; he appeared to view COSI as a science resource for his school.
Teachers’ Perceptions of COSI’s Role in the Partnership

Grade 3, 4, and 5 science teachers were observed and interviewed for this research. In each of the two years of the partnership examined, each of the three teachers participated in at least one field trip to COSI and one five-day co-teaching experience at SP. Depending on their views of science, experience and/or comfort with science education, their views of what COSI brought to the partnership varied. The teachers involved in the partnership each communicated that they viewed COSI as a resource to their students and themselves, although to varying degrees. From conversations with these teachers who were involved in the partnership during year one and two, COSI was viewed to play three roles in the partnership (See Table 2.):

1. Student program provider.
2. Professional development provider.

<table>
<thead>
<tr>
<th></th>
<th>Ms. H</th>
<th>Mrs. D</th>
<th>Mrs. P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Program Provider</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Professional Development Provider</td>
<td>No</td>
<td>Year One No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Year Two Yes</td>
<td></td>
</tr>
<tr>
<td>Science Resource</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 2. Teachers’ View of COSI’s Role In Partnership

1. **Student Program Provider**

The teachers’ perceptions of COSI’s role within their school are discussed in the following paragraphs. All three teachers identified COSI as an organization that provided student programs, although each had a different understanding of the extent of
COSI’s support. One teacher felt that COSI’s only role as a partner was to provide student programs, while another teacher viewed COSI as a complete science resource.

Ms. H felt that COSI’s primary role in the partnership was one of program provider, at SP or at COSI. “I’ve always enjoyed [COSI’s outreach program] when they come here, that’s always fun and the kids really love it. And Mr. COSI, he did … a wonderful activity [in my classroom]. He had some of my difficult children … engaged” (Teacher Interview #2, 12/13/07). Ms. H discussed COSI only as a student program provider; she did not mention COSI in terms of professional development or science resources. Ms. H had limited experience teaching science.

Mrs. D felt that a central goal of the partnership was to provide students with the opportunity to visit COSI. In addition to student visits with their teacher, she recognized that COSI arranged for buses to shuttle families from SP to COSI on days when school was not in session, providing students with additional opportunities to visit COSI with their families (Teacher Interview #3, 12/14/07).

In addition to recognizing that COSI provided programs during the regular school year, Mrs. D acknowledged COSI’s assistance with programs when school was not in session; she said, “I know you help with intersession, and you even helped us unpack and set up when we moved schools” (Teacher Interview #3, 12/14/07). During the one- or two-week thematic intersession programs, COSI provided science lessons at the school that augmented the school’s themes, which included “Space” and “Chase Away the Winter Blahs.”

Mrs. P participated in every COSI-related activity, but the other teachers did not. Therefore, she viewed the partnership differently than her colleagues. She observed that
field trips were just part of a larger relationship that SP shared with COSI. She appreciated that COSI was “establishing a relationship as a field trip site, doing workshops there, the overnight there, all those COSI events kind of jelled together to make successful learning” (Teacher Interview #1, 12/4/07). Mrs. P was a national board certified teacher and SP’s lead science teacher.

2. Professional Development Provider

In addition to providing programs for students, two of the three teachers identified COSI’s role as a professional development provider. The COSI team co-taught science curriculum with SP teachers in their classroom, and these co-teaching experiences used inquiry-based methods and spanned three to five science lessons. Teachers had diverse perceptions regarding the way in which they grew as professionals as a result of this co-teaching support.

During year one, Mrs. D appeared to see her role in the co-teaching experience as one of disciplinarian. The COSI team taught the lesson, while Mrs. D ensured order in the classroom. This changed during year two, when Mrs. D became the fourth grade science and math specialist, she consulted with the COSI team on lesson ideas. (Field Notes, 2/6/08).

In addition to keeping order in the classroom, Mrs. P co-taught with the COSI team both years. She linked the experiences initiated by the COSI team to material she previously had covered with her students. She believed that co-teaching had the greatest benefit to the students. She said, “If that teacher can go on and do a better job after COSI has left the classroom, that day or that week or next year, then they are going to benefit so many more kids” (Teacher Interview #1, 12/4/07).
3. Science Resource

In addition to, or maybe because of, the student and teacher programs provided to SP students and teachers, two of the three teachers identified COSI as a science resource or source expert during interviews. These teachers were comfortable asking the COSI team to clarify science concepts and were aware of COSI’s support on several levels.

Mrs. D expressed her understanding that COSI was trying to assist SP on several levels and viewed COSI as a science resource. During the second year of co-teaching, she stopped the COSI team after a lesson on chemical and physical change and asked for clarification of the science concepts (Field Notes, 2/6/08).

Mrs. P recognized the different elements of the partnership, identifying the different ways that the COSI team helped at SP, including “coming into classrooms, … modeling some good science techniques, teaching techniques, introducing the children to some experimentation that I’m sure they wouldn’t have gotten without COSI’s intervention.” She felt “COSI was very instrumental at helping the science education here at SP” (Teacher Interview #1, 12/4/07).

Principals’ Perceptions of the Goals of the Partnership

There were two principals during the two years of this research project. Principal one initiated the partnership and was principal during year one. He left SP during the summer break between year one and two. Principal two entered SP during year two, after the school year had begun. She inherited the staff, policies, and partnerships of principal one. Thus, principal one experienced the partnership as initiator, co-creator, and implementer, while principal two had little input into the conceptualization of the partnership and inherited the project as an implementer only. Though each principal
maintained a focus on teaching and learning, each viewed the partnership through a different lens, which impacted the partnership.

Principal one developed the partnership with these goals in mind:

1. Support science teaching and learning at SP.
2. Motivate students to learn.
3. Provide professional development in science content and pedagogy.
4. Provide students and parents with opportunities they might not otherwise receive.

Having been a principal at another high-profile elementary school within the district, principal two had been part of several district and school partnerships. Conversations with principal two revealed that she had one goal for the partnership: “To support what is occurring at the school” (Principal Interview #2, 1/9/08), which, loosely defined, meant to support student achievement in reading and mathematics. Table 3 summarizes the principals’ goals of the partnership and the extent of their support.

<table>
<thead>
<tr>
<th>Support science teaching and learning at SP</th>
<th>Principal One</th>
<th>Principal Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivate students to learn</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Provide professional development in science content and pedagogy</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Provide Science Content Resources for students, teachers, and parents</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 3. Principals’ Goals of the Partnership

1. Support Science Teaching and Learning at SP

Both principals believed that this partnership needed to support teaching and learning at SP, but because of their different beliefs regarding teaching and learning, this
led to different expectations about how this goal would be met. Student academic achievement was a priority for both principals, but each principal envisioned this in a different way, and their visions impacted the partnership.

Principal one did not focus on testing. He was aware that SP had low test scores on high-stakes tests, but he attributed that to a prior merger with another school (Personal Conversation, 11/18/06). He believed that the students from the other school brought low test scores with them. Principal one mentioned that these students needed to bring up their scores, but he was sure that his students would achieve. “In fifth grade math, only 8% [of students from the other school] passed. That’s like two kids. What was that teacher doing?” he asked rhetorically (Personal Conversation, 11/18/06). Principal one did not appear overly concerned about high-stakes test scores; he was not data-driven. He mentioned test scores only one time during several personal conversations about SP.

Principal two appeared to be more aware of the pressures exerted due to the No Child Left Behind Act [NCLB]; she was data-driven. During her interview, which took place in her office, she pointed to charts and graphs on the walls and explained that these charts listed each grade 3, 4, and 5 student and his or her current academic achievement. She went on to explain that she was focused on the “bubble students”: those students who administrators believe could pass the high-stakes test if they could just answer a couple of additional test questions correctly. Each of their deficient areas in reading and mathematics were identified on the chart. Reading and math were important because those were the two subjects analyzed by the Ohio Department of Education to determine student achievement for NCLB.
2. Motivate Student Learning

While principal two recognized that COSI’s “focus is improving science education,” and “science is definitely a weakness” at SP, she made it clear that her priorities were student achievement in reading and mathematics. She voiced this concern about COSI’s presence in the classroom, “Nobody goes into a school thinking they are going to decimate a school’s schedule … they are coming in to support what you are doing, but you have to clearly communicate what this is.”

This was a change from principal one, who encouraged the COSI team to go into classrooms and work with teachers. He believed that science experiments could successfully motivate student learning and contribute to a student’s positive attitude toward learning all subjects, ultimately increasing their high-stakes test scores. He stated:

I don’t view science as second tier, for me it’s just as important as reading. Kids love the wow activities, and in the end I think . . . it did help . . . the test scores, and will continue to help, help them with their thinking instead of just knowing how to answer a question (Principal Interview #1, 11/29/07).

By bringing in dynamic science lessons, principal one believed that COSI was motivating his students. By successfully motivating his students, principal one believed that COSI was contributing positively to his students’ overall performance on high-stakes tests.

3. Professional Development in Science Content and Pedagogy

Principal one’s goal was for the COSI team to assist teachers by co-teaching in the classroom and helping teachers gain a degree of expertise and comfort with science. He wanted the COSI team to “come in and show [teachers that they] can do some things, help [them] do some things, go see things” (Principal Interview #1, 11/29/07). By sharing their knowledge and expertise, principal one felt that the COSI team provided
teachers with additional science content knowledge and resources for teaching science. This increased their comfort level and confidence when teaching science, ultimately increasing student understanding of science concepts.

He shared “everybody loves science,” and if the COSI team could “help [teachers] do some things, … the teachers benefit, and the kids love the wow activities” (Principal Interview #1, 11/29/07). He felt that elementary teachers did not always have the time or the science background necessary to feel comfortable teaching dynamic science lessons. In his interview he said, “Elementary school teachers are required to teach lots of content, and for them to really give science … the right kind of attention, it’s hard … because reading is so important, math is so important” (Principal Interview #1, 11/29/07).

Principal two agreed with principal one’s assessment of elementary teacher’s feelings about classroom science. During her interview she stated “Science is one of those areas that elementary teachers are a little weaker.” “Providing staff with that professional development because that is not a strong area” was meeting her goal for the partnership. She believed that COSI was “supporting an area that is not necessarily very comfortable for elementary teachers to teach” (Principal Interview #2, 1/9/08), but she made it clear that reading and mathematics were her priority.

4. Provide Science Content Resources for Students, Teachers, and Parents

In addition, or because of, COSI’s ability to provide professional development for teachers and motivate students, principal one viewed COSI as a science content expert and resource for the community. He initiated discussions with the COSI team to develop
the partnership because he believed that COSI could provide the “science expertise” necessary to enhance student and teacher understanding of elementary science concepts.

He also believed that COSI could serve as a resource for parents, as well. He arranged for each family to have a membership to COSI, which allowed them to visit the museum free of charge, and at their convenience. He stated: “Inner city kids don’t get those opportunities. These kids [suburban students at his new school] go to [other museums], they go to COSI, they know all about that stuff. I thought getting a membership was pretty cool” (Principal Interview #1, 11/29/07). Principal one wanted to provide his students’ families with additional resources to stimulate learning. Overall, he hoped that the partnership with COSI was “a spark that would light a dark place” for the students and their families (Principal Interview #1, 11/29/07).

**COSI Team Perceptions of the Goals of the Partnership**

Like the other members of the partnership, the COSI team viewed the partnership through their own lenses. Unlike the SP students and staff, the COSI team operates within a free-choice learning environment, which varies from the formal learning environment influenced by NCLB. The COSI team did not feel the pressure of high-stakes testing directly or the need to maintain order in the classroom; therefore, their goals and understanding of the partnership differed from those of the SP teachers and staff.

Several COSI team members interacted with the SP students, teachers, and staff. With so many different COSI team members providing services to SP, and since the researcher is a member of the COSI team and has easy access to these individuals, 10 COSI team members were interviewed for this project. Based on the amount and/or level
of contact the team member had with SP students, parents, and teachers, the 10 COSI team members were placed in three different categories for data analysis purposes. The three representative categories are: (1) isolated providers, (2) integrated providers, and (3) Vice President. The majority of COSI team interviewed was isolated providers. They had limited contact with SP students, families, and faculty. They maintained their traditional role and interacted with SP students as they would any other students. Three COSI team were considered integrated providers, serving in a number of different capacities and providing the majority of the SP programs. One COSI team member fell in the third category, Vice President. COSI’s Vice President was integral to getting the partnership started, but she was not involved in the day-to-day operations. Various members of the COSI team had the following goals (see Table 4 for breakdown):

1. Serve as science resource.
2. Serve as student motivator.
3. Provide Professional development experiences.
4. Provide access to students who may not have otherwise had the experience.
5. Encourage students to consider careers in science.
6. Help students pass the Ohio Achievement Test.
7. Support teaching and learning at SP.
8. Support the community.

Each category of COSI team members viewed the partnership through a different lens; therefore the perceptions of the members of each category have been examined to
determine their beliefs of the goal of the partnership and COSI’s role within the partnership.

<table>
<thead>
<tr>
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<tbody>
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<td>NM</td>
</tr>
<tr>
<td>Student motivator</td>
<td>Yes</td>
<td>Yes</td>
<td>NM</td>
</tr>
<tr>
<td>Professional development provider</td>
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<td>NM</td>
</tr>
<tr>
<td>Provide access</td>
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<td>Yes</td>
</tr>
<tr>
<td>Encourage students to consider careers in STEM</td>
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<td>Yes</td>
<td>NM</td>
</tr>
<tr>
<td>Help students pass the Ohio Achievement Test</td>
<td>NM</td>
<td>Yes</td>
<td>NM</td>
</tr>
<tr>
<td>Support teaching and learning at SP</td>
<td>NM</td>
<td>NM</td>
<td>Yes</td>
</tr>
<tr>
<td>Support the community</td>
<td>NM</td>
<td>NM</td>
<td>Yes</td>
</tr>
</tbody>
</table>

NM= No Mention

Table 4. COSI Team Member’s View of COSI’s Role in the Partnership

*Isolated Providers’ Perceptions of the Partnership Goals and Their Roles in the Partnership*

Isolated providers had limited contact with SP students, teachers, and families. From their viewpoint, it appeared that SP was just another student group for which they were providing science education services. They served SP as they did other schools. Two isolated providers, who had worked at COSI for six months or less, did not even
realize that COSI was a partner with SP. Isolated providers believed that COSI afforded SP the same services it provided to any school using the science center.

The COSI team views themselves as science resources, experts, and motivators for anyone who visits COSI. For instance, during his interview, J. R. stated that he believed the goal of the partnership was “to get kids interested in science, being creative, learning anything, encourage them to ask questions, to have fun with learning. I think that should be the goal, to make learning more open, fun, free to ask questions” (COSI Team Interview #5, 12/21/07). Isolated providers shared goals for the partnership that were consistent with COSI’s philosophy.

*Integrated Providers’ Perceptions of the Partnership Goals and Their Roles in the Partnership*

Integrated providers were aware that COSI had a partnership with SP, and these team members had several contacts with SP students, teachers, and families. They assumed several roles to support the COSI programs for SP students, parents, and teachers, including field trips, co-teaching, and other classroom experiences. They understood that COSI was a science resource for the school, and that COSI supported the teachers with professional development in the form of co-teaching. The three integrated providers believed that COSI played six different roles within the partnership, including:

1. Serving as a science resource.
2. Serving as a student motivator.
3. Serving as a professional development provider.
4. Providing access to students who may not have otherwise had the experience.
5. Encouraging students to consider careers in science.
6. Helping students pass the Ohio Achievement Test.

1. Serving as a science resource

The COSI team members were recruited in part for their science knowledge. The members all have significant background experience in science and/or science education. Regarding COSI expertise and resources, L. S. said, “Our resources are different [than SP’s]. I would like to believe that most students and families will find something valuable here.” He added: “It is my belief that this institution has sort of built its support base on the ability to adapt and to jump in and help [with science needs]. When someone walks through the door, the attitude is, I’m here for you, how can I help you?” (COSI Team Interview #3, 12/12/07).

2. Serving as a student motivator

Integrated providers felt that COSI was responsible for encouraging positive attitudes in science. L. S. stated, “One of the outcomes of the partnership was that there is a certain expectation at this facility that is known for its excitement and enthusiasm in the learning process.” (COSI Team Interview #3, 12/12/07) He believed that COSI was responsible for sharing that excitement with the SP students and teachers. A. A. shared: “I think over the course of that period, I saw the students’ attitudes change. I saw them look forward to the programming that we would bring in, with each time we came in they were that much more excited the next time we were there” (COSI Team Interview #1, 11/30/07).

When asked about the goal of the program, R. D. said, “Well, our general [goal]…is to show that science is fun and that the learning can be fun and to raise the
awareness of science, technology, engineering, and math” (COSI Team Interview #6, 1/21/08). This goal was shared by all COSI team members.

3. **Serving as a professional development provider**

All integrated providers participated in co-teaching; therefore, they shared the belief that a goal of the partnership was to coach teachers about meaningful science lessons. A. A. felt that when the COSI team members shared science resources, they consistently “modeled science process skills, inquiry, [and] thinking like a scientist” (COSI Team Interview #1, 11/30/07). R. D. stated that one of COSI’s goals was “to improve the exposure of the teachers to different teaching methods in order to improve what they’re doing, make them more effective teachers” (COSI Team Interview #6, 1/21/08).

4. **Providing access to students who may not have otherwise had the experience**

A goal of the partnership was to provide SP students with opportunities that they might not have otherwise. A. A. said, “I think being an underserved or inner city school they are provided with an opportunity that a more well-to-do school may be the only ones who can afford” (COSI Team Interview #1, 11/30/07). R. D. shared during her interview, “I think one of the goals is also to show that we’re a community partner and that we are vested in Columbus and in the people of Columbus, and so we’re trying to do things to better our community” (COSI Team Interview #6, 1/21/08).

5. **Encouraging students to consider careers in science**

This perception was held by only one of COSI’s integrated providers. LS believed, as he believes with each COSI program he does, that he was encouraging students to consider careers in science. He stated during his interview:
Traditionally, sometimes if you ask a kid what they want to be, we find these kinds of repeat patterns of professional basketball player, football player, and race-car driver. I have personally heard students vocalize and verbalize that I would like to be a doctor, I would like to be a veterinarian, I’m really thinking about being a scientist. This is really cool. …that’s kind of rewarding not knowing exactly if I had some influence in that or if that was just something that COSI does to keep them motivated (COSI Team Interview #3, 12/12/07).

6. Helping students pass the Ohio Achievement Test

R. D. expressed that a goal of the partnership was “to improve the test scores for the students of SP through activities” (COSI Team Interview #6, 1/21/08). A. A. shared:

I think places like COSI provide an environment that helps the kids work on the concepts and work on the process …I don’t know if we can show that it [impacts test scores]. I think that if the test is the measurement and what we are doing supports what they are being measured, it couldn’t hurt (COSI Team Interview #1, 11/30/07).

COSI Vice President’s Perceptions of the Goals of the Partnership

COSI’s Vice President encouraged partnerships with local schools for several reasons, including enhancing the institution’s role in the community as a science resource and enhancing its own financial resources. COSI’s Vice President welcomed the opportunity to work with SP when principal one contacted COSI. The Vice President believed that COSI’s role in the partnership was to:

1. Support teaching and learning at SP.
2. Support the community.
3. Provide access to those who are not able to visit otherwise.

1. Support teaching and learning at SP

COSI’s Vice President believed that COSI could support teaching and learning at SP. During her interview, COSI’s Vice President stated that the institution had a “role to
play in improving education and that the way to do that is through a relationship-based program as opposed to come to our workshop and go home” (COSI Team Interview # 4, 12/13/07). COSI’s Vice President believed that a partnership involving several contacts with one school was the most effective way to support teaching and learning.

2. Support the community

At the time that SP approached COSI to develop a partnership, COSI’s leadership was exploring options to expand its community presence. COSI had just chosen a new president, who brought with him a strong history with community partnerships. During her interview, COSI’s Vice President shared that she wanted “to get COSI out into the community in a different way so that it’s not all about people coming here, but we have a presence there as well” (COSI Team Interview # 4, 12/13/07). COSI’s Vice President believed that the science center needed to increase its community presence.

3. Provide access to those who are not able to visit otherwise

COSI’s Vice President realized that the institution was not serving the entire community. She felt that the community included everyone, those who had access to the museum and those who did not. During her interview she shared, “There was a goal that was related to access and providing access to families who might not otherwise experience COSI for whatever reason, whether it’s transportation or financial or whatever that is” (COSI Team Interview # 4, 12/13/07).

To provide access, the partnership provided SP families with COSI memberships during year one and two. In addition, during year two, the science center secured funding to provide transportation to the science center on select days when students were out of school.
Question One Conclusion

The literature indicates the importance of mutual goals in maintaining effective partnerships. The data analysis indicates that partners could identify 10 goals, three of which were shared by the majority of partners, and seven that were not.

Shared Goals

Among the four constituent groups, 10 goals were identified, with each partner contributing between two and six goals (see Figure 5: Partners’ Perceptions of Goals for the Partnership). Several goals were shared by more than one partner, with only one goal — supporting student learning — mentioned by all four partners.

Of the remaining nine goals, two were identified as partnership goals by members in the three adult constituent groups: (1) professional development, and (2) science resources. Of the remaining seven goals, three were identified by both of the SP principals and members of the COSI team: (1) support teaching, (2) provide access, and (3) motivate students. With support from both the school and the science center, these would be viewed as the mutual goals of the partnership.

Diverse Goals

Three goals were identified by only one constituent group. Although these goals might be important to that constituent group, they were not identified by another group and therefore are not mutual goals; however, each of these goals was achieved to some degree. These goals include providing field trips (teachers), encouraging careers in STEM (COSI team), and supporting the community (COSI team).

Within some of the larger constituent groups (i.e., teachers and COSI team), a goal might be shared by only part of the group. For example, two of the three teachers
viewed COSI as a professional development provider and science expert. Teachers’
views of COSI role might be shaped based on their comfort level with science, their
interest in science education, their view of science education within their school
curriculum, their interaction with the COSI team, or their participation in setting the goals
for the partnership.

COSI team members’ views of the goals of the partnership might be shaped by
the number and quality of the interaction they have with SP students, parents, and
teachers, or their participation in setting goals for the partnership. For example, those
who facilitated co-teaching programs felt that professional development was a goal of the
program; those who did not participate in co-teaching programs did not. The greater
number of interactions the COSI team had with SP staff or students, the greater their
understanding of the partnership. The broader goal of providing access was seen by
integrated program providers and COSI’s Vice President, but not by isolated program
providers. Improving Ohio Achievement Test scores was mentioned as a goal by
integrated providers, but because this is difficult to quantify, it was not considered a goal
of the partnership by the Vice President.

As would be expected, the student goals were focused on themselves and
involved learning and fun. This is typical of elementary students with a limited scope
and understanding. The adults focused on the bigger picture, listing goals that benefited
students, the community, as well as themselves.

One goal, fun, was mentioned by the students and the COSI team. This goal
seemed to create tension between teachers and the COSI team. The COSI team believes
that learning and fun are inseparable; the teachers appear to see the two as unconnected.
The literature indicates that mutually agreeable goals are central to the effectiveness of a partnership. The partnership struggle could have been mitigated by the development of mutual goals communicated to all participants at the beginning of the partnership.

Question Two. What Does Each Group Expect From the Other partners and From the Experiences Provided Within the Partnership?

The second question considered in this research flows from the first question regarding perceptions of the partnership. When analyzing the data it became evident that the perceptions of the goals of the partnership had a great deal to do with shaping and influencing the expectations that each partner had for the other partners and the experiences that were to be a result of the partnership. The question of expectations regarding roles and experiences will be examined through the lenses of the teachers, principals, and the COSI team. This does not mean that the students’ expectations of the partnership were irrelevant; their expectations were believed to be similar to their goals, whereas the teachers, principals, and COSI team members were vocal about unmet expectations. Thus, the expectations discussed in the following paragraphs highlight where a partner believed that a goal of the program was not being realized fully.

*Teachers’ Expectations of COSI as a Partner*

The three teachers in the partnership shared their expectations of COSI during interviews, and as they had expressed varied perceptions of the goals of the partnership, there was also a variation in expectations. Teachers’ expectations of COSI as a partner appeared to depend on their views of science, experience and/or comfort with science education, interaction with the COSI team, or their participation in setting the goals for
the partnership. Several unmet expectations that were identified by the teachers concerning student programs at COSI and SP, including:

1. COSI activities/lessons need more structure and direct connection to Ohio’s science standards.
2. Redundancy of COSI experiences.
3. Communication.

1. *COSI activities/lessons need more structure and direct connections to standards*

Overall, the teachers believed the COSI activities/lessons needed more structure and a direct connection to the state standards. Because teachers in the NCLB era, are accountable for student achievement on high-stakes tests, they needed to ensure that every lesson helped a student answer test questions correctly. The COSI team, not bound by NCLB and advocates of free-choice learning, did not fully understand the teachers’ need for structure and curriculum connections.

Although the teachers appreciated the COSI student programs, they expressed concerns. During her interview, Ms. H shared that she liked that her students were able to visit COSI, but she wanted more structure during field trips. She said that many of the “children are not really exploring that activity when they are bouncing around,” and that her students needed more structure “because sometimes we can’t get enough volunteers to go with them, and when you have a large group ... it’s hard to keep them all focused” (Teacher Interview #2, 12/13/07). Ms. H appeared to believe that learning happens when students are structured and focused.
In addition, Ms. H felt that all students needed the same experience when visiting COSI, and that experience must connect to state standards. She said “Many times when they are in different groups, some of the children say they did this, this, and this, while the other ones did not have that participation, they don’t quite understand. I would want them to all be doing the same thing, [everything connecting to] our standards” (Teacher Interview #2, 12/13/07). By ensuring that all students had the same experience, Ms. H appeared to believe that all students mastered the same information.

Mrs. D also wanted additional structured activities for her students during COSI field trips. She shared, “It’s kind of like ‘oh look at this’ and then they touch something and they fly over.” She said, “I am frustrated because, you know, I want to kind of teach or, you know, I want them to like be independent or read or try and ask questions but …it’s almost kind of like a carnival kind of an atmosphere here” (Teacher Interview # 3, 12/14/07). Ultimately, Mrs. D desired “interaction with instruction.”

In addition to connecting field trip experiences to standards, Ms. H and Mrs. P wanted more explicit connections to the standards during COSI co-teaching experiences at SP. Each of the teachers interviewed had participated in a five-lesson co-teaching experience. During these lessons, the COSI team worked with the teacher to teach inquiry-based lessons on a topic. Ms. H had little to no experience with inquiry learning prior to this experience. Mrs. P was aware of inquiry-based learning and used it with her students during science class.

Ms. H confirmed that she liked the five-lesson inquiry experience for her fifth-grade students to be focused on light and shadows. The COSI team had proposed the light and shadows lesson, believing that it reinforced the concepts that Ms. H had
introduced in her electricity unit, as well as the scientific inquiry standards. Although Ms. H said, “I loved that,” she added, “but it didn’t tie in with our standards as much” (Teacher interview #2, 12/13/07).

Mrs. P participated in a five-lesson series of inquiry lessons focused on force and motion. During these lessons, students made paper airplanes and conducted several test flights to determine what made a paper airplane fly farther. When discussing the COSI co-led activities, Mrs. P shared how she prepared students for the test:

I give them a hands-on experience so that they feel it, they see it, they’ve done it, then attach some vocabulary with it, then [have students] answer the question, a question [they] might see somewhere on a very important test. So now [they’ve] had the opportunity to act and behave just like a real scientist does (Teacher Interview #1, 12/4/07).

When reminded that real scientists don’t take standardized tests, Mrs. P replied, “That’s right, but real students do” (Teacher Interview #1, 12/4/07).

2. Redundancy of COSI Experience

The majority of COSI’s 300,000 square feet of exhibits do not change. Although SP students came on a two-hour field trip to COSI only once during the regular school year, students who attended the intersession experiences often visited the museum with a teacher three to four times in one year. This concerned Ms. H, who worked during the intersession. She stated, “Sometimes I think they are going too much, because they are seeing the same thing” (Teacher Interview #2, 12/13/07). Ms. H was correct; because many of the COSI exhibits are fixed, there was the chance students could experience the same exhibit several times during one year. The COSI team believed that the majority of the exhibits offered several different experience levels, but without the proper facilitation, these exhibits most likely appeared static.
Ms. H went on to say, “I would like more structured activities for them, because when they are going to COSI and they are walking around and they are seeing the same things and doing the same things . . . it gets kind of monotonous” (Teacher Interview #2, 12/13/07). Ms. H appeared to believe that the redundancy of the exhibits did not lead to new learning and therefore was not necessary in the “neo-liberal audit culture of education.”

3. Communication

Communication is essential to a successful partnership, yet with so many different experiences, people, and communication styles, there are challenges. The SP teachers alluded to communication challenges they experienced with the COSI team during interviews.

Mrs. D shared a communication misunderstanding she experienced during a COSI field trip with her students. “There was just kind of a foul-up about what door we were supposed to go in, and who paid, and who had the money, and there was kind of a delay.” She also experienced a delay connecting with chaperones who had entered the museum through a different door. “I’m just saying it probably would have been better if I would have known … where we were going to park or to say where to meet, which was just another delay” (Teacher Interview #3, 12/14/07).

Principal’s Expectations of COSI as a Partner

Both principals in the partnership shared their expectations of COSI during meetings to outline the partnership at the beginning of each school year, so the COSI team was aware of their expectations. As the principals were keys to the success of the partnership, all COSI team members in the partnership did their best to deliver programs
to meet those expectations. During their interviews, as each principal had expressed varied perceptions of the goals of the partnership, there was also a variation in expectations. Both expected COSI to support teaching and learning at the school. However, the expectation of connecting lessons to the Ohio Achievement Test intensified between year one and two.

Because the researcher had worked with principal one to develop the partnership and understood his expectations of the partnership from the beginning, he did not express unmet expectations during the interview. His expectations had been met regarding professional development for teachers, family memberships for his students, and lessons that motivated students.

In the initial meeting with principal two, she expressed an additional expectation of the COSI team: the need to ensure that all COSI experiences included potential test questions that students might see on a high-stakes test. During her interview, principal two expressed her belief that students had difficulty “transferring their hands-on project-based knowledge to written knowledge.” She continued, “Oftentimes I think children have ideas trapped in their brains, and they know what they want to say, and they don’t know how to get it out; and I think that’s where they fall short on testing” (Principal Interview #2, 1/9/08). If COSI wanted to continue working with SP, all lessons needed to provide students the opportunity to write answers to potential high-stakes test questions.

**COSI Team’s Perceptions of Expectations of SP Students, Parents, and Faculty**

Viewing the field trips and lessons through the lens of the COSI team, there were expectations of SP students, parents, and faculty that were unmet. During interviews with the COSI team members, the following positions emerged:
1. Communication.

2. Responsibilities of SP staff and adult chaperones.

3. Student behavior.

4. Punctuality.

Isolated providers expressed a greater degree of unmet expectations of SP as a partner, either because they had the least interaction with SP students and teachers or because they expected SP students and teachers to act like other students and teachers with whom they worked. Each COSI team member who worked with SP had different expectations based on COSI’s program needs. For purposes of data analysis, expectations are organized by findings and include comments from isolated and integrated providers who worked with COSI’s overnight, outreach, and co-teaching program experiences.

1. Communication

The importance of communication was previously discussed through the lens of the SP teachers; to demonstrate that communication is a two-way street, it is addressed again through the lens of the COSI team. The COSI overnight, outreach, and co-teaching team members felt that they had communicated with the appropriate SP staff member; however, they did not see evidence that the message they had thought they conveyed was received or understood by the SP students, parents or staff.

Prior to the overnight and outreach programs, standard COSI pre-visit information packets were mailed to the school, and in the case of the overnight program, the information also was e-mailed. COSI serves hundreds of schools through outreach and overnight programs, and the same information is sent to all school leaders.
The COSI team expects the point person at the school to read the pre-visit information and communicate with COSI and their school staff. For the overnight program, the point person is supposed to communicate the number of participants to COSI two weeks before the overnight date. For the outreach program, the point person is supposed to communicate the assembly and hands-on activity period schedule. In addition, the SP point person is supposed to communicate to the school staff participating in the event the general flow of the event and any specific expectations.

The SP point person did not respond after receiving the pre-visit information. For each event, the isolated provider responsible for obtaining the information attempted to contact the SP point person via e-mail and telephone to no avail, then appealed to the COSI director who was responsible for the partnership to obtain the information.

In addition, the pre-visit information included such educational information as vocabulary and basic science content, as well as student behavior expectations and teacher/chaperone information that the point person was supposed to share with participating teachers. During the overnight program, the COSI team assumed that this information was shared with students and chaperones before they arrived, but they did not observe evidence that either the students or chaperones were aware of these documents based on the behavior observed at the overnight. During his interview, KS said it appeared that the students and parents “didn’t have a clue” during the overnight (COSI Team Interview #2, 11/20/07).

Regarding the outreach event, the outreach demonstrator who led the program shared:
The … teachers and COSI weren’t on the same page, the teachers didn’t know the expectations we had, and we didn’t know the expectations that the teachers had, for how the day was going to run. COSI sent that information out to them, but I don’t think it was shared with the entire teacher faculty or with the students, because at every hands-on session I repeated the same thing, these are the expectations, and each teacher had no idea. They came in with, OK, COSI, what are we doing? They weren’t prepared (COSI Team Interview #5, 12/21/07).

Another outreach demonstrator at the event wasn’t sure where the communication breakdown occurred. He said, “I think it might have to do with what COSI has done there before, not [outreach], but other workshops … [outreach] is an entirely different beast, so many different things are going on, maybe even if the SP point person shared everything with them, I’m not sure if it describes the run of the day [accurately]” (COSI Team Interview #5, 12/21/07).

These comments by COSI team members, shared during interviews after the program, illustrate the challenges with communication. In each case, there appears to be a communication breakdown. Since the COSI team does multiple programs annually with numerous schools, the same information is provided to each school. Eighty percent of schools return the completed information before the visit, and this is extremely helpful as the COSI team prepares for the program. Additionally, since the COSI team members do not have access to all participants prior to an overnight or outreach program, they expect the group leader to convey the information in the pre-visit packet to all involved. These communication issues might contribute to perceived challenges regarding the expectations of SP staff and adult chaperones that confronted the overnight and outreach teams.
2. **Responsibilities of the SP Staff and Adult Chaperones**

During the COSI overnight, the SP staff and chaperones appeared unaware of their responsibilities. Parent chaperones left children unsupervised, and key SP staff did not attend the overnight. When these duties went unfulfilled, the COSI team experienced challenges.

SP students attended an overnight during the first year of the partnership, but not during year two. Principal one expressed support for an overnight during meetings, and the COSI team assumed that he planned to attend to ensure that behavior expectations were met. The COSI team observed the arrival of the students’ with two teachers and adult chaperones on the evening of the overnight. Those implementing the overnight expressed their disappointment and concern that principal one was not participating, but felt they had little recourse at that time to stop the overnight (Field Notes, 11/9/06).

Each COSI overnight includes several schools and between 200–800 students. SP was the only urban school participating in that particular overnight. The other groups were smaller rural and suburban schools. Each of these schools had teachers’ who had attended a prior COSI overnight, and each group came with its own set of expectations for their students and the event based on this prior experience. None of the SP staff had ever attended an overnight, so they did not have prior knowledge or expectations. L. C., an overnight coordinator, said:

The main thing from the other schools’ perspective was that [they] had chaperones and their 4 or 5 kids together all night and when SP got in … their chaperones were not with the kids, and the chaperones did not spend the night, and there were chaperones who … said they were going to go out and get cigarettes, they’ll be back in a few minutes, … and the kids were running around [unsupervised] (COSI Team Interview #2, 11/20/07).
In addition to general supervision, the overnight team felt that getting the SP students quiet at lights-out took more effort than usual. The COSI overnight staff said:

After lights-out, many of the chaperones left, and it took seven team members and two safety officers to get the group quiet and ready for bed. There was all this running around; Ms. H refused to move her air mattress out of the way of the fire exit. The kids weren’t listening, nor should they. There teacher wasn’t listening. And they were listening to the person that they knew … and if she isn’t moving, I’m not moving either. There were a few teachers [who] … tried very hard, the parents -- I don’t think had a clue. I think they thought they were coming to COSI for a few hours and that at lights out you can go to bed at home. One brought a 2-year-old and had no concept why Jr. couldn’t stay (COSI Team Interview #2, 11/20/07).

The overnight team believed some of the adults were trying very hard to ensure that students met the COSI team’s behavior expectations but said that their numbers were insufficient and their authority diminished without the support of the principal. This had a negative impact on the other schools participating in the overnight.

In addition to the overnight, there were occasional challenges with co-teaching experiences. R. D., who facilitated many co-teaching experiences, shared the following regarding student preparation before a lesson: “I would expect that the teacher would have at least introduced the topic, given them the definitions before we got in the door. And we’ve seen it in all of our programs when the teachers do the pre-activities, the kids, you know, the [students] get it more” (COSI Team Interview #6, 1/21/08).

Finally, outreach demonstrators say that they can tell which teachers complete pre-visit lessons with students prior to the assembly, because those students answer questions and appear to understand what to expect. During his interview, J. L. commented: “From what I saw yesterday … I would say the students weren’t exactly
prepped for what they would be doing in the hands-on. As far as prior knowledge, I imagine the level of preparation wasn’t the highest” (COSI Team Interview #5, 12/21/07). When the SP teachers did not prepare students prior to a COSI experience, student learning was impeded.

3. Student Behavior

As part of the overnight, students attended inquiry-based workshops on specific topics with their chaperones. These workshops enhance the learning and provide structure to the event. At the SP overnight, student behavior in the workshops was difficult to manage.

COSI team members said in interviews that it was difficult to keep the SP students on task during these workshops. A COSI overnight staff member said that he believed there had been “a big push to teach the [SP] teachers how to use inquiry in their classroom”; therefore, when the students and teachers came to his program, he was surprised by their behavior. He believed that when the students “were put into an inquiry-based atmosphere and when they had choices they were thrown for a loop because they weren’t used to the non-structure” (COSI Team Interview #2, 11/20/07). The students appeared unaccustomed to the freedom usually given to students in inquiry-based settings. K. S. stated, “There was no support from the parents” (COSI Team Interview #2, 11/20/07) to assist with student behavior.

4. Scheduling and Punctuality

Expectations regarding scheduling and punctuality varied between partners. The COSI team expects punctuality, and this was not always the case with SP faculty and students. When several schools are involved in an overnight, or several grades are
participating in different hands-on sessions during an outreach program, punctuality promotes smooth operations. Regarding the outreach program, M. W. said:

The one big hindrance of the day, and I’m not sure where this came from, the assembly started 30 minutes late, and every subsequent hands-on session started at least 10 minutes late, one was 15 minutes late. I don’t know if the schedule wasn’t communicated correctly or if they had discipline problems in the classroom and said we aren’t going until fill in the blank. I actually had one teacher come in 15 minutes late. I talked to the kids and got them started, then I always go up to the teacher and describe how I’m going to wrap up and share the time it’s going to happen, and she said, so they only get 10 minutes? [She was] blaming me, [when she was] the one 15 minutes late. [Timing is] the one area where COSI is really regimented (COSI Team Interview #5, 12/21/07).

Perceived expectations of scheduling also varied. R. D. shared the following regarding the co-teaching program:

They schedule us to come in and then they change that. … we end up showing up and they’ve forgotten we’re coming. When we put the planning in it to do it and then that morning we get a call, ‘oh can we switch?’ One time, no big deal, but it seems to be a habit or something that just keeps happening and I don’t know if … they feel so comfortable with us that they can shift us around or they just don’t value it or they think COSI is going to be there regardless so its ok if we dump on them or shift them around. And it’s probably something beyond what the teachers can control (COSI Team Interview #6, 1/21/08).

The COSI team’s expectations of SP faculty, parent chaperones, and students appeared to be different from those of the COSI team. One team member shared after working with SP: “It takes two to tango. We were just not prepared for our part of the dance.” Another said, “We were prepared for the COSI dance as we knew it” (COSI Team Interview #2, 11/20/07).

Question Two Conclusion

Teachers, principals, and COSI team members had unmet expectations, with one expectation: communication, mentioned by SP faculty and the COSI team. The majority
of the SP concerns had to do with making the COSI experience similar to the structured school environment, while the COSI team concerns dealt with helping SP staff understand their programming needs.

While the teachers expressed appreciation for the field trips to COSI and the lessons provided by the COSI team, they wanted an experience that was compatible with the classroom experience. Due to time limitations imposed by the curriculum, if a COSI experience was part of a lesson, it needed to meet the state standards that the teachers are required to meet. Teachers who were observed to be less comfortable with science education and who did not participate in setting the goals for the partnership had more unmet expectations than teachers who were observed to be more comfortable with science education and participated in setting the goals for the partnership.

The COSI team’s expectations were focused on increasing their understanding of COSI’s program, and varied based on the amount of time spent with SP and the type of program provided. Isolated providers had more unmet expectations than integrated providers, possibly because isolated providers spent less time interacting with SP faculty.

Finally, the principals expressed few unmet expectations. During this study, the importance of principals in driving a partnership was evident; therefore, the COSI team believed meeting the expectations of the principal was essential. The expectations of the principals regarding this partnership varied from year one to year two because of the change in principal. Although both principals expected COSI to support teaching and learning at SP and provide quality professional development to teachers, the expectation of connecting lessons to potential Ohio Achievement Test questions intensified in year two.
Question Three. How is Teaching and Learning Perceived Across Context and Participant?

In the previous two questions, the partners each had their own perspective regarding the goals and expectations of the partnership. This was found to be true in the data analysis for question three, with each of the partners sharing a somewhat different view of teaching and learning. As with the previous question, there were shared preferences about teaching and learning, including the impact of testing on learning and the importance of critical thinking.

*Students’ Perceptions of Teaching and Learning*

SP is a year-round school with a traditional teaching environment. Grade 3 students are in a self-contained classroom with one teacher who teaches all subjects, while students in grade 4 and 5 change classes, with one teacher teaching science to all grade 4 students and another teaching science to all grade 5 students. In addition to the required daily lessons in language arts, mathematics, science, and social studies, students also participate in “specials,” including physical education, music, and art.

Those students involved in this research viewed school positively, and had specific preferences regarding teaching and learning. During these conversations, they expressed the following preferences regarding learning:

1. To have fun
2. To be actively engaged

*1. To Have Fun*

Several students expressed that they learn more when they are having fun. When asked what makes a class fun, A. J. said, “I learn when I have fun.” When asked if she
can learn when she was not having fun, she replied, “Sometimes, but most of the time no.” When asked for an example of a subject that was not fun, she shared, “Like division problems. I get so bored … because I have to listen to the teacher all the time. That gets really boring and I’m about to fall asleep” (Student Interview #1, 12/17/07).

M. S. said that she, too, learns best while having fun. When asked to describe a class where the two co-existed, M. S. said:

We act like we are the Pilgrims and the Europeans, and stuff like that, … how they … were all worried about Great Britain, because they taxed us all the time, so we wrote this letter, to … the Continental Congress, we wrote a letter like how they wrote a letter back then. We learn and had fun too (Student Interview #4, 12/11/07).

2. To be Actively Engaged

The COSI team brought hands-on and inquiry-based lessons to the classroom to teach the district science curriculum. This appeared to be especially important for kinesthetic learners like R. R., who said: “I like doing science, I don’t like reading about it. When I do social studies I keep falling asleep” (Student Interview #5, 12/11/07). D. R. shared that he prefers to be actively involved in learning. When asked if he preferred school science class or COSI science class, D. R. responded, COSI has “more things to do and things to work on.” He added, “The COSI team know a lot more and have a lot of gadgets” (Student Interview #3, 12/17/07). Illustrating the importance of engaging with authentic materials, M. S. shared this comment when asked how she felt about a recent trip to a local history museum, “I think that it’s more fun at COSI because you can touch stuff and you can really learn what the astronauts did” (Student Interview #4, 12/11/07).
**Teachers’ Perceptions of Teaching and Learning**

The three teachers expressed similar views about teaching and learning. Their views were shaped by prior teaching experience. All have multiple years in the field; Mrs. P has taught for 23 years and Mrs. D for 22 years. During conversations with the three teachers, the following positions were evident:

1. Teachers are preparing students for success in life
2. Teachers use diverse science teaching pedagogies
3. Teachers are impacted by testing and the No Child Left Behind Act

**1. Teachers are Preparing Students for Success in Life**

The three SP teachers articulated during interviews that they care about their students and want to ensure their success throughout life. They appeared to understand their students’ circumstances. Mrs. P stated during her interview that, as a teacher, she focuses on “making improvements; it’s on becoming a good reader, the best that you can become, becoming a good mathematician, becoming a good scientist” (Teacher Interview #1, 12/4/07).

She shared a personal experience that she had in motivating one child as they discussed his improvements on the standardized reading test:

I try to point out and praise. We track how well we are doing, our reading fluency rates, and reading scores on different comprehension, knowledge, and all of that… For instance, today T said, ‘Wow, I only read 29 words a minute the first grading period’ and I said ‘Yeah, and you missed a few words, and look what you did today; it’s 55.’ Now that’s not third grade level, that’s more like late first grade or early second grade level, but he did see for himself when I showed him my chart, and it’s motivating him. (Teacher Interview #1, 12/4/07).
Ms. H believes that teachers prepare students for the real world. She stated that a teacher needs to “expose [students] to some of the things they need exposure to.” She believes, “school has to be engaging… and relevant to what they are going to need in life” (Teacher Interview #2, 12/13/07). To help prepare them for life, Mrs. P encourages her students “to be understanding of each other’s ideas, to learn the governmental processes of being in a classroom community together and making it together and making a good academic effort every day together” (Teacher Interview #1, 12/4/07).

2. Teachers Use Diverse Science Teaching Pedagogies

The three teachers used different pedagogies when teaching science. This most likely is due to several factors, including available classroom space and materials; classroom management styles; and understanding of and comfort with different science pedagogies.

When discussing science lessons, Mrs. D began by sharing thoughts on her classroom. “It’s not an ideal classroom… I’m limited by space because I don’t really have any storage, I don’t have a sink,” she said. “When we do an ‘investigate’ it’s like modeled … There’s a demonstration and then it’s done, the demonstration for the next group but it’s not everybody gets their hands in it” (Teacher Interview #3, 12/14/07). Classroom space and materials influence Mrs. D’s science pedagogy.

Mrs. D continued, “I’m not a real creative person. I’m more of a traditional teacher, and I like some organization and I like some control. I’m not against kids using manipulatives and getting their hands dirty, but I don’t want it done haphazard. I want some protocol” (Teacher Interview #3, 12/14/07). Mrs. D’s classroom management style appears to differ from Mrs. P’s.
Mrs. P believes in an inquiry-based pedagogy for science. To ensure organization, she uses peer coaches. She said:

If everyone is asking questions, and there is less of the teacher telling, and more let’s talk together, more social interaction, more freedom to move around the room, hands-on things, … If you have a leader in the group who’s reminding kids, we want to get our star, keep your hands to yourself. I saw a boy today say, ‘No, you don’t want to do that, put a stop sign in your head’ and that child walked away (Teacher Interview #1, 12/4/07).

As management styles appear to differ in Mrs. D’s and Mrs. P’s classrooms, so do teaching methods. Mrs. D shared her strategy for science lessons: “We have like an ‘investigate’ video that walks them [through it] and so it presents it and shows all the materials you’re going to need and it’s kind of calm, and then they’re not like, ‘What are we doing?’” (Teacher Interview #3, 12/14/07). Her science lessons appear to be structured and include exposition and demonstration with limited guided discovery, or hands-on, experiences.

On the other end of the continuum, Mrs. P uses inquiry-based teaching methods. During her interview she shared a typical science lesson:

Usually there is a quick vocabulary review to warm us up, and to get us ready to read and understand the meaning of the words that we will be talking about in that lesson, than there is an intro of the lesson. For example, today I used the inquiry approach, I didn’t tell them a lot about classifying, I just gave them a large piece of paper, put them into groups, dumped out a baggie full of plastic bugs and said classify them. They looked at each other with a puzzled look and asked ‘What’s classify?’ I said talk together and figure out what I want you to do. They started by picking up the bugs and looked at them, then they said let’s put them together, then I came by and said, ‘You classified’, then they instantly knew, without being told, what that concept was, so they constructed their language, then I put the term with it (Teacher Interview #1, 12/4/07).
Mrs. P appears to have less of a need to control student behavior, relying on her peer coaches. With student behavior managed by peer coaches, Mrs. P is able to use inquiry-based teaching methods in her science class.

Ms. H’s approach falls somewhere in the middle of the continuum between Mrs. D’s and Mrs. P’s. Sharing her thoughts on science education, she said: “I tell them, the best thing about science, when you don’t get something, you don’t get an F for not getting it; you chalk it up as an experiment and you do it again, and as a scientist, you don’t fail, you look at it as exploring and experimenting. Electricity was not invented the first time around” (Teacher Interview #2, 12/13/07). She described how she used guided, or teacher-initiated, inquiry during her electricity unit, challenging students to light a bulb with a battery and wire without step-by-step directions. She said: “If they spend all science time trying to get the light bulb on, that’s what they are going to do. Sometimes kids don’t get it, [if I say] ‘OK let me show you’, they aren’t going to put forth the effort because they know eventually I’m going to show you” (Teacher Interview #2, 12/13/07).

3. Teachers are Impacted by Testing and the No Child Left Behind Act

The emphasis on student achievement as measured through high-stakes, standardized tests is a result of The No Child Left Behind Act. Teachers and schools are measured by their students’ test scores. Federal funding is tied to these scores. Schools deemed to be failing are required to show progress in order to receive federal funding. Urban schools, with large populations of students who come to kindergarten less prepared for learning; have a difficult time catching up with their suburban contemporaries. Besides the pressure teachers and administrators place on themselves, there is pressure from the community due to the publication of high-stakes test scores.
During her interview, Ms. H was asked to share what she wanted for her students, and her response was:

I want them to pass the Ohio Achievement Test, that’s all I can focus on right now, I want them to pass that test, that’s it… am I test-driven, kinda-sorta, but … The people higher than me say this is how we are going to grade children, this is what I have to focus on. If students don’t pass, nothing happens to them; it happens to us. As a school we get labeled; because you know we have those labels, deficient, almost deficient, almost there, we get labeled (Teacher Interview #2, 12/13/07).

Mrs. D said of her frustrations about the challenge of expecting all children to pass the test: “I have a lot of kids that I think need to be tested or screened for learning disabilities. I mean we go over all these problems every week and then I give a quiz, I take a sampling of what I’ve taught. Still you know about five from each group that don’t have a clue” (Teacher Interview #3, 12/14/07). Ms. H’s and Mrs. D’s comments illustrate the pressure they feel regarding the expectations of students’ performance on high-stakes tests. Mrs. P does not feel additional pressure because of the test. She shared:

I would have that pressure anyway; I mean it’s not an additional pressure because I pressure myself. It’s not enough to say 55% of the class passed, that means 45% of the class didn’t. And that’s my goal; that everyone passes. I don’t think a good educator is going to say it’s OK with me that 25% or 55% didn’t pass. That’s quite a few kids that sit in my classroom every single day, and I take that responsibility to service them in what I said I would do (Teacher Interview #1, 12/4/07/07).

Although high-stakes testing produces anxiety in some teachers, the data it produces can identify student misconceptions and problem areas. “Principal two believes in data,” said Ms. H (Teacher Interview #2, 12/13/07). As a result, SP teachers are very aware of testing data and what they reveal about students. Understanding the data provides teachers with focal points for lessons.
For example, Mrs. P said that test scores indicate that measurement is difficult for her third-grade students. She witnessed a COSI team member “picking up the child’s airplane and saying you went 16-½ feet” during a co-teaching experience. During her interview she said that she would have rather “had the child go to the measuring tape and measure for themselves” and report the measurement (Teacher Interview #1, 12/4/07). The COSI team adapted this lesson to ensure students were doing all the measuring.

Mrs. P seems to do her best to prepare her students for the high-stakes test. She shared, “I give them a hands-on experience so that they feel it, they see it, they’ve done it, then attach some vocabulary with it, then [have them] answer the question, a question you might see somewhere on a very important test” (Teacher Interview #1, 12/4/07).

When asked if the partnership with COSI benefits students when they are taking Ohio’s high-stakes test, Mrs. P responded:

Absolutely, so many of the questions, if you look at the test, are content questions. … If you want to identify the meaning of the word momentum, you have to race the race car. To understand the meaning of the word pressure, you have to feel pressure, you have to do that. So experimentation is so important to understanding concepts (Teacher Interview #1, 12/4/07).

**Principals’ Perceptions of Teaching and Learning**

The two principals had a range of responses regarding their perceptions of teaching and learning. Principal one was principal during the first year of the partnership and initiated the partnership. Principal two inherited the partnership and implemented it during year two. The principals expressed similar views about teaching and learning. Analysis of interviews with each principal, as well as personal conversations and observations, generated the following findings:
1. A good teacher has certain characteristics.
2. A good teacher develops students’ critical thinking skills.
3. A good teacher understands how students’ lives impact teaching and learning.
4. A good teacher uses data to ensure students’ achievement.

I. A Good Teacher has Certain Characteristics

Each principal was asked about the teachers at SP. When principal one reflected on the teachers, he simply said: “You have to be on your toes at SP, getting those kids engaged, stimulating them, not wasting time. You have to be ready to go … [a good teacher] keeps her kids engaged through pretty meaningful and neat stuff” (Principal Interview #1, 11/29/07). Principal one appeared to believe that a good teacher worked well with all learners, especially kinesthetic learners, and was able to engage students with meaningful lessons.

Principal two pointed out that she did not select the SP teachers, because she became the principal after the school year had began. Instead of reflecting specifically on SP teachers, she preferred to share her thoughts on the characteristics of good teachers in general. She stated that a good teacher “knows what [her] children know … how they view the world, and then connect that to what you are teaching, and if you can do that, then you can reach any child.” She said she looks “for teachers that allow students to speak and be heard and get their ideas out, and then support them in how to communicate those ideas so that others understand it.” She also shared, “I look for humor. I think I’ve always enjoyed education because it’s fun” (Principal Interview #2, 1/9/08).

Principal two discussed data and testing more than principal one. Principal two believes that understanding formative assessment is “huge” for teachers. She shared, “I
think we have the curriculum in front of us, and we have to get through all of it, without really knowing what the kids already know, and we re-teach things that the kids already know, because we are comfortable doing that, and we don’t give the time that the more complex pieces of the curriculum need” (Principal Interview #2, 1/9/08). Principal one did not mention formative assessment when discussing the characteristics of a good teacher.

2. **A Good Teacher Develops Students’ Critical Thinking Skills**

Both principals said that critical thinking is an important characteristic to develop in students. Principal two shared, “I want my students … to be critical thinkers; I want them to be able to problem-solve and have a bucket of strategies that they can use to attain whatever their goal is” (Principal Interview #2, 1/9/08). Principal one shared his belief that students “thought more critically” after developing “background knowledge” and completing “inquiry” experiences (Principal Interview #1, 11/29/07). Since COSI values inquiry, this may be one reason why principal one established the partnership.

3. **A Good Teacher Understands how Students’ Lives Impact Teaching and Learning**

Both principals expressed understanding of and appreciation for the strengths and weaknesses SP students brought to class. Both principals shared the belief that their students’ “street sense” was a strength. Principal two said: “I don’t think we give kids enough credit for what they already have. Especially in a place like SP, our kids have some survival skills that we never tap into” (Principal Interview #2, 1/9/08).

Both principals acknowledged that SP students tended to have similar weaknesses in vocabulary and writing. Principal one said:
I think there is a vocabulary deficiency in the urban, I mean they have a vocabulary that is different, their whole street sense, we wouldn’t have a clue what they were talking about. If you were talking to a first grader at SP and you were talking about a skyscraper I wonder if they know it, their parents don’t walk around and say that’s a skyscraper, they say that’s a big building. I don’t think they are exposed to the same words as suburban kids (Principal Interview #1, 11/29/07).

The importance of the role of the teacher in helping students connect their street knowledge with their school knowledge emerged in the interview with principal two. She said: “I don’t know if children know how to transfer their hands-on, project-based knowledge to written knowledge. I don’t know if we do a good job with that, I think we give them experiences, but we don’t always make connections for them” (Principal Interview #2, 1/9/08). Both principals acknowledged that science could influence students in other content areas, including language arts and mathematics.

Principal two acknowledged that science could help students with reading comprehension. During her interview, she asked a rhetorical question: “How do you read nonfiction without doing science? How is that meaningful reading if you know nothing about it? I think they go hand-in-hand” (Principal Interview #2, 1/9/08). Principal one shared his belief that “everybody loves science.” By capturing the students’ attention with a “wow activity” and doing hands-on science, he appeared to believe that the students were increasing their thinking skills, and that would help them on several levels (Principal Interview #1, 11/29/07).

Principal two said:

I would just like our kids to be able to say, OK these are things I know how to do, here’s new knowledge, with this new knowledge I can attain this, or I can go anywhere I want, I want them to understand that its much
bigger than fifth grade, it’s much bigger than SP, … I want them to have the same opportunity that my own child has (Principal Interview #2, 1/9/08).

Both principals appeared to recognize that their students’ parents played a significant role in the education process. Principal two said: “There is not one parent that sends their child to school thinking, ‘I just want a mediocre education.’ Everybody wants what’s best for their child. Now we may not see eye to eye on how to get there, but everybody wants that.” However she expressed a belief that parents might be uncomfortable speaking to teachers or principals. She shared that it is “our responsibility as teachers and principals to break that barrier” (Principal Interview #2, 1/9/08).

Principal one expressed his belief that a good relationship with the parents was necessary to ensure classroom management. He said, “Many of [the students] wouldn’t go over the line because they knew I had clout with their parents or their families” (Principal Interview #1, 11/29/07).

4. A Good Teacher Uses Data to Ensure Student Achievement

The two principals appeared to have different feelings about data and assessment. Principal one stated that he was aware of data, but chose not to focus on data (Personal Conversation, 11/18/06), while principal two was a “firm believer in data” (Principal Interview #2, 1/9/08).

Principal two said that data was informative on many levels. She said: “I think we do a lot of teaching just shooting in the dark hoping that it lands on something, and that’s not going to get us anywhere. But if we were to use tests the way they were designed, …, then we would be fine.” She appeared to value data. She commented, “If you aren’t aware of where the children are, you can’t move them forward. You don’t
even know where you are going; you don’t even know how to get there‖ (Principal Interview #2, 1/9/08). Principal two focused on student achievement in reading and mathematics. She commented, ―I think there is a focus on reading and math because that is what NCLB said we should be focused on, and if you weren’t, then you were going to lose funding and you were going to be taken over by someone who would do it better‖ (Principal Interview #2, 1/9/08).

Through observations of and interviews with principal one, he appeared to be unconcerned with data and assessment. He said, “If I was mired in slumping test scores, things would have changed for me. Because the kids were able to continue to do well on the test, [I was] left alone.” He shared, “Rich authentic learning environments … and activities combined with written activities, will do more for the kids” than focusing on the test (Principal Interview #1, 11/29/07).

COSI Team Members’ Perceptions of Teaching and Learning

The COSI team brought a different perspective to teaching and learning. Few team members have taken pre-service education courses or have classroom teaching experience, but all had attended traditional k-12 schools. Those interviewed for this inquiry had between one month and 27 years of experience at COSI. The following positions emerged through an analysis of interviews:

1. An effective teacher makes learning fun.
2. An effective teacher creates learning experiences that engage a variety of learning styles.
3. An effective teacher emphasizes skills that help students pass high-stakes tests.
4. An effective teacher has certain characteristics.

5. An effective teacher manages students’ behavior.

1. An Effective Teacher Makes Learning Fun

The COSI team believes that learning can be fun. One team member who supervised isolated providers stated that when creating a new demonstration, science content is important but the essential element is fun (Personal Conversation, 2/9/08).

COSI’s outreach demonstrators attempt to create a fun atmosphere during their assembly presentations. When doing his outreach assembly, M. W. typically asks students, “Who likes science? Who considers themselves a scientist?” He said that during the SP show, “at least 75% of [the student’s] hands went up” in response to these questions. He expressed his belief that the SP students “make the connection between COSI and fun and science and fun” (COSI Team Interview #5, 12/21/07).

Students also seemed to be learning during the outreach assembly and hands-on activities. J. R., a new outreach demonstrator assisting with the SP outreach program, stated, “During the hands-on portion I had my own [hands-on activity station], and the kids were really excited and participating” (COSI Team Interview #5, 12/21/07). MW contributed, “You can tell they are having fun, … they asked great questions, they were willing to jump in to anything” (COSI Team Interview #5, 12/21/07). Due to COSI’s interest in inquiry, and the importance that questions play in inquiry, the COSI team believes that learning occurs when students are formulating questions.

R. D., who led several co-teaching programs at SP, shared her belief in fun and learning. “When COSI comes in, the kids know COSI is going to be fun,” she said, “So
they are paying attention, they are going to maybe hold onto the learning better” (COSI Team Interview #6, 1/21/08).

2. An Effective Teacher Creates Learning Experiences that Engage a Variety of Learning Styles

Reflecting on Howard Gardner’s research, COSI’s Vice President shared her belief about how COSI differs from traditional schools. She stated that traditional schools “engage the learner … who is auditory, who can sit and listen and follow what is happening on the board and then translate that.” She believes that COSI tries to:

- give the auditory learner something to do, but we also give the visual learner something to look at, we give the kinesthetic learner something to touch… We try to create experiences that really allow people to experience them in a variety of different ways, and at some point you’ll find something that clicks with you, and then you can learn it (COSI Team Interview #4, 12/13/07).

R. D. appears to believe that the students at SP are kinesthetic learners who appreciate active engagement during their lessons. She said: “I think that, if given the choice of science over English, most students would probably choose to do a science lesson because it is more active. It is a subject that lends itself to doing active experiments” (COSI Team Interview #6, 1/21/08).

3. An Effective Teacher Emphasizes Skills That Help Students Pass High-Stakes Tests

The COSI team appeared to understand that high-stakes test results are important to the SP students and faculty. COSI’s Vice President stated, “I think if we’re going to continue to be relevant in the schools we have to … help them pass the test” (COSI Team Interview #4, 12/13/07). She believes that COSI focuses on “content that is related to the
test that they’re going to have to take” and “we give them these interactive ways to understand the content” (COSI Team Interview #4, 12/13/07). R. D. expressed a belief that we are helping teachers prepare students for the test when we co-teach because “we are having the kids do pre-test and post-test questions” (COSI Team Interview #6, 1/21/08).

Isolated providers had a different view. JL, an outreach demonstrator, said, “If COSI’s outreach program occurs in a vacuum, nothing leading to it, no assessment after it, then they’ll get [some] value out of it, but not the same kind of value [if it was accompanied by additional classroom lessons].” M. W. concurred, adding, “We are a tool, not the cure.” (COSI Team Interview #5, 12/21/07).

Overall, COSI’s Vice President believes that COSI programs might help students do well in testing “when we help them to be critical thinkers. We help them to learn how to figure stuff out and how to sort through data.” She said, “I would like to think that helps pass the test” (COSI Team Interview #4, 12/13/07).

4. An Effective Teacher Has Certain Characteristics

Due to historical and practical reasons, constructivism has taken a back seat to behaviorism, in part because behaviorism can be easier to assess on standardized tests. COSI has not yet been impacted by standardized tests, and the preferred educational theory of COSI educators is constructivism. That likely is why the COSI team views teaching differently than their SP partners.

Possibly because the majority of COSI team members did not have education degrees, only two of them commented during interviews on the characteristics of good teaching. R. D., who does have an education degree, stated that good teaching means that
teachers “know their subject matter.” A good teacher, R. D. shared, is one who can “really engage with her students” (COSI Team Interview #6, 1/21/08). L. S., who does not have an education degree, said that “to be a good teacher you must be excited about learning” (COSI Team Interview #3, 12/12/07).

In addition to having a thorough understanding of their subject matter and engaging students, R. D. also believes that “teachers are charged with trying to teach [students] how to be better humans” (COSI Team Interview #6, 1/21/08).

5. An Effective Teacher Manages Students’ Behavior

COSI team members have different teaching styles. After different members went to SP to do different programs, they expressed a belief that consistency in teaching and classroom management would benefit SP students. To ensure consistency, certain team members were identified to play prominent roles in COSI’s SP education programs. A. A. said, “If it’s COSI, they should see the same people. L. S. was the one the students seemed to resonate best with … so we shifted towards the middle of last year to L. S. teaching the programs” (COSI Team Interview #1, 11/30/07).

The SP teachers and the COSI team varied in their classroom management techniques. A. A. shared:

The COSI discipline style allows more expression on the student’s part; in some of the experiences we were more concerned with are the students engaged, and the SP staff was more concerned with the students’ behavior. I saw some kids being pulled out because they weren’t raising their hands or because they were talking about the phenomena they were observing … and they were pulled out of the experience because they weren’t acting as the school defined as appropriate; however, I thought they were engaged, and that was sad (COSI Team Interview #1, 11/30/07).
As both groups began to understand the other’s classroom management styles, A. A. stated, “We came closer together” (COSI Team Interview #1, 11/30/07).

A direct contradiction of A. A.’s comments regarding classroom management at SP was evident during the overnight at COSI. On that evening, the SP students were observed running through the building, hitting children, and yelling (Field Notes, 11/9/06). L. C., a member of the overnight team, expressed a belief that the SP students need “culture 101, just the basics, keep your hands to yourself, don’t run, basic manners.” K. S. stated, “They weren’t respectful of their surroundings at all, people and stuff” (COSI Team Interview #2, 11/20/07). During her interview, COSI’s Vice President shared, “I don’t think teachers realize that they have to prepare students on how to behave in a museum” (COSI Team Interview #4, 12/13/07).

R. D. said that she believes if the “students knew that they were going to have more opportunities to do cool things, some of the discipline issues might take care of themselves” (COSI Team Interview #6, 1/21/08). That did not prove true during the overnight, when the overnight team observed students misbehaving in a unique setting that provided opportunities to do “cool” things.

There is a significant difference between classroom management at COSI and SP, shared R. D. She commented: “People come here because they want to come here, so in some ways it is easier for us to do the things we do. In a classroom setting the students are in there with you whether they want to be or not” (COSI Team Interview #6, 1/21/08). COSI’s free-choice learning environment is significantly different from the traditional classroom environment.
Question Three Conclusion

Although several positions were shared by the various partners, different aspects were highlighted by each group (see Figure 6). The school faculty view teaching and learning through the formal education paradigm, which is a direct, didactic method of teaching science content, and that which easily can be measured on high-stakes tests.

Science is one of many courses taught throughout the school day. The COSI team, given the very nature of science, view teaching and learning as inquiry, exploration and investigation, and are not bound by the need to insure student achievement on high-stakes test. They have the luxury to focus on science, mathematics, technology, and engineering education exclusively. They are not bound by the same constraints as the SP faculty.

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<th>Perceptions of Teaching and Learning</th>
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<th>Principals</th>
<th>COSI Team</th>
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Figure 6: Partners’ Perceptions of Teaching and Learning

Among the many viewpoints, there is one common position shared by teachers, principals, and the COSI team: high-stakes testing and NCLB impact teaching in schools and museums. Several views were shared by more than one partner, including the
importance of fun while learning (students and COSI team), classroom management (teachers and COSI team), characteristics of good teaching (principals and COSI team), and developing critical thinking skills (principals and COSI team).

Within their constituent group, teachers, principals, and the COSI team viewed testing and NCLB differently. Among the three teachers, two indicate that they felt additional pressure because of the test. Principal two discussed testing more than principal one, opting to structure the spring intersession during year two around student deficiencies in reading and mathematics, thus providing students in grade 3, 4, and 5 with additional lessons to prepare for the test. To meet the expectations of principal two, COSI chose to adapt hands-on lessons to the test, providing pre- and post-test questions for co-teaching lessons during year two. Although some COSI team members feel that they can assist teachers in preparing their students for the test, others said that teachers should be responsible for connecting the concepts introduced during a field trip or outreach program to their students’ understanding.

A discussion of education philosophies and development of goals pertaining to teaching and learning established early in the partnership might have allowed partners to work together more effectively throughout. Because there was no discussion about these philosophical issues, there was a disagreement between SP staff and COSI team members on the impact of testing, classroom management styles, and the role of fun in learning.

Question Four. How Did the Partnership Change Over Time?

Between year one and year two of the partnership, several significant changes occurred. During the summer, between year one and year two, principal one, who initiated the partnership, left and was replaced by principal two. Funding for the
partnership changed; year one was funded by SP, and year two was funded by a local bank. Lessons and activities were added and dropped from year one to year two, based on prior experience and perceived needs of the partners.

The significance of these changes became apparent through analysis of interviews, field notes, documents, and e-mails which generated findings about the following.

1. Principals’ role in and perspective on the partnership.
2. Experiences linked more closely and deliberately to standards/testing.
3. Modes and methods of communication.
4. Changes in funding.
5. COSI team increased consistency.

1. Principals’ Role in and Perspective on the Partnership

The researcher had been told that the support of the school principal was essential to a teacher’s field trip plans, but she never fully grasped the significance of that statement until witnessing the impact of a change in principals. The replacement of principal one changed the unvoiced goals and expectations of a key leader of the partnership.

Principal one was the driving force during year one of the partnership. He arranged the meeting that began the partnership and found the resources to fund it during year one (Field Notes, March 24, 2006). He said that “everybody loves science.” By capturing the students’ attention with a “wow activity” and following that up with hands-on science, he appeared to believe that the students were increasing their thinking skills, and that that would help them on several levels (Principal Interview #1, 11/29/07).
Principal one was the catalyst of the partnership. His role was to administrate and delegate. Analysis of e-mails showed that principal one focused on the establishment of program offerings, the contract, and the payment (E-mails, 7/31/06, 8/2/06, 9/15/06, 11/1/06, 1/11/07, 1/23/07, 3/13/07, 4/23/07, 6/1/07, 6/8/07). The day-to-day operations of the partnership were the responsibility of Mrs. P, the lead science teacher. All programming issues, including logistics and lessons, were handled by her during the first year of the partnership (E-mails, 6/9/06, 6/12/06, 6/14/06, 6/15/06, 6/16/06, 6/22/06, 6/25/06, 7/7/06, 7/19/06, 8/4/07, 8/24/06, 8/29/06, 9/8/06, 9/20/06, 9/22/06, 9/23/06, 12/28/06, 1/17/07, 1/18/07, 1/19/07, 1/25/07, 1/31/07, 2/7/07, 3/14/07). This changed during year two.

Principal one left in June of year one. Principal two began her tenure at SP two months later. Priorities shifted during principal two’s tenure. She arrived after the school year had begun, inheriting the staff, programs, and partnerships of principal one. The school was a model for the district, was part of a larger project with the university; and it hosted several partnerships with several agencies. These diverse and numerous partnerships created a complex school environment.

Given the demands of learning about such a school within such a complex context, several e-mails, phone calls, and the assistance of Mrs. P were needed to set up a meeting with principal two to discuss the partnership. This meeting happened six weeks into the school year, but due to the change in principals, it could not have happened earlier. However, this impacted the ability of COSI to conduct programs at SP during the fall of year two. During year one of the partnership, the COSI team conducted several
programs in the school during August and September. During year two, the COSI team did not conduct any programs within the school until December.

At the September meeting, the COSI team presented a list of partnership activities from the prior year, assuming that the principal two would be aware of these activities and accept them. Principal two however was unfamiliar with the options, and the COSI team needed to clarify the offerings. In addition, principal two did not accept all activities unconditionally; she needed to review them to ensure that they met her goals for SP (Field Notes, 9/11/07). She stated that her goal for the partnership was “to support what is occurring at the school,” and her focus was to increase student achievement, especially in language arts and mathematics (Principal Interview #2, 1/9/08). All program activities would be reviewed with this in mind.

Principal two was involved in administrative and programming issues (E-mails, 9/9/07, 9/13/07, 9/21/07, 10/16/07, 10/20/07, 10/22/07, 12/10/07, 1/16/08, 2/19/08, 3/7/08, 3/10/08, 3/13/08, 3/19/08, 3/26/08, 4/17/08, 4/25/08, 4/30/08, 5/12/08, 5/21/08, 5/22/08). Not only did she meet with the COSI team to discuss program opportunities and work out a contract, (Field Notes, 9/11/07), she also appeared to be the final authority regarding program matters. Her e-mail of March 10, 2008, illustrates her role in program planning during year two:

I am SO SORRY about the delay. In our grade level teams last week, we discussed organizing Intersession according to GLIs and rotate students through 5 classes each day based on the GLIs that they are closest to mastering. As you can imagine, this took a little time to construct. Using the practice OAT data and staff who are planning to teach, I have developed a ‘rough draft’ schedule.
[These are the concepts we will focus on:]
R2 - Acquisition of Vocabulary M1 - Numbers and Number Sense
R3 - Reading Comprehension M2 - Measurement
R4 - Informational Text M3 - Geometry
R5 - Literary Text M4 - Patterns, Functions and Algebra
M5 - Data Analysis and Probability

I would also like to do one trip to COSI instead of two - April 9 for fifth grade students sounds very good (E-mail, 3/10/08).

Due to the many responsibilities of being a new principal in a building and the need to juggle the demands of many programs running simultaneously with the COSI partnership at SP, the second principal needed additional time to make decisions and communicate about the needs of the school and the partnership. This frustrated the COSI team members, who wanted information earlier to make staffing decisions.

2. Experiences Linked More Closely/Deliberately to Standards/Testing

This school, like many in the nation, was being influenced by the standards movement. As a result, several modifications were made to COSI experiences to assist the SP staff in meeting their achievement goals during year two. The changes that occurred as a result of this shift included aligning all activities to the curriculum, adding pre- and post-test questions to all lessons, including field trips, structuring COSI visits to include experiences that aligned to high stakes tests; and purchasing workbooks with grant funds that were originally meant for the overnight.

When the partnership was designed, principal one appeared enthusiastic about every opportunity COSI could provide his students, parents, and teachers. He wanted to extend multiple and diverse opportunities to students and their families. Principal two’s priorities were different; she was more aligned with school district policies, which at that time were more in line with meeting the achievement standards mandated by the district.
Although she approved many of the activities discussed in the initial meeting, principal two wanted to think about the overnight. Several months after the initial meeting, she decided that the school would not participate. One thing was obvious to the COSI team as they left the first meeting: all COSI experiences must have a direct tie to the curriculum, standards, and testing (Field Notes, 9/11/07).

All COSI co-teaching lessons were revised to link hands-on, inquiry-based science lessons to the curriculum, standards, and test. Students in grades 1 and 2 received graphic assessments, while students in grades 3, 4, and 5 completed assessments that included a combination of multiple-choice, short-answer, and extended-response questions. Although co-teaching lessons for grades 3, 4, and 5 had included workbooks during year one, in year two more emphasis was placed on having students write in these workbooks.

The majority of field trips during year one was non-structured, but this changed during year two. Ms. H stated her need for students visiting COSI to focus on exhibits that tied to the standards. Regarding her students’ visits, she stated, “I would want them to all be doing the same thing, [everything connecting to] our standards” (Teacher Interview #2, 12/13/07). Ms. H requested more structure for her field trips and was accommodated. During her year-two field trip, the COSI team was able to structure her visit. Throughout their two-hour visit, her students were scheduled into experiences that reinforced science concepts that they would encounter on their high-stakes tests, including a 30-minute chemistry demonstration that emphasized chemical and physical change, followed by an hour of hands-on investigations that illustrated the concepts introduced in the demonstration. The remaining 30 minutes of their two-hour visit was
spent exploring COSI via a scavenger hunt that involved students identifying changes in technology (Field Notes, 4/9/08).

During year one, all intersessions were based on science themes, i.e., space and animal adaptations. This changed in year two when intersession topics were based on student deficiencies identified through data analysis of student test scores and the interests of teachers who would be teaching during intersession. Data indicated that students needed remedial work on social studies due to low test scores on high-stakes tests. As a result, the fall intersession topic was Ohio history. To support this, the COSI team delivered lessons that highlighted Ohio’s inventors and contributions to technology. For the spring intersession, principal two did a comprehensive analysis of student data, focusing on reading and mathematics. The COSI team supported this intersession with lessons that highlighted measurement and graphing, science process skills that are tested on the mathematics high-stakes test (E-mails, 3/7/08, 3/8/08, 3/10/08, 3/19/08, 3/20/08, 3/26/08). The following e-mail from Mrs. P illustrates the type of lesson that COSI developed:

Thanks for your help with our kids! [Principal two] and I discussed briefly the measurement activities that we feel would be helpful. Our kids need ALL types of measurement in addition to linear measurements: gallons, quarts, pints, cups, teaspoons, tablespoons, cubic centimeters, decimeters, kilometers, degrees Fahrenheit, liters, milli-liters,....

We also thought that the books that we are requesting would give you an idea of the types of measurement questions and the units of measure that the kids are required to know. They really need the hands-on measurement followed by a test question. So you could allow the test questions to guide your hands-on activities (E-Mail, 3/8/08).
The COSI team understands that reading and math scores are most important in the NCLB era, as student scores in reading and math count toward annual yearly progress, which is one of the factors used to determine student achievement.

Principal two requested that funds originally secured for the overnight be used to purchase *Show What You Know* workbooks for all students in grades 3, 4, and 5. Although the COSI team does not traditionally purchase this type of materials, they did purchase them to support the achievement goals of SP. The workbooks were used during the year two spring intersession.

3. **Modes and Methods of Communication**

   During year one, principal one established that the primary communication method was via e-mail (E-mail 9/21/06, Field Notes 9/21/06). He responded to e-mail requests within 24 hours. Principal one was available for brief phone calls and could be found in his office most mornings at least one hour before the school day began.

   During year two, the COSI team perceived challenges to communicating with the SP faculty and staff. A communication protocol was not established during year two; therefore, communication was inconsistent. Mrs. P continued to respond to e-mail, but principal two’s response to e-mails was inconsistent. Principal two usually responded by telephone, leading the researcher to believe that she preferred direct communication.

4. **Change in Funding**

   Sufficient resources, both human and financial, are essential to the success of a partnership (Hirzy, 1996). During year one, COSI programs were paid for by SP; during year two, the COSI team secured funding for the partnership from a local bank. The
additional funds provided by the local bank allowed COSI to provide additional services to the SP students, families, and teachers (Field Notes, June 14, 2007).

During year one, principal one manipulated his operating funds in order to pay for COSI programs. The COSI team was contacted by principal one two times to reconfigure invoices because services were paid using different funding sources (E-mails 4/23/07, 6/8/07).

During year two, COSI secured funding through a mutual supporter. All COSI activities were funded by the supporter with no impact to the school budget. This is important because principal two approached funding differently from principal one. During her interview, principal two was asked why schools in her district did not send students on field trips to COSI, and her answer was funding. She went on to explain:

Our budgets are dictated by NCLB status, that’s first. If you are a school that is in school improvement, 10% of your budget is directed towards school improvement/pd, then there are pieces of your Title 1 (Federal funding source) budget that are allocated out, for your math/science safety net people, so by the time you get down to what you have left, it’s not a whole bunch (Principal Interview #2, 1/9/08).

The outside funding allowed COSI to provide summer camp scholarships using the funds originally secured for the overnight. In addition to the camp fees, COSI also arranged transportation for students from their home to COSI and back. All grade 4 and grade 5 students received a scholarship application, each requiring a teacher recommendation and students’ explanation of why they wanted to attend camp. Nine applications were received, and all were approved.

These outside funds also were used to transport SP families to COSI on select days when school was not in session, providing families who had limited transportation
with the opportunity of taking advantage of their COSI memberships. These hourly bus shuttles met with mixed success. The first offering, on a fall Friday, was considered successful, with 115 adults and children taking the bus between SP and COSI. The second offering, on a cold Monday holiday in February, was considered unsuccessful, with 12 adults and children taking the bus between SP and COSI ( Documents 11/29/07, 4/7/08).

The change in funding structure served this partnership. Although principal one was able to find funding for this partnership within his budget, principal two allocated funds differently, giving priority to materials that have been proven to increase student achievement. COSI’s ability to secure an outside funder provided the resources necessary for the museum to continue offering programs during year two.

5. **COSI Team Increased Consistency**

Throughout the partnership, the COSI team members realized that they wanted to present a consistent set of services. Since team members have the freedom to teach lessons using whatever methods and materials they wish, the COSI team administering the partnership decided to limit the number of isolated providers who interacted with SP students, families, and teachers.

When the partnership was established, COSI team member AA shared that COSI sent whichever team member was available to SP, but that changed toward the middle of the first year. The hope was that assigning the same person would create stability, provide students with some consistency, and strengthen the partnership between the key partners. A. A. said, “If it’s COSI, they should see the same people” (COSI Team Interview #1, 11/30/07). COSI’s Vice President shared, “The real meat [of a partnership]
is the person-to-person, that’s what makes a partnership a partnership” (COSI Team Interview #4, 12/13/07). Three COSI team members became the primary SP providers in hope of establishing the person-to-person relationships that would strengthen the partnership.

*Question Four Conclusion*

As with any partnership, changes occur over time. In the case of this partnership, the most significant change was that of the principal. Principal one played the role of initiator and administrator, with a key teacher organizing all programs. Principal two was the administrator, reviewing programs to ensure that they would contribute to student achievement. Principal two removed the key teacher as organizer; and she approved all programs.

Principal one was obliquely aware of student achievement, appearing to believe that students needed a diverse set of experiences to succeed in life. Principal two was acutely attentive to student achievement, ensuring that COSI lessons were aligned to Ohio’s high-stakes tests with a focus on mathematics, to satisfy NCLB and AYP requirements. All COSI lessons added pre- and post-test questions to reveal student learning, and test-preparation workbooks were purchased with funds secured by COSI to provide students with an overnight learning experience.

Electronic communication was the primary means of communication during year one, with principal one receiving copies of all e-mails. He would print a copy and put it in a teacher’s mail box to aid in communication. During year two, a communication protocol never was established, resulting in ineffective communication. Principal two
usually responded by telephone after the researcher attempted to reach her via e-mail and phone message. Since her approval was necessary for all program elements, this was a concern.

The change in principal might have been detrimental to the partnership. Although principal one funded the partnership from his budget, principal two gave priority to materials proven to increase student achievement in reading and mathematics. Had COSI been unable to secure funding, the partnership might not have survived today.

Conclusion

The data in this chapter indicate that the partnership between COSI and SP had effective and ineffective elements. Although the partnership has survived two years, it did not begin with mutually agreed-upon goals. This resulted in participants listing 10 goals, with everyone agreeing upon one. Without goals, and without a well-developed communication plan, teachers and COSI team had different expectations of each other.

Coming from different environments, the COSI team and SP faculty had different educational philosophies, resulting in conflicts. The COSI team came to realize the impact that testing and the No Child Left Behind Act has on SP students and teachers, adjusting lessons to include more assessment. Finally, the importance of changes in key personnel was illustrated when the SP principal changed between year one and year two.

In the next section, the data will be discussed in relation to the literature. The strengths and weaknesses described in the data, along with pertinent connections to the literature, will be used to contribute to the theory of free-choice learning centers that create and maintain effective partnerships with schools.
CHAPTER 5

EXTENDING THE THEORY OF PARTNERSHIPS

Partnerships often are thought to be crucial to creating and maintaining social institutions that serve the needs of a broad audience (Benton Foundation, 2001; Marshall, 2002). Yet, establishing and sustaining productive partnerships appears to be more elusive than one would expect. Therefore, the questions are: What makes a partnership effective? How do partners from different institutions work together to achieve something worthwhile?

This chapter links major findings from this study with the existing related scholarship to contribute toward an evolving theory of partnerships. While the purpose of Chapter Four was to analyze distinct qualities of this particular partnership and the process and outcomes involved, particularly as they relate to the research questions, this chapter seeks to situate the work of this partnership within the extant research and literature regarding partnership in hopes of rendering visible the strengths, weaknesses, and possibilities of the partnership and in hopes of informing future partnership work.

A meta-analysis of the literature indicates that there are five critical elements of successful partnerships. Four of these are basic elements and can be documented; for example, written goals, communication, and research plans. They are:

1. Establishing and maintaining common goals and expectations.
2. Ensuring effective communication (listening as well as talking).

3. Establishing and maintaining key leader support.

4. Ensuring effective planning and research.

The fifth element is basic, yet intangible. It cannot be documented easily. It is:

5. Establishing and maintaining personal relationships among partners.

This fifth element can be broken into four interpersonal elements.

1. Personal responsibility.

2. Honesty.

3. Communication at the Intimate Level.

4. Trust.

The findings from this study are used to more fully flesh out characteristics of each of these elements. These elements are then used to illustrate how a partnership is like fabric, with the elements woven together like threads to achieve strength and effectiveness. The chapter concludes with recommendations for how future partnerships might be constructed to take advantage of this theory.

**Establishing and Maintaining Common Goals and Expectations**

Goals are the building blocks of a partnership. Researchers studying university-school partnerships agree that, for a partnership to function effectively; all partners need to share a commitment to common goals (Burnaford, 2001; Marlow and Nass-Fukai, 2000; Su, 1999). Researchers studying museum-school partnerships concur, indicating that a shared vision created by setting realistic, concrete goals is a condition for a successful partnership (Hirzy, 1996; Marshall, 2002; Sheppard, 2007). Universities,
museums, and schools are educational institutions, yet each may have different goals for a partnership (Burnaford, 2001), based on their reality. The COSI-SP partnership struggled with the process of establishing and maintaining shared, consensually-determined goals. A discussion of mutual goals was not part of the initial conversations regarding the partnership, nor was it a significant part of conversations throughout the first two years of the partnership. Four key elements regarding goals emerged during this inquiry, and these elements illuminate the issue of developing and maintaining shared goals. They are:

1. **Logistics are not goals.**
2. **Your priority is not my priority.**
3. **I should know what happens when I make assumptions.**
4. **Goals are not just for the beginning of the partnership.**

1. **Logistics Are Not Goals**

The discussions that led to the partnership between key SP and COSI staff consisted primarily of logistics; there was no discussion about the goals of the partnership. SP staff shared their needs, and the COSI team offered various services. Initial discussions were brief and to the point, and logistics guided these conversations. Key SP and COSI staff met to discuss the opportunities. SP needed professional development for teachers, additional science lessons and experiments for students, and science resources for students, their families, and teachers. The COSI team members believed that they could meet those needs and shared a list of services they could provide. SP principal one and the COSI administrator appointed lead staff to develop a plan to meet the needs. Once the plan was established, discussions focused on logistics,
including potential dates for services, topics for professional development and science lessons, and the availability of science resources. Goals, objectives, and expectations, in the broad sense, were not developed. The logistics plan was accepted by principal one, and pertinent information was shared with those SP teachers and COSI team impacted by the plan.

With most, if not all, of the conversations regarding this partnership focused on logistics, it is not surprising that the four principal partners (students, teachers, principals, and COSI team) would identify 10 goals for the partnership, with only one goal identified by all four groups. Grundy et al. (2001) found that partners might have different philosophies, which lead to different goals, but that they must clarify for the group those they share and those they agree to disagree upon. It was only through this inquiry that the different goals and expectations emerged. Once discovered, they could be addressed.

2. Your Priority Is Not My Priority

Discussions regarding goals, expectations, or educational philosophies were not a priority for either party; therefore, time was not prioritized for discussions on these topics. The SP faculty and COSI team were busy throughout the day. SP teachers focused on teaching, classroom management, and assessment, while the COSI team members were busy with student and teacher programs in and outside of the museum. Neither partner had much time for meetings during the school day. Although the COSI team members had a flexible schedule, they had difficulties contacting SP teachers, who were unable to take phone calls or read e-mails while teaching.

Burnaford (2001) ascertained that universities and schools exist in different environments but can create an effective partnership if they establish mutual goals.
Museums must come to a better understanding of how schools operate in order to create effective partnerships. In this partnership, both partners appeared to value the partnership and sought its benefits, but neither had a sense of the other’s priorities. With such distinctly different priorities, it appeared that meetings to discuss the goals of this partnership were not a priority; therefore, time was not scheduled for meetings to discuss anything beyond logistics.

3. *I Should Know What Happens When I Make Assumptions*

There may have been an assumption that partners understood and accepted each other’s unvoiced philosophies. Principal one had attended several professional development programs for teachers at COSI, so COSI team members assumed that he understood and embraced their educational goals and expectations. However, there was no evidence that SP teachers attended COSI professional development programs before the partnership began and understood and embraced COSI educational philosophies. Of the COSI team members involved in this project, only two had direct experience in the classroom, and both left the traditional classroom for the freedom offered by museum education. To believe that the COSI team understood what the teachers wanted from this partnership would be an immense assumption.

Marlow and Nass-Fukai (2000) found that in true partnerships, each partner recognizes what is important to the other; this was not the case with this partnership. Although the COSI team members believed that they understood that academic achievement was important to the SP teachers, they did not completely comprehend how SP teachers defined academic achievement. Throughout the two years that this partnership was studied, key COSI team members felt that they understood SP staff’s
focus on academic achievement. However, through this inquiry, it became clear that both partners viewed academic achievement through different lenses. Once the differences were illuminated, the COSI team worked with the SP staff to develop programs that better met the needs of the teachers and students, leading to significant changes during year three of the partnership.

4. Goals Are Not Just for the Beginning of a Partnership

Goals need to be measured, reviewed, and revised throughout the partnership, and not developed and then put on a shelf to gather dust. Although partnerships can be assessed on several levels, one strong assessment of a partnership is to assess whether it is meeting its goals. If goals are never developed, judging the effectiveness of the partnership is difficult. In this data-driven climate, partnerships need data to prove that they are effective.

Re-examination of the goals of this partnership would have been helpful when key SP leadership changed, because this change brought changes in educational philosophy as well as logistic routines. As the partnership shifted and changed with the introduction of principal two, an opportunity to develop goals for this partnership presented itself and was disregarded once again. Instead of meeting with principal two to discuss goals, expectations, and educational philosophies, the conversations again focused on logistics; most likely because of time constraints.

Partnerships must be assessed throughout their lifespan to determine if resources are being used wisely, goals are being met, and desired outcomes are achieved (Benton Foundation, 2001; Hirzy, 1996; Marshall, 2002, Sheppard, 2007). By doing this at agreed-upon times, the data acquired can be analyzed and fed back into the system,
ensuring that the partnerships is effective (Marshall, 2002). This was not part of this partnership; therefore, this partnership struggled throughout the first two years with no goals and no way to assess its effectiveness.

**Implications for Practice**

Ideally, potential partners are vetted during preliminary conversations to ensure that they share similar visions, missions and goals. In conversations during the courtship phase of the partnership, partners should discuss the mission of their institutions and the goals and expectations of the partnership. Too many times, these conversations do not occur, possibly because partners assume that they understand the goals of their partner, that their partner wants exactly the same things they do, and each equally considers the partnership to be a priority. Early meetings to develop a common goal may flush out untrue assumptions, prompting an honest discussion of expectations.

In museum-school partnerships, partners must discuss their educational philosophies to ensure agreement. Science centers are classified as informal learning institutions by the National Science Foundation and, as such, they promote voluntary, self-directed, lifelong learning. Learning in science centers is believed to be motivated by intrinsic interests, curiosity, exploration, manipulation, and social interaction (National Science Foundation, 1997). Attendance in traditional k-12 public schools is compulsory, learning is directed by the teacher, and success is measured by high-stakes test results reported to the community. In this partnership, key leaders should have realized that COSI’s educational philosophies differed from SP’s philosophies. Early discussion of these philosophies could have alleviated challenges created by unmet expectations.
Once consensually determined goals are agreed upon, they should be written down and communicated with all those involved. To ensure an effective partnership, these goals must be reviewed at designated times throughout the partnership. This does three things: (1) ensures that all partners agree on the goals and expectations, (2) provides partners with an easy reference to share with staff administering partner resources and services, and (3) provides the basis for an assessment plan. To say that there is no time to do this, or that the timing is not right, jeopardizes the future of the partnership.

Pugach and Johnson (1995) found that partnerships that did not share a common goal failed. Taking the time to write down the goals and expectations and communicate them to all involved seems like a small thing to do to avoid failure. If partners cannot agree upon common goals, or if they don’t have time to have these conversations, then perhaps they should not be partners.

Ensuring Effective Communication (Listening as Well as Talking)

George Bernard Shaw said, “The single biggest problem in communication is the illusion that it has taken place.” Just because partners are talking or e-mailing does not mean that communication is occurring. Effective partnerships must ensure that messages are shared and understood by all partners. This partnership experienced challenges in exchanging and understanding messages.

When mutual goals are established, it is critical that the goals are communicated to all who have a role in the partnership. Su (1999) studied a partnership between a university and several schools that had drafted written goals, but those responsible for sharing the goals with all partners failed. The assumption that communication had
occurred was invalid: partners at all levels — university faculty, graduate students, school teachers, and members of the steering committee — were unaware of the partnership goals. Ensuring that goals are understood by all partners is one example of why effective communication is important to partnerships.

Museum-school and university-school partnership research indicates that proficient communication is essential for effective partnerships (Benton Foundation, 2001; Burnaford, 2001; Marlow and Nass-Fukai, 2000; Marshall, 2002; Richmond, 1996; Sheppard, 2007). Partners must effectively communicate big ideas and minor details effectively across and within their different cultures (Grundy et al., 2001, Richmond, 1996). Each partner may communicate differently, thereby creating communication barriers. Throughout the two years this partnership was studied, there were times when partners found communication difficult. Throughout this inquiry, three key elements emerged to illuminate the challenges of effective partner communication. They are:

1. We speak in different tongues.
2. Your priority is not my priority, take two.
3. We don’t interface.

Although these elements were experienced to some degree throughout the partnership, when key SP staff changed between year one and year two, communication challenges increased.

1. **We Speak In Different Tongues**

   It takes many languages to describe reality, therefore it is essential to work with a diverse group of partners (Marshall, 2002); however, different educational institutions, including schools and museums, use language and terminology differently to describe
similar experiences (Grundy et al., 2001; Marshall, 2002; Marx et al., 2006; Richmond, 1996; Sheppard, 2007). This was true of this partnership.

In describing educational experiences unique to museums and informal settings, COSI team members use jargon unique to museums. These terms were not always understood by the SP staff. The SP staff used terms to describe teaching tools and assessment strategies that were not familiar to the COSI team. This difference in terminology may have contributed to the misperception that both partners understood and accepted each other’s unvoiced goals, expectations, and educational philosophy.

Both partners could have benefited from ensuring a common understanding of significant terms, possibly developing a written glossary of significant terms that could be provided to all involved within the partnership. Since language development is fluid, this document could have been maintained on a common electronic platform so that it could be updated as needed. Although time consuming, a written glossary, when used, could have contributed to mutual understanding.

2. **Your Priority Is Not My Priority, Take Two**

Time is viewed differently by museum-school and university-school partners. Burnaford’s (2001) research indicates that teachers have limited time available to communicate with out-of-school partners throughout the school day, because they are focused on managing their students. Museum-school partnership research completed by Hirzy (1996) found that museum time differs from school time, with both having different ideas on the amount of time necessary to plan and implement a program.

This was confirmed in this partnership; work priorities and schedules varied between the SP teachers and COSI staff, and this impacted communication. SP staff
taught their students throughout the day; thus, they often were unavailable for meetings and phone calls. When they were not working with students, they used their time to ensure that they were prepared for the next day’s lessons. Student academic achievement was their priority, and they focused their work time almost exclusively on ensuring that students met established academic achievement goals.

The COSI team had a flexible work schedule, juggling education programs within and outside of the museum. Although busy, they could take time out for phone calls and meetings if they were not directly involved in a program. This partnership was one of several equally important priorities for COSI team members, but because they had difficulty connecting with the SP teachers, the COSI team felt that the SP teachers did not care about the partnership to the same extent they did. Neither the SP teachers nor the COSI team fully comprehended each other’s schedule or priorities.

Face-to-face meetings on a regular basis to discuss mutual issues strengthen partnerships (Benton Foundation, 2001; Marlow and Nass-Fukai, 2000). Marlow and Nass-Fukai (2000) found that alternating these meetings among each partner’s respective headquarters encourages them to become familiar with each other’s environments. The Benton Foundation (2001) found that meeting outside the partners’ respective headquarters, if necessary, can reduce office disturbances and ensure everyone’s comfort. Due to the busy schedules of both SP teachers and principals and the focus on their students, this partnership held very few face-to-face meetings. Those meetings that were held happened exclusively at SP, so as not to inconvenience the teachers. In addition, SP teachers and the principal had difficulty focusing during meetings at their school because they were drawn into school-related issues, i.e., student behavior issues, report card
deadlines, etc. Finally, school partners did not have the opportunity to experience and understand the museum-work culture since all meetings happened at the school.

The lack of meetings may have been a key contributing factor to communication challenges; information that could have been shared at meetings was not. Although both partners had different priorities, the challenges these caused could have been overcome if both partners had discussed the difficulties. If face-to-face meetings were not possible, alternative meeting or communication methods could have been explored, but this did not happen due to the different priorities of both partners. Throughout the two years that this partnership was studied, differences in priorities played a role in stifling communication and creating misunderstandings.

3. We Don’t Interface

Preferred communication interfaces, or methods, differed between SP teachers and COSI team members. Teaching is an isolated profession, in that teachers are the sole adult in a room with their young students; they have limited time to converse with colleagues. Although they may work in isolation, Burnaford (2001) found that teachers appear to derive their professional satisfaction from personal interaction with students and other teachers. This may be why the SP teachers preferred the personal interaction and immediate feedback of face-to-face meetings or phone calls.

On the other hand, the COSI team members interact with children and adults during education programs in and outside of the museum. When not leading education programs; the COSI team members work in a maze of cubicles that are spread throughout a three-story building. Since they are usually working on several projects at one time, with others spread throughout the building and the community, they appreciate the
written trail of e-mail exchanges and routinely use e-mail to communicate with colleagues both inside and outside of the museum. The COSI team preferred to interface with the SP teachers via e-mail, allowing partners to send and respond to messages at convenient times while creating a communication record that could be referred to when challenges arose. The difference in preferred communication methods added to the communication problems of the partners.

With both teams preferring different communication methods, communication slowdowns occurred. One SP teacher said that because she was focused on her students during the day, she checked her e-mail only on weekends. This greatly impacted the timeliness of her responses to COSI team e-mails. Knowing that some teachers did not respond to e-mail, the COSI team tried to contact teachers by phone but, due to their teaching schedule, they were often unavailable to talk during the school day, and very few responded after the school day.

The Benton Foundation (2001) report suggests developing a communication plan that identifies points of contact within each organization, a timeline for key actions, and preferred communication methods. After a communication challenge during the first year of the partnership, principal one was approached by COSI team to determine which communication method would be most effective. It was mutually agreed that important information would be e-mailed and that principal one would be copied on all e-mails to teachers. Principal one checked e-mail daily, and he would print out the e-mail and place it in the respective teacher’s school mailbox to ensure that it was received. During year one the COSI-SP communication plan identified key points of contact within each
organization and a preferred communication method. This plan worked for the principal, COSI team, and the lead teacher.

During year two, communication between partners was less effective. The year one communication plan no longer worked, because principal two appeared to prefer a different communication method; she did not respond to e-mail as quickly as principal one. A new communication plan was never developed, and communication between the COSI team and SP teachers suffered. Taking the time to establish a communication plan with principal two may have alleviated communication challenges.

Implications for Practice

To alleviate communication challenges within partnerships, a communication plan should be developed as outlined by the Benton Foundation (2001) and reviewed semi-annually. The communication plan would identify points of contact within each organization, a timeline for key actions, and preferred communication methods. By including a timeline for key actions, significant dates/times will be identified, and deadlines established. Definitions of all terms unique to one organization or the other would be included in the communication plan. Both the COSI team and the SP teachers could have benefited from a communication plan.

In addition, partners must understand each other’s priorities and be coached on how to communicate with each other. Deadlines established in the communication plan would have to be viewed as equal priorities by both partners to ensure completion. As COSI continues this partnership and considers new partnerships, written communication plans should become common protocol. If the time is not made to develop consensually written communication plans for future partnerships, they are destined for failure.
Establishing and Maintaining Key Leader Support

Museum-school partnership research indicates that key leaders must support a partnership for it to be effective (Benton Foundation, 2001; Hirzy, 1996; Sheppard, 2007). In “traditional” school-university partnerships, key leaders develop the partnership and then assign support staff to implement the program developed by the partnership (Stephens and Boldt, 2004; Su, 1999). In these partnerships, key leader support is evident. In other university-school partnerships, those involved in leading specific activities may develop a partnership with an outside provider and gain key leader support later (Connell, et al., 1994). In these partnerships, key leader support is not guaranteed, and without it, the partnership may struggle.

This study’s partnership was initiated by SP principal one. During his tenure, the partnership was supported by key leaders in the school and the museum. However, when principal one left the partnership after the first year, principal two did not immediately embrace and support the partnership. Due to the change in leadership at SP, the critical nature of key leader support was evident in this partnership. Through the two years and two different principals of this partnership, three factors emerged as influential in the establishment and maintenance of key leader support:

1. Different leaders have different priorities.
2. Different leaders have different work styles.
3. Little changes in packaging make a big difference.

1. Different Leaders Have Different Priorities

Richmond (1996) found that each partner brings different perspectives, history, and knowledge to a partnership. For a partnership to succeed, key leaders must become
aware of each other’s priorities and develop trusting relationships (Burnaford, 2001; Grundy et al., 2001; Marlow and Nass-Fukai, 2000; Richmond, 1996; Stephens and Boldt, 2004). This was found to be true in this partnership.

Principal one established the partnership. Although academic achievement in reading and mathematics as measured by the high-stakes tests was necessary, his educational philosophy was based on the belief that all subjects are important, including music, gym, science, and social studies. He thought that inquiry-based science lessons, like those taught by COSI team members, helped students develop critical thinking skills, which ultimately helped students on the high-stakes tests.

Principal one had developed several community partnerships for his school, which was considered a model within the district. In addition to science lessons provided by COSI, partners provided a variety of services to students, their families, and teachers, including reading tutors, after school care, and dental health screenings. The school was close to the local university, and several professors and their students, conducted research or provided special programs. Principal one was an advocate for partnerships, in part because he felt that the partnerships he established with outside organizations contributed to the development of the whole child.

In addition, principal one believed that everybody loved science. He sought out the partnership with COSI so that the COSI team members could share their enthusiasm for science by demonstrating successful science teaching techniques that teachers could use to motivate student learning. He arranged the initial meeting with key COSI team members, found monies within his school budget to fund the first year of the partnership, and appointed a lead teacher to handle the development and implementation of the
various educational programs. During year one, the COSI team felt welcomed and supported at SP.

During the summer between year one and year two; principal one left SP to pursue other career options. Principal two began her tenure at SP after the school year had begun. In addition to adjusting to a new staff and a new school building, with little preparation time, principal two needed to learn about the many partnerships that operated within this high-profile school. However, there was a difference in educational philosophies between principal one and principal two.

During year two of the partnership, the difference in educational philosophies between principal one and principal two created different priorities for teachers, and partners. Principal two focused almost exclusively on student achievement in reading and mathematics as measured by the high-stakes tests, and this differed significantly from principal one’s philosophy. This was not immediately recognized by the COSI team working with SP, nor did the COSI team realize the challenges principal two faced acclimating to a new school.

The COSI team assumed that principal two was familiar with the partnership and wished it to continue as planned by principal one. Several months into year two of the partnership, the COSI team began to realize the different priorities of each principal, and it took several more months to develop an effective working relationship with principal two.

The Benton Foundation (2001) research found it is difficult for a partnership to focus on one issue if key leaders feel that it should be focused on a different issue. SP priorities for the partnership changed when principals changed, and this was not
immediately recognized by the COSI team. Expecting principal two to understand and embrace the partnership as principal one did was a mistake. Reflecting on the need for goals and effective communication discussed previously in this chapter, it would have been wise to schedule a meeting with principal two to determine if she was interested in continuing the partnership, instead of assuming she wanted the partnership to continue with no changes. In addition, providing her with a packet of concise written information regarding the partnership before the meeting may have provided her with the background information she needed to better understand the partnership (Benton Foundation, 2001).

In a school district driven by student achievement scores, principal one was an anomaly. The COSI team should have realized that and been better prepared for the initial meeting with principal two, who was data driven and focused on student achievement scores.

2. Different Leaders Have Different Work Styles

In addition to different priorities, different leaders have different work styles that can impact the partnership. Principal one delegated the operational tasks of the partnership to Mrs. P. He trusted that she knew the science curriculum and would make sure that the students were involved in programs that met their needs. During year one, Mrs. P coordinated all COSI experiences for SP.

When principal two came to SP, Mrs. P did not feel she had the authority to make decisions. Principal two did not delegate the operational tasks of the partnership; she wanted to be involved in every logistical issue. Since principal two was already busy negotiating the many demands of her new school, this partnership was not as high a priority, and logistical issues began to delay partnership activities. In addition, communication styles differed between principal one and two. Communicating by e-mail
was less effective with principal two; she did not respond quickly to e-mails, and this also delayed partnership activities.

In their inquiry into a university-school-museum partnership, Marlow and Nass-Fukai (2000) found that tensions were created by different work cultures and agendas. This was true of this partnership. Adjusting to the new system at SP took COSI team members considerable time. To alleviate challenges, principal two and Mrs. P met with key COSI team members as the second school year ended to plan COSI experiences for the entire third year of the partnership. With a plan in place, and a better understanding of the partnership after participating in it for one year, principal two did not feel compelled to handle the logistics, trusting Mrs. P to make arrangements for specific programs. This allowed the partnership activities to progress in a timely fashion.

3. **Little Changes in Packaging Make a Big Difference**

Principal one wanted the COSI team to support science teaching and learning at SP by providing professional development in science content and pedagogy for teachers and to motivate students to learn by providing students and their families with opportunities they might not otherwise receive. Principal two wanted the COSI team to support “what was going on at the school,” which translated to helping SP teachers prepare students for the high-stakes reading and mathematics tests. It took the COSI team several months to understand how important the high-stakes reading and mathematics tests were to principal two. Once they did, they were able to connect their science lessons to the high-stakes test mathematics content.

The COSI team members are not formal educators and do not measure student achievement by high-stakes test results. Since museum educators typically spend a short
amount of time with students during any given school year, it appears they have limited impact on student learning. Although the COSI team had several interactions with the SP students and felt what they were doing was helping students understand science and develop critical thinking skills, they did not believe that their influence could be measured on the high-stakes tests. The COSI team was aware of the No Child Left Behind Act, and understood that in Ohio, Annual Yearly Progress for a school building was determined exclusively by student reading and mathematics scores, but they did not understand the pressures the SP teachers and principal were under to ensure that students achieved high scores on the high-stakes tests.

Once they understood what principal two wanted, the COSI team members altered their lessons to better meet her priorities. During year two, each lesson modeled by a COSI team member at SP included a written pre- and post-assessment of key science content included in that lesson. In addition, these written assessments included short answer response questions to provide students with the opportunity to practice formulating short written responses, reinforcing a test-taking skill that several students found difficult. Common mathematics skills used in science, including measurement and graphing, were focused on during COSI lessons because they were found on the high-stakes mathematics assessment. Field trips to the museum became focused learning experiences, with every moment in the museum linked to a state science or mathematics content standard. In addition, students completed worksheets at the museum or immediately following their museum visit to reinforce science understanding and further develop writing skills.
Understanding that principal two’s goals were different than principal one’s goals greatly impacted the partnership, the SP faculty’s focus, and the COSI lessons and experiences planned for the students and teachers. By repackaging the experiences that COSI provided to SP, focusing on math skills within the science content, COSI was able to connect with principal two.

*Implications for Practice*

In the ideal partnership, key leaders develop and facilitate a partnership throughout its existence, but in reality, key leaders change. Insuring the support of key leaders during a time of transition is important to maintaining effective partnerships, yet this is difficult when the new key leader’s priorities are unknown. In this partnership, COSI team members needed some time to realize the difference between principal one and principal two and to understand the impact the change in key leader had on this partnership. If they had remained oblivious to principal two’s priorities, the partnership would have ended. To produce an effective transition, understanding the new key leader’s background, educational philosophy, and feelings regarding the partnership before the first meeting would be helpful.

Leaders are leaders for a reason; some are passionate, while others are positional. In this partnership, principal one was passionate, while principal two was positional. Passionate and positional leaders operate differently. Understanding the leadership style of a key leader would be helpful in determining the role they will play in day-to-day partnership activities.

It is unrealistic to believe that a shift in key leaders will not impact a partnership; it will. To survive the loss of a passionate key leader, the remaining partners should meet
as soon as possible with the new key leader to discuss the goals of the partnership. If the new key leader has different priorities, the partnership may need to dissolve or the goals of the partnership may need to change to accommodate the new key leader’s goals (Benton Foundation, 2001). Once the COSI team understood principal two, they were able to repackage their educational programs to emphasize existing program elements that were important to principal two in order to gain her support. If the partnership is to continue, the vision must be shared.

Insuring Effective Planning and Research

Planning and research may be especially difficult when organizations approach these differently. For example, Valli (1999) described planning among universities and schools with the following firing range command, “ready, aim, fire”; she felt universities focus on “ready, ready, ready” and schools focus on “fire, fire, fire” (p. 1), neither was able to actually “fire,” because they could not complete all three commands. If museums and schools view planning and research differently, the first step must be for all partners to develop a common understanding of planning and research.

Once the terms are defined and understood by all involved, time must be allocated for planning and research. As discussed earlier in this chapter, those involved in implementing this partnership took minimal time to plan, focusing instead on logistics. Since no time was allocated for planning, no goals were developed for this partnership. Without goals, there are no measures on which to base success or failure.

As Sheppard’s (2007) research on museum partnerships indicates, resources are scarce and expectations are high, making it imperative that museums document their successes. Museums must account for all of their resources; leaders are examining
partnerships for a return on investment (Marshall, 2002). If a return on investment cannot be identified, a partnership may disband.

In the past, research on museum education partnerships focused solely on educational outcomes, and few partnerships systematically measured the impact of the partnership. Now, as the economy forces museum partners to secure funding, the museum community is examining the research for partnership exemplars and finding little. It is important for museums partnerships to contribute to the body of knowledge in order to help all museums. Although partners did not plan or evaluate this partnership, several lessons were learned, including:

1. No plan . . . no proof . . . no partnership.
2. Planning and research are nobody’s priority.
3. If you can’t change it, don’t ask.

1. *No Plan . . . No Proof . . . No Partnership*

With no plan, there are no goals. With no goals, there is no way to determine if a partnership is effective. Although partners may assume that the partnership is productive, there will be no proof, and if you can’t prove it is effective, it can be eliminated (Marshall, 2002). Therefore, there is substantial value in planning and research; however, it is difficult to make the time to develop goals, strategize, and examine the partnership when the daily realities of teaching and delivering educational programs in and out of the museum are the immediate priorities of those involved in the partnership.

Without goals, a measure of success was never mutually defined by SP and COSI leaders. Therefore, no metrics were developed at the onset of the partnership to measure the success of the partnership. As with many education programs within the museum,
samples of student work and anecdotal evidence were collected to measure the impact of programs on students, families, and teachers. But a thorough, systematic evaluation component was not developed. Moving forward, all partnerships need planning time to define goals, strategies and evaluation plans to measure the partnership’s impact. If this does not occur, the partnership risks elimination.

2. Planning and Research Are Nobody’s Priority

As mentioned throughout chapter five, time to create and maintain the basic elements of a partnership was limited in this partnership, and this was especially true of planning and research. After the initial meeting, there were several informal meetings and e-mail exchanges between key people that focused on developing and implementing program activities and classroom lessons for SP teachers and students. A list of services was developed and subsequently approved by principal one, and key staff from SP and COSI moved forward to execute their duties. An activity calendar was created, and in retrospect, this served as the plan.

In their research of university-school partnerships; White et al. (1994) found that partners need to make time for joint decision making and planning to build a common understanding so that they can work together. If there would have been communal time to plan in the beginning, a list of mutual goals for the partnership might have been created. With a list of goals, a communication plan, as outlined by the Benton Foundation (2001), could have been developed, including a timeline that identified deadlines and decision makers. Neither of these occurred.

In addition to limited planning time, there was limited time for reflection. Researchers studying university-school partnerships found that teachers were too busy
teaching to plan and reflect on partnership activities (Erickson and Christman, 1996; Noffke et al., 1996). Although similar research does not exist for museums, this inquiry found that museum educators were too busy to methodically reflect on the partnership. After the calendar was set, the SP teachers went back to their classrooms, where they were busy teaching their students, and the COSI team went back to the museum to prepare for the SP programs and facilitate a myriad of other museum education programs. Everyone was busy with the logistics and operation components of the partnership, and no one made time for systematic reflection of the partnership. The COSI team members did discuss their frustrations when lack of communication resulted in program challenges; however, this was unsystematic complaining, not research.

Even though no research was conducted on the nature of the partnership, the COSI team attempted to measure student learning as a result of their programs. Unfortunately, it was difficult to gather a significant amount of data due to limited classroom time and a high rate of student absenteeism. Although incomplete, this research was shared with principal two to help her understand the impact COSI lessons had on student learning.

To ensure that planning and research were a priority for each partner, someone from each organization must be assigned this task. Partnership responsibilities are time consuming and should be included in job descriptions. If no one is accountable for nurturing the partnership, planning and research will not happen. Without planning and research, the partnership will flounder when it encounters challenges.
3. *If You Can’t Change It, Don’t Ask*

Marshall (2002) states that museums often enter partnerships for social or public good; and these types of partnerships create high expectations. That was certainly the case with this partnership. This was a high-profile partnership for this museum, and the new president wanted it to succeed. Additionally, during year two, the partnership was funded by a local bank that was active within the partnership and the community; it expected results. Museum staff involved in the development and implementation of museum education programs for SP felt the pressure associated with high expectations. Although they may have wanted to cancel a program when the SP staff did not communicate, they knew they could not.

Evaluation can result in a recommendation that a partnership disband due to differences in partner goals or motivations (Marshall, 2002). This was not an option for this partnership. Between year one and year two, when key leaders at SP changed, there was concern that the partnership might end. However, that was not an option because of the support of the local bank. When research is conducted on high-profile partnerships, research questions must focus on areas of the partnership that can change. Research conducted at this time could have benefited the partnership. With such high expectations for success and no goals, evaluation of this partnership would have been difficult.

*Implications for Practice*

Often school and museum partners are focused on the outcomes of a partnership and spend most of their time discussing logistics and implementation plans. Planning and research are overlooked; therefore, no goals are ever established, and no research plan is identified. Partners may believe that planning and research are essential to the success of
a partnership (Marshall, 2002), but due to the reality of daily operations, they do not make it a priority. This was the case with this partnership.

Scholarly research on museum-school partnerships can benefit the field as more museums form partnerships with educational institutions. One way this research can support the field is by identifying the ways in which partners have found time for planning and research. As more schools and educational institutions are forced to adopt business metrics to remain viable, research into the effectiveness of partnerships will become mandatory to ensure that partnerships are increasing resources, creating efficiencies, or enhancing content (Marshall, 2002). Additional research on partnerships could identify effective models that other partnerships may adapt. This would help both the partnership and the field.

Museum and school leaders need to look beyond the outcomes to nurture the partnership. These leaders must appoint effective managers to direct the partnership and provide them with time to plan, develop goals and communication plans, and reflect on the challenges and successes of the partnership. In addition, museum staff must consider contributing to the body of scholarship on partnerships so that the field may benefit from their experiences.

Establishing and Maintaining Personal Relationships Among Partners

Research has found that tensions can be created when schools and university faculty collaborate because of the different educational environments each represent (Marlow and Nass-Fukai, 2000). This research could be applied to museum and school partnerships; both foster their own unique cultures. In addition, Pugach and Johnson (1995) found that partners may enter a partnership with preconceived ideas about each
other, thus entering the partnership with incorrect stereotypes about their partners. To alleviate tensions and prevent stereotypes, personal relationships among partners need to be encouraged.

Marlow and Nass-Fukai (2000) believe that partners who possess kuleana, the Hawaiian word meaning responsibility and accountability, create strong partnerships. Their research has found that partners who feel a strong commitment to support their partners in realizing their goals have effective partnerships. In addition to this research, Stephens and Boldt (2004) studied the dialogue of partnerships and found that partner dialogue can occur on three levels: (1) rhetoric, (2) reality, and (3) intimate. Partners that can dialogue on the intimate level involve honest communication and tend to be the most effective partnerships. A strong personal commitment, including conversations that occurred on the intimate level, was essential to maintaining this partnership.

This research supports the idea that institutional partnerships are strengthened by strong personal relationships, where partners are intimately honest and feel responsible to each other. Developing personal relationships takes time and involves informal contact between partners, including time discussing each other’s recent significant events such as weddings, new homes, and illnesses. This partnership in this study was developed on two levels, institutional and personal, and succeeded in part because of the personal relationship between Mrs. P and the COSI point person. The research reveals two findings:

1. Strong bonds are created by brief exchanges.

2. Supporting each other is a priority.
1. **Strong Bonds Are Created by Brief Exchanges**

Marlow and Nass-Fukai (2000) believe that *kuleana* is best developed outside of formal meetings, and this was the case for this partnership. While waiting for meetings to begin, at the beginning of telephone conversations, or immediately following a meeting, Mrs. P and the COSI point person exchanged snippets of personal information. When Mrs. P’s son got married; the COSI point person sympathized as Mrs. P shared the challenges with sewing her daughters’ dresses for the wedding (April 10, 2008). When principal one left, Mrs. P listened and understood the COSI point person’s concerns (July 14, 2007).

By understanding each other personally, as well as professionally, Mrs. P and the COSI point person were better able to understand each other’s goals and expectations for the partnership. Through open and honest discussion of personal issues, they were able to have conversations about difficult logistical issues impacting the partnership. Those who were unfamiliar with SP did not understand the challenges faced by the SP faculty and staff. Through personal sharing, the COSI point person was better able to understand these challenges and find ways to work around them, resulting in small logistical successes.

**Supporting Each Other Is a Priority**

Museum research indicates that partnerships need time to develop (Benton Foundation, 2001; Marshall, 2002; Sheppard, 2007). During this time, partners must gain an understanding of each other’s staffs, programs, facilities, etc. (Sheppard, 2007). University-school researchers agree, finding that for a partnership to succeed, all members must become aware of each other’s distinct interests, moving beyond the
preconceived stereotype, and begin to trust each other (Burnaford, 2001; Grundy et al., 2001; Marlow and Nass-Fukai, 2000; Stephens and Boldt, 2004). Supporting each other became a priority for the two point people responsible for the logistics of the partnership. By taking the time for brief personal conversations, the two logistical leaders of this partnership developed an alliance to ensure that all planned programs were carried out successfully. Through their support, they were able to negotiate and fund transportation for field trips, provide additional science activities for families as part of an unscheduled science fair, and repackage COSI lessons to make them appealing to principal two. Without each other’s support, the partnership would have been overcome with logistical issues.

Implications for Practice

Harold Kramer of Connecticut Public Broadcasting described the development of a partnership as a “courtship” (Benton Foundation, 2001). Courting partners takes time: time to talk about a child’s wedding before a meeting, chatting about work challenges on the phone when checking on program dates, and laughing together when something humorous occurs. Taking the time to support each other can overcome many partnership deficiencies, as was the case in this partnership. This partnership did not have mutual goals, or a communication plan, or a research plan, and it continued to remain somewhat effective due to the mutual respect and support of the two operational point people.

Therefore, one of the goals of a partnership should be to create a supportive, nurturing environment so that all involved in the partnership can safely share their expectations and concerns; communicating on an intimate level. It takes time to establish
a safe environment and develop caring relationships for other partners, yet the time invested here overcame several basic element deficiencies.

Ideally, a partnership will have strong basic and interpersonal elements. Partnerships without strong interpersonal relationships must rely on documentation of all basic elements: goals, communication plans, key leader support and research plans. Partnerships with strong interpersonal elements can exist if basic elements are deficient, because the interpersonal elements sustain the partnership.

Weaving a Partnership Tapestry

The research indicates that there are several basic elements (mutually-developed goals, communication plans, key leader support, research plans) and interpersonal elements (personal responsibility, honesty, communication on the intimate level, and trust) that are needed to sustain an effective partnership. When the basic elements are lacking, strong personal relationships can sustain a partnership. To increase a partnership’s effectiveness, the basic elements need to be woven together with the interpersonal elements, like threads woven into a fabric (see Figure 7). Weaving the basic elements of the partnership with the interpersonal elements reinforces the fabric of the partnership and makes it stronger.
Figure 7: Weaving the Fabric of a Partnership

If a partnership is lacking in one of the basic elements, as this one was found to be, it can still exist if the interpersonal elements are strong enough to overcome these deficiencies. If there are no mutually-developed goals, honest conversations between key operations leaders can support a partnership. If there is no communication plan, conversations at the intimate level between two key members of the partnership can sustain it. If there is no research plan to measure a partnerships value, responsible partners can obtain some temporary measure of effectiveness. Weaving personal
responsibility, honesty, intimate communication and trust between the basic elements of a partnership strengthens it, allowing it to exist when the odds are against it.

This study found partners did not find time to implement the basic elements of a partnership. To ensure the effectiveness of a partnership, partners need to allocate sufficient resources, including financial and human. Although government agencies and sponsors are more willing to fund partnerships than single entity requests, in this tight economy funding for nonprofit organizations and schools appears inadequate to provide for all the needs. Human resources are always in demand in nonprofit and educational institutions. With limited time and demanding schedules, it may be difficult to develop the basic elements completely. This research demonstrated that spending time to nurture the personal relationships will help when a partnership is challenged. Without strong personal relationships holding the fabric of the partnership together, when one thread is pulled, the fabric, or partnership, may unravel.

Strong personal relationships may not be as important in other types of partnerships, but they are in museum-school partnerships. Classroom teachers tend to be isolated from other adults throughout the school day (Burbules and Rice, 1991), therefore they appreciate meeting with partners who are interested in them personally, as well as professionally. Building strong personal relationships with others who share similar interests insures that when the partnership struggles, there are people equally vested in the partnership to ensure its success.

Implications for Constructing Future Partnerships

There are several questions to consider as museums construct future partnerships with schools. First, is there something to be gained by moving outside of the word
partnership itself? The word *partnership* comes with a large history and a set of expectations that might actually hinder the ability to work flexibly toward diverse outcomes. Thus, is there something to be gained from shifting our language, moving from the word *partnership* to the more realistic *mutually beneficial relationship*?

Second, what must museums do to adapt to the challenges facing teachers in the NCLB era? Finally, are there critical steps that should be considered when museums construct mutually beneficial relationships with schools? For instance, should museums shift their focus and concentrate on educating teachers instead of students?

In the case of the term *partnership* and the kind of equality of relationship it communicates, one might ask whether it is possible for schools and museums to be equal partners. Does the word *partner* create unnecessary challenges? Instead of getting caught up in the language of partnerships, which implies an equal, reciprocal relationship, museum educators might do better to move beyond the word *partner* and use the words *mutually beneficial relationships*. Museum and informal educators can then focus on constructing mutually beneficial relationships with focused goals and outcomes that lead to student learning that support a teacher’s needs to increase concept recognition and the museum educator’s desire to nurture lifelong learning.

When thinking about creating mutually beneficial relationships, how are museums positioned to truly support schools and the learning that is expected there. As Schauble, et al. (1996) remind us, learning in museums is about more than cognitive gains; students also expand their sense of aesthetic appreciation, develop motivation and interest, form and refine critical standards. In this time of high-stakes testing, teachers and administrators have little choice but to change teaching methods to ensure that children
can perform on these tests. Otherwise they face sanctions and or diminished resources. Given this, many schools have turned toward more didactic approaches to ensure that children have the content understanding that is required before taking the high-stakes test. Have museums who partner with schools made enough effort to understand this political context, or have museums changed very little from the more open-ended and process-based pedagogies that are now somewhat in conflict with many school’s agendas? Museum educators may fixate on the word partnership but with such significant differences in teaching methods, a partnership may not be possible.

In the end, if museums are to partner with schools, museum educators must adapt their programs to assist teachers in the NCLB era. Museum educators must understand and appreciate that teachers are focused on student achievement as measured by high-stakes tests. Museum educators who empathize with these teachers would plan learning experiences that focus on content that aligns to state and national standards. Museum educators who can co-construct teaching and learning goals with collaborating schools can develop research plans that measure student achievement and attitude based on the content presented by museum educators. Research on these programs would benefit all museums that struggle with proving their worth to the formal education community.

Several pragmatic ideas were learned through this study of a school-museum partnership. One concerns the nature of focus and the other the nature of process. In regards to the focus of the relationship or partnership, often times museums seek to provide something for everyone – from developing enthusiasm, motivation, and joy to creating family time and enhancing scientific understandings. While this is important when working with the general public, within a school partnership having so many goals
may actually seek to disperse time and energy in ineffective ways making it hard to
achieve any discernable goals. In this partnership the focus was fairly spread and, as a
result it became hard to measure any movement toward any single goal. Certainly, the
limited amount of time the children actually spent at COSI or with a COSI educator could
not affect the learning in measureable ways.

Museum educators may consider shifting their focus from students to teachers.

The 2000 National Survey of Science and Mathematics Education: Status of Elementary
School Teaching by Horizon Research (2002) indicates that elementary teachers do not
have adequate background in STEM content. For instance, in science, 40% of the
elementary teachers surveyed had taken four or fewer semesters of science coursework.
Sixty five percent of teachers surveyed believed there is a need for professional
development that focuses on how to use inquiry/investigation-oriented teaching
strategies. To better support elementary teachers who may have little science content
knowledge, museum educators may want to re-focus their education programs,
concentrating on providing teachers with the content they need to be more confident
teaching science.

Perhaps the largest or most important of the pragmatics has to do with the
attention to the process of creating a healthy relationship that has the potential to truly
impact children’s live and learning. This process is outlined below and in Figure 8.

Step 1: Meet with potential collaborators to discuss educational vision, goals and
expectations for any relationships.

Step 2: Determine if there are mutual goals and expectations regarding teaching
and learning.
Step 3: If so, have formal meeting with all collaborators to discuss mutual goals and expectations. Include time for all involved to get to know each other on a personal level. (OUTCOME: List of Mutually Determined Goals and Expectations)

Step 4: Appoint key operations leader for each institution, entrust them with daily operations of relationship. Time must be allocated for key operations leaders to get to know each other so they are comfortable conversing about partner issues on an intimate level.

Step 5: Key operations leaders develop communication plan, including timeline, to meet all goals and expectations, blessed by all collaborators. Ensure that each institution’s preferred communication style is accommodated. Provide time for team building among all involved. (OUTCOME: Communication Plan)

Step 6: Key operations leaders meet with outside researcher who will develop research plan to measure if goals regarding teaching and learning are met. Ensure that there is time for all to socialize before or after the meeting, including the outside researcher. (OUTCOME: Research Plan)

Step 7: Once these items are in place—goals, communication plan, research plan—implement the educational activities. Key operations leaders should continue to meet on a regular basis to build strong personal relationships and discuss and rectify any challenges.

Step 8: If key leaders remain constant, all collaborators should meet annually with the outside researcher to determine whether the partnership is effective, as
defined by the goals developed at the onset of the partnership. If one or more key leaders change, the entire relationship must be re-examined.

Although the answers to these questions are currently unknown, additional research might provide answers in the future.

Limitations of This Study

This study was limited to one educational partnership between a science center and an urban school. While the results of this study cannot be generalized to other science center-school partnerships, the findings can help readers to better understand other museum-school partnerships.

Recommendations for Future Research

As budget challenges impact educational programs at museums throughout the country, mutually beneficial relationships are essential. COSI is involved in several educational relationships that involve multiple entities, including universities, community-based organizations, schools, for-profit, and nonprofit businesses. Applying the results of this study to relationships with multiple members is a logical next step.

In addition, studying other relationships to determine whether the basic elements of a partnership identified in this study exist on a continuum would benefit all involved in museum-school partnerships. By doing this, minimal levels of effectiveness for each element may be determined. Finally, determining how museums and schools make time for basic partnership elements should be studied. These studies would benefit the museum field as mutually beneficial relationships develop.
Conclusion

Partnerships consist of several individuals/organizations coming together to overcome their weaknesses and create something neither could establish alone. (Benton, 2001; Marshall, 2002; Sheppard, 2007). Ideally, an effective partnership will have four basic elements (mutual goals, communication plan, key leader support, planning and research) and strong interpersonal elements (personal responsibility, honesty, communication at the intimate level, and trust). Partners may have difficulty developing these to their fullest extent due to time limitations. No partnership is perfect. By creating strong interpersonal relationships, partners can mitigate challenges caused by limited basic elements, increasing the likelihood that their partnership will succeed.
Initial Meeting
Outcome: Do we share similar goals? Do we want to work together?

Formal Meeting with all Partners
Develop list of goals and expectations for the partnership

Appoint Key Operations Leaders

Key operations leaders develop communication plan

Key operations leaders meet with outside researcher to develop research plan based on goals of partnership

After goals, communication and research plan are developed, implement partnership activities

Get to know each other on a personal level

Spend time together, Learn about each other on a personal level

Team Building among key operations leaders, begin to develop trust

Spend time together, including outside researcher. Learn about each other on a personal level

Key operations leaders continue to meet on a regular basis to build strong personal relationships and rectify any challenges that arise

Figure 8: Steps to Construct a Partnership
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APPENDIX A

ORIGINAL PARTNERSHIP AGREEMENT
COSI Connects With SP Elementary School

COSI agrees to provide the following services on mutually agreed upon dates and times to the students and faculty of SP Elementary School:

**All School Assemblies:**
*Introduction Assembly:* This 45 minute assembly is designed to kick off your science-focused school year. This motivational assembly introduces/reinforces the importance of science process skills. It includes experiments/experiences that touch on the K-5 science curriculum.

*Concluding Assembly:* This 45 minute assembly will wrap up the school year, building on the science experience of students throughout the year. It will also include a motivational appearance by COSI’s former president and veteran of three space shuttle missions, Dr. Kathryn Sullivan.

**Family Opportunities**
*Process Skills Night:* Focusing on the process skills of science, this fall family night provides parents with concrete ideas that reinforce science process skills they can do at home with their children. This 90 minute experience involves your teachers and a COSI demonstrator facilitating ten different stations throughout your school, each station highlighting a different process skill. Parents leave with a packet of activities they can do at home with their children.

*Inquiry Science Fair:* End the school year by showcasing student projects that focus on inquiry science. This 90 minute experience provides students the opportunity to share with their parents the science lessons/experiments that they completed throughout the year.

*Family Memberships:* Provide your students the opportunity to explore COSI with their family at their convenience.

**Grade Level Opportunities**
Combine the excitement of COSI in the Classroom with a Co-Teaching experience, highlighting the science process skills and utilizing inquiry-based teaching methods, that relates to your science curriculum. Connect the curriculum to real-world experiences with a COSI Field Trip.

*COSI in the Classroom:* This 60 minute experience provides one classroom with a 20 minute presentation and two – four different science experiments that illustrate the topic.
Co-Teaching Experience: Pairs your teacher with a COSI instructor, utilizing inquiry-based science methods to teach your curriculum. It may encompass 1 – 5 60-minute science lessons. These may be done on consecutive days or one day devoted to the topic.

COSI Field Trip: Spend the day at COSI exploring exhibits that reinforce state academic content standards and connect your classroom studies to the larger world.

COSI Overnight Learning Experience: Students in grades 3 – 5 can spend the evening exploring COSI and experiencing specific thematic activities that connect to classroom studies. Dinner, snack and breakfast are included, in addition to sleeping in the COSI building.

Intercession Opportunities
For each intercession week, including September 26, October 3, January 9, April 3 and April 10, COSI will provide programming for up to 6 hours/week (3 days, approximately 2 hours of program time daily). Programs will be thematic and may include a COSI On Wheels program, thematic hands-on activities and a field trip to COSI. Details to be worked out with Pam Condo at least one month prior to the intercession.
APPENDIX B

INTERVIEW QUESTIONS
Questions to frame the interview with Grade 3, 4, and 5 SP Students include, but are not limited to:

1. What was your favorite part of school so far? (If no answer, I will prompt . . Did you have a favorite class? Did you have a favorite field trip? Did you have a favorite after school activity this year?)
3. What makes school fun? (If possible, refer to specific example from Question 2) What did you learn when you were having fun? (If possible, refer to specific example from Question 2)
4. Who do you learn the most from? Why do you think that is?
5. Tell me about your favorite teacher? What do they do that other teachers don’t?
6. You know I work at COSI. What did you learn from the COSI Team when you visited COSI or when they visited your school?
7. What do you think your teachers wanted you to learn when you visited COSI?
8. What surprised you the most during your time with COSI?
9. How are COSI and school alike? How are they different?
10. When I was a kid I remember getting in trouble at school for talking during class. What do students get in trouble for here at SP? What do you get in trouble for at home? When you went to COSI, did your teachers tell you that you would get in trouble if you did certain things? Do you remember what they were?
11. What are the classes like in school? What are classes like at COSI?
12. What do you usually do when you aren’t in school?
13. If you had a Saturday morning free, and you could stay at home and watch tv, go to a science workshop at COSI, go to school and get extra homework help from your teacher, or stay home and play outside with friends, which would you prefer? Why? What would be your second, third, fourth choice? If COSI is not the first choice, ask, What could we do to make COSI your first choice?
14. Did you get a chance to visit the museum with your family? If so, what did you do on those visits?
15. What do you want to do when you get older? What kind of help do you need to do that? Is there anything COSI can do to help you?
16. Is there anything else you’d like to tell me about school or COSI?
17. Are there any questions you’d like to ask me about COSI?
18. After I think about our conversation, I may have more questions. Would it be OK if I ask you more questions later on?
Questions to frame the interview with SP Parents include, but are not limited to:

1. What kind of adult do you hope your child will become? (prompt . . . What would you like to see your child doing when they are 25? What kind of job would you like your child to have when they are 25?)
2. What will help your child become that kind of adult? (prompt . . . What will help your child get the job you would like them to have?)
3. What should schools do for children?
4. People learn in different ways. Some learn by doing, others learn by reading, others learn by watching. How do you learn?
5. Where did you go to school? How did the schools you went to prepare you for what you are doing today? Did your teachers help everyone learn in different ways?
6. Tell me about a favorite teacher. What made him/her your favorite teacher? What did this teacher do that most other teachers did not?
7. What is your child’s favorite part of school?? (prompt . . . What part do they talk about most?)
8. Which classes do you think your child learns the most in? Why? (prompt . . . Which class do they get the best grades in? Which class have they made the most improvement in?)
9. What do you think makes school fun for your child? (If possible, refer to specific example from Question 7)
10. What do you think children learn when they are having fun? (If possible, refer to specific example from Question 7)
11. What kind of advice would you give the principal to help him better understand the students of SP?
12. What has your child told you about their experiences with COSI? (prompt . . . Did they go to COSI on a field trip? Did they say anything about what COSI did in their classroom? Did they spend the night at COSI?)
13. How do you believe school and COSI are alike? How are they different? (prompt . . . What do they learn in each setting? How do they learn in each setting?)
14. Do you believe places like COSI help your child score well on state tests? Why or why not?
15. If your child had a Saturday morning free, and he/she could stay at home and watch tv, go to a science workshop at COSI, go to school and get extra homework help from your teacher, or stay home and play outside, which would he/she prefer? Why? What would be their second, third, fourth choice? Which would you prefer they do? If COSI is not the first choice, ask, What could we do to make COSI the first choice?
16. Did you receive your COSI family membership? Have you used it to visit the museum? If yes, what was the most unusual thing about your visit? What do you think was your child’s favorite part of the museum? Why? What surprised you about COSI? Why? What did you get from the experience? What did you think COSI wanted you to get from the experience?

17. If you haven’t been able to visit the museum, can you tell me why?

18. What advice would you give me to share with my COSI colleagues about how we can better support your family and the SP community?

19. Is there anything else you’d like to tell me about school or COSI?

20. Are there any questions you’d like to ask me about COSI?

21. Is there anyone else you believe I should speak with about this subject? Who?

22. Do you mind if I use your name when I write up my research? If not, what name should I use if I quote you?
Questions to frame the interview with SP Teachers include, but are not limited to:

1. What do you hope for your students?
2. What is SP school doing to help prepare students for the future?
3. Your students exhibit a variety of learning styles. How do you keep all your students actively engaged in learning?
4. How do you believe your students are different from a rural or suburban school?
5. What is your definition of teaching and learning and the best environment for it? (prompt . . . Name five essentials for teaching and learning.)
6. How are the teaching and learning environments at COSI and SP the same? How are they different?
7. How did you prepare your students when they visited COSI? How is that different from when you prepare them for a day at school?
8. Do you believe places like COSI help your child score well on state tests? Why or why not?
9. If your students had a Saturday morning free, and he/she could stay at home and watch tv, go to a science workshop at COSI, go to school and get extra homework help from you, or stay home and play outside, which do you think the majority would prefer? Why? What would be their second, third, fourth choice? If COSI is not the first choice, ask, What could we do to make COSI the first choice?
10. Are you aware that there is a partnership between COSI and SP? What were your goals of the partnership? How have those goals been met/ not met?
11. What do you value about this relationship? What would make it more valuable to you? Tell me about the parts of this relationship you struggle with?
12. What advice would you give me to share with my COSI colleagues about how we can better support you and the other teachers at SP?
13. Is there anything else you’d like to tell me about school or COSI?
14. Are there any questions you’d like to ask me about COSI?
15. Is there anyone else you believe I should speak with about this subject? Who?
16. Do you mind if I use your name when I write up my research? If not, what name should I use if I quote you?
Questions to frame interviews with the COSI staff include, but are not limited to:

1. What is your definition of teaching and learning and the best environment for it? (prompt . . . Name five essentials for teaching and learning.)
2. How are the teaching and learning environments at COSI and SP the same? How are they different?
3. What is SP school doing to help prepare their students for the future?
4. What is COSI doing to help prepare SP students for the future?
5. SP students exhibit a variety of learning styles. How do you keep students with a variety of learning styles actively engaged in learning?
6. How do you believe SP students are different from rural or suburban school students?
7. What do you think the teachers did to prepare the students for a COSI field trip? What do you think they should have done to prepare their students for a COSI field trip?
8. How do you think teachers prepare their students for a day at school?
9. How is learning in the SP classroom different than learning at COSI?
10. Do you believe places like COSI help students score well on state tests? Why or why not?
11. If the SP students you worked with had a Saturday morning free, and he/she could stay at home and watch tv, go to a science workshop at COSI, go to school and get extra homework help from you, or stay home and play outside, which do you think the majority would prefer? Why? What would be their second, third, fourth choice? If COSI is not the first choice, ask, What could we do to make COSI the first choice?
12. Are you aware that there is a partnership between COSI and SP? What were your goals of the partnership? What were the goals of the science center? How have those goals been met/ not met?
13. What do you value about this relationship? What would make it more valuable to you? Tell me about the parts of this relationship you struggle with?
14. What advice would you give me to share with the SP teachers that would help make this partnership more effective?
15. Is there anything else you’d like to tell me about SP or COSI?
16. Are there any questions you’d like to ask me about my research?
17. Is there anyone else you believe I should speak with about this subject? Who?
18. Do you mind if I use your name when I write up my research? If not, what name should I use if I quote you?
Questions to frame the interview with adult members of SP business and community groups include, but are not limited to:

1. I understand your organization is part of/has an impact on the SP Community. Could you explain the connection to me in your words?
2. How are things going in the SP Community?
3. What do you believe would strengthen this community?
4. Do you have any children in school? Do they attend SP? What is their favorite part of school? Why?
5. Where did you go to school? What was your favorite part of school? How did the schools you went to prepare you for what you are doing today? Why?
6. What do you believe schools should do for children?
7. Are you aware of a partnership between COSI and SP? If yes, how did you hear about it? If no, explain partnership.
8. What should I know about working with the children of this community? What should I know about working with their parents? (prompt…What do people do with their free time?)
9. How can places like COSI help the children in this community?
10. Is there anything else you’d like to tell me about the community or the school or COSI?
11. Are there any questions you’d like to ask me about COSI?
12. Is there anyone else you believe I should speak with about this subject? Who?
13. Do you mind if I use your name when I write up my research? If not, what name should I use if I quote you?