

*The Nature Exchange Program at the Woodland Park Zoo:
Exploration, Evaluation, and Impact*

by

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Abstract

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Nature Exchange is a program at the Woodland Park Zoo in Seattle, Washington which represents one type of education in an informal learning setting. Nature Exchange encourages children to learn about their natural surroundings through exploration, observation, research, and interactive discussions with zoo staff and volunteers. The goal of this thesis was to evaluate the Nature Exchange Program by ascertaining whether the program is meeting its intended goals and identifying areas for improvement. I researched both the history of the Woodland Park Zoo and the creation of its new "Zoomazium" for children. The Nature Exchange Program is both an engaging place and program within the Zoomazium. To provide a framework for my evaluation approach, I researched the development of the field of evaluation methodology in informal learning settings. I used Robert E. State's mixed-method case study approach. My data collection strategies included parent and staff interviews, participant observations, and a questionnaire primarily distributed via e-mail. The questionnaire contained both open- and close-ended questions which provided quantitative and qualitative data for analysis; I received 121 responses from parents of participants. From the data, I learned that Nature Exchange is a successful program which encourages children to spend more time outdoors, provides a space for thinking, reflecting, observing, and learning, and helps children to become more aware of and interested in nature. Nature Exchange also provides an opportunity for children to practice and improve their observation and communication skills.

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Chapter One

An Introduction

“In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught.”
(Baba Dioum Quotes, 2006)

In a decade where humanity is bombarded with headlines such as “Climate change ‘to create 1 billion refugees,’” (CNN, 5/15/07) and “The Big Debate: Global Warming or National Security,” (CNN, 10/5/07) it is more essential than ever for our society to learn to appreciate and understand our natural world so that we can learn how to live in harmony within it. At the Woodland Park Zoo in Seattle, Washington, the Nature Exchange Program specifically encourages learning about the natural world. According to one staff member, one of this program’s goals is “to foster an appreciation and understanding of the natural world, and increase the depth of understanding.” (Staff Interview, 5/9/07).

Nature Exchange (often referred to as NE in this thesis) represents one type of education in an informal learning setting which allows children to explore their surroundings and then learn about them through observation, research, and discussion. Through Nature Exchange stimulated explorations, a secondary goal of this program is to encourage children to spend more time in nature—appreciating, observing, and learning from the outdoors.

The Nature Exchange Program is located within the Zoomazium, a large and educational child-oriented building at the Woodland Park Zoo. It is both a physical space and a program.

The physical space consists of shells, fossils, rocks, and other similar items found in nature. These items are available for trading and observation. The space also includes literature ranging from picture books to encyclopedias, computers with Internet access for researching, and workspace for participants. The program allows children to “discover nature at their own pace and trade their observations for prizes” (Zoomazium Press Kit, WPZ). Through this program, children are also able to see historic items—such as fossils—and compare them to similar organisms that exist today. For instance, a child could see a fossil of an extinct animal in NE and then he or she could see that animal’s relative alive in the zoo today. NE encourages children to observe, record, research, and communicate to learn about the natural world using a wide range of activities. The intended audience ranges from pre-kindergarten children through junior high students, with a focus on 6- to 8-year-olds.

Nature Exchange Program educational techniques include scavenger hunts, the trading of found objects, worksheets, discussion, research, engagement in observation and in the scientific method, and more. All children spend time with a staff member, usually in a discussion about what they are learning. Staff members encourage the children to reach for knowledge beyond what they already know. The Nature Exchange Program reflects the zoo’s commitment to education and nature appreciation in an informal learning setting.

I have two goals for this thesis. The first is to evaluate the Nature Exchange Program by identifying its achievements and areas for improvement. This information has the potential to be useful both to this and to other Nature

Exchange Programs, and it could lead to increased implementation of this type of program in other informal learning settings. The secondary and more personal goal is to gain understanding and practice with evaluation methodologies appropriate to informal learning settings such as zoos.

In Chapter Two, I will describe the history of the Woodland Park Zoo, the creation of Zoomazium (the building where Nature Exchange is located), and the design of the Nature Exchange Program. Within this chapter, the goals and methodology used within the Nature Exchange Program will also be identified.

In the third chapter, I will delve into the world of evaluation methodology, with a review of approaches and specific techniques relevant to evaluation of informal learning settings. Following this, the fourth chapter will detail the methodology that I used to conduct the evaluation of the Nature Exchange Program. In the fifth chapter, I will present the data that I collected through observations, staff and parent interviews, and surveys. In the sixth chapter I will analyze the data provided in chapter five and will present recommendations for improvements for the Nature Exchange Program. Furthermore, this chapter will include recommendations for further research about the Nature Exchange Program. The final chapter will present my overall conclusions.

To summarize, I hope that my readers gain new ideas about the value of a mixed method evaluation methodology, informal nature learning, and the Nature Exchange Program. I opened this chapter with a quote by Baba Dioum because it captures the essence of the Nature Exchange Program. If children are taught to explore nature and appreciate it when they are young, they will have a better

chance of learning to love it. If they love it, they will want to understand it, and they will understand it only if we, the educators, teach them through programs such as Nature Exchange.

Chapter Two

Understanding the Woodland Park Zoo, the Zoomazium, and the Nature Exchange Program

“Woodland Park Zoo is a conservation and education institution demonstrating the value, beauty and interdependence of all living things.”
(Discover the difference..., WPZ)

To fully appreciate the Woodland Park Zoo, the Zoomazium, and Nature Exchange, it is important to know the history behind these projects. Knowing the history of an institution and its programs allows you to see how it has grown, changed, and developed. It provides insight into how and why certain decisions were made and what effect those decisions have on the institution today. The history and the story of WPZ, the Zoomazium, and NE also offer an opportunity to identify themes that have shaped these projects. One of the overarching themes that I see is an increasing emphasis on education and conservation. The quotation above is the current mission statement of the Woodland Park Zoo, which is now 121 years old. That mission statement ties directly into the themes of education and conservation, and emphasis on those two areas will be seen throughout this chapter.

This chapter describes the progression and history of this zoo; it tells the story of how the Zoomazium and Nature Exchange came to be in the Woodland Park Zoo today. In this chapter the transition of the zoo from a place of entertainment to a center for learning and conservation is also chronicled.

To begin the WPZ story, in 1887, Guy C. Phinney, an estate developer, purchased 342 acres of land for \$10,000. Out of that he turned 180 acres into a hotel, formal gardens, and a menagerie (including animals such as bears, deer, and ostrich). This part of his estate was open to the public as long as visitors followed specific rules such as no swearing or dogs allowed in the park. Only six years later, Phinney died at 41 year of age. A few years after that, in 1899, the Seattle City Council passed an ordinance which allowed Seattle to purchase the land from Phinney's wife for \$100,000. The intent behind the purchase was to complete Woodland Park and the Woodland Park Zoo (Payne, WPZ).

From 1900 on, more and more animals were added to the zoo. In 1902, the Olmsted brothers, landscape architects who designed the Central Park Zoo in New York, were hired to design the Woodland Park Zoo. In 1905, for the first time, burro rides were offered at the zoo for five cents per ride. This also paved the way for additional rides such as a mini-train and Ferris wheel. In essence, when it was first created, the zoo existed for people's entertainment without regard to anything else. When the zoo opened, animals were kept in cages with steel bars and cement floors; additionally, many of the animals spent most of their life in indoor cages. Those that were outdoors had simple habitats that were easy to maintain without extensive vegetation or variation in their surroundings. To show just one example, below is an image of an early outdoor monkey habitat at the Woodland Park Zoo (Payne, WPZ).



Woodland Park Zoo
Courtesy of the Knudson Family

Photograph #1, Former Monkey Island (Payne, WPZ)

Throughout the early 1900s, the zoo continued to expand and improve its animal exhibits. For example, the zoo added a heated primate house, an elephant barn, and bear grottos. Even with all of the improvements and advancements, automobile traffic was routed through the zoo, right next to the animal cages. This continued until 1951 when fencing of the zoo was completed and traffic was routed elsewhere (Payne, WPZ). Allowing cars to drive through the zoo until 1951 may have been due to the fact that when zoos started growing in popularity in the early to mid 1900s, they were created to bring nature into cities to give residents a break from the chaos of every day life (Wirtz, 1997). Driving through the zoo allowed residents to view animals instead of cityscapes as they were driving through Seattle. WPZ and other zoos at the time saw their roles as providing families with a feeling of escape from the city. Cars were relatively

new during the early 1900s, and they were often driven for pleasure. Driving through the zoo added to the enjoyment and luxury of these pleasure drives.

In 1948, for the first time, the zoo leadership decided to go beyond rides in their effort to attract children. They turned their focus to educating children and, in turn, their parents when they proposed the creation of a children's zoo. However, it took until 1960 for a City Bond to be passed to help fund the Children's Zoo. It started with a family farm. There was great debate in the conceptualization stages over whether to make the children's zoo "fantasy-based" (themed like a fairy tale) or to create a more authentic family farm. In the end, as can be seen today, the Children's Zoo was set up to look similar to a family farm. In addition, in 1954, the zoo's first staff educator, Jack Alexander, was hired. He was given the title of Guide-Naturalist. From this point on, the zoo began to train volunteers and docents to be additional educators in the zoo. This change also paved the way for even more education programs and the eventual construction of the Zoomazium (Payne, WPZ).

A "foreign friends village" or zoo nursery was created as part of the Children's Zoo in 1967, and in 1972, the theater and farm village in the children's village were completed. In 1971, the zoo instituted its first parking fee, although admission through any of the zoo's gates remained free. In the 1970s, a new director, David Hancocks, was hired. He began to examine everything in the zoo with four main purposes in mind: education, recreation, conservation, and research. This led to many changes and improvements in the zoo, which brought it more closely in line with the zoo one sees today (Payne, WPZ). These changes

began to take place because of the influence of the major American zoological professional organization, the American Association of Zoo Parks and Aquariums, which was formed and incorporated in 1972. Zoos began striving for accreditation by the AAZPA, which was based on the following six criteria: professional practices in the care of animals, ethics, services, finance, education, and science/conservation (Croke, 1997). The zoo's quest for accreditation only took the zoo further on its journey towards improving its education and conservation programs.

First, the zoo began to take a closer look at the signs at the exhibits. In the beginning (the early 1900s), signage was minimal, generally just naming the animal that a cage housed. In the mid-1900s, storybook signs were created. These were "oral" signs, which required buying a key that activated a recording that told the listener more about the animal they were observing. In the late 1960s, these signs were removed and replaced with more traditional written signs. However, the new signs were designed with quotes about nature, and they were placed at varying heights to compel the visitors to look at their surroundings a little more. The hope was that these new signs would also encourage visitors to examine their attitudes about wild things and wild places.

During the mid-1960's improving exhibits became a trend across zoos. WPZ began improving the exhibits after its director toured other zoos across the nation. Improvements included the creation of new enclosures and further development of existing exhibits. Previously, most of the exhibits consisted primarily of concrete and steel, but during this time period, grass, live plants, leaf

litter, and hiding spaces were added to exhibits to make them more representative of each animal's natural setting (Payne, WPZ). In addition to providing a more stimulating and comfortable environment for the animals, the naturalistic exhibits also provided a more educational experience for visitors. While not specifically a "conservation effort," providing more "naturalistic" exhibits encourages visitors to think of the space, foliage, and food that these animals need to survive in the wild. By the late 1960's, every zoo in the United States had at least one "natural enclosure" (Croke, 1997). Below is a photograph of the more "naturalistic" monkey island; the photograph clearly shows the changes from the original monkey island (pictured above) which included primarily concrete to one which includes foliage, grottos, and more. During this time WPZ was making changes and striving towards improved animal care, enhanced natural exhibits, and a deeper educational experience for visitors.



Photograph #2, Updated Monkey Island (Payne, WPZ)

In 1970, 34 zoos out of a total of 49 American zoos were charging admission. Woodland Park Zoo did not charge admission until 1977. In 1977, the Zoo charged \$1.50 for adults, 50 cents for kids, teens, and seniors. Zoo staff discovered that when they charged admission, the public was better behaved and interacted with the animals more positively. Zoo staff and researchers believe that this change came out of growing respect for the zoo and increased respect for the animals due to the “naturalistic” exhibits (Payne, WPZ).

In the late 1970s and early 1980s, the zoo began to be recognized for its efforts by winning the Conservation Award for their Eagle Rehabilitation Program and the Top Rating for American Zoos from the Humane Society. These awards and many more were the result of the improvements that the zoo made including naturalistic exhibits, development of conservation programs, and an increased emphasis on education (Payne, WPZ).

Expanding on the continuing themes of education and conservation, in 2001 the Woodland Park Zoo began working on plans for Zoomazium. The inspiration for Zoomazium came from a growing belief throughout the educational world that children spend too much time in front of electronic media. In fact, the Kaiser Family Foundation found that in an average week, children spent 44 hours in front of TVs, computers, or video games (Zoomazium Press Kit, WPZ). In addition, because the zoo’s largest visitor demographic was children eight and under, the Woodland Park Zoo wanted to create a space specifically for those children. The Zoomazium was created to help children connect to the outdoors, to provide them with a full-body learning experience, and to allow

children to learn through fun, hands-on, minds-on, self-directed interactive activities, and play. The Zoomazium was designed, in part, to help instill an appreciation for nature in children at a young age. In addition, because Seattle is both an urban and a rainy region, staff at the Woodland Park Zoo wanted to create a place where children could experience “year-round nature learning” regardless of the weather. As part of the construction of Zoomazium, 10 “zoo-kids” were chosen and were consulted on many aspects of the design (Zoomazium Press Kit, WPZ).

The Zoomazium is composed of six main “discovery zones”: Forest, Grasslands, Toddler Zone, Stage, and Nature Exchange. Each zone contains natural looking scenery which is created through items such as hidden caves, changing backdrops, a climbing tree, and even a gigantic egg from which children can hatch as if they were an animal. These zones were designed to allow children to experience what it is like to climb a mountain; imagine drinking from a water hole; feel the exhilaration of climbing a tree; interact with live animals; and connect their observations indoors to the outdoors. Beyond the discovery zones, the Zoomazium houses a workspace for the teen volunteers, a place for parents and children to relax, an outdoor stage, and a “feature creature” exhibit where children can view small animals up close. The Zoomazium is also a “green building” incorporating 21,000 plants on its green roof, energy efficient heating and lighting, sustainable materials, and special elements like patterned glass to minimize bird deaths (Zoomazium Press Kit, WPZ). Just before it opened, Richard Louv, author of *Last Child in the Woods* observed that the, “Zoomazium

captures the spirit of what I have in mind...I was very impressed with the idea. They really understand that it is very, very important within the zoo to offer a hands-on experience beyond a petting zoo” (Mulady, 2006).

As mentioned above, one of Zoomazium’s six discovery zones is Nature Exchange, the focus of the evaluation presented in the following chapters. Nature Exchange is described as “Zoomazium’s most complex program...where kids discover nature at their own pace and trade their observations for prizes. The interactive program encourages kids to take learning into their own hands and become researchers out in the field” (Zoomazium Press Kit, WPZ).

The following is a brief description of how Nature Exchange works. Upon entering Zoomazium, there is an information desk which is run by staff members and volunteers where people can ask general questions about the zoo. This is also a Nature Exchange desk where people can ask questions about Nature Exchange and children can share their work and the objects they have brought in to receive points towards prizes. Upon entering the Nature Exchange area, children can pick up an activity sheet to complete. The sheets could be a scavenger hunt (to do throughout the zoo), a small research project, or an observation sheet about an object the children are bringing in for trading. If a child does not feel like completing a sheet, he or she can participate in imaginative activities such as “build-a-bug” or the opportunity to be an imaginary animal vet in the research tent. Children can also enter the space just to look at abundant collection of shells, fossils, rocks, and plants that are on display. They can glance through books, do Internet research on computers, or just sit and ask

staff members' nature-related questions. There are multiple chairs and desks at varying heights that overlook Zoomazium, the research tent, or windows that look out into the zoo. The design of the Nature Exchange area allows children to make observations throughout their entire Nature Exchange visit.

The primary activity in Nature Exchange is a trading program which allows the child to take home a new rock, shell, or fossil after completing a worksheet or bringing in an object. When a child comes in to Nature Exchange, he or she has a choice of doing an activity sheet, bringing in a completed project, or bringing in an object to trade. If the child brings in an object, he/she will be asked questions by a staff member or volunteer about its use, size, where it was found, etc and from that verbal exchange with a Nature Exchange staff member, the child will obtain points. These points can be used immediately or saved to "buy" another nature object such as a piece of fool's gold or a coyote skull. Children receive points for any activity they do as part of Nature Exchange, whether it is a scavenger hunt or a research paper.

Through my interviews with Nature Exchange staff I identified the following goals of the Nature Exchange Program:

1. To foster an appreciation and understanding of the natural world.
2. To provide a space that encourages people to slow down to observe, think, reflect, and learn.
3. To create an experience for kids that translates curiosity into learning.
4. To teach kids about environmentally ethical collecting.

Obviously, within these goals, there are many "sub-goals" such as encouraging

children to spend more time outdoors, to improve their communication skills, and to develop deeper connections with nature and natural processes. The success of these goals will be explored in more detail in later chapters (Staff Interviews, 5/9/07).

Throughout the history of zoos, there have been critiques as well as praise. John Berger, an author and art critic, once said that, “visitors pass from cage to cage, not unlike visitors in an art gallery who stop in front of one painting and then move on to the next” (Willis, 1999). Over the past fifty years, WPZ has strived to be a zoo whose visitors do not just “pass from cage to cage.” Instead, WPZ works to have its visitors experience a connection with each animal and its habitat, and engage in meaningful learning.

This brief history of the Woodland Park Zoo, the Zoomazium, and the Nature Exchange presents an important story of the zoo’s early years and its current, leading-edge efforts to instill a love of nature in children through active learning and naturalistic exhibits. From a zoo which had bars and burro rides to a zoo with natural exhibits, a green building and an emphasis on children’s education, the Woodland Park Zoo has taken great strides to meet its mission of being a “conservation and education institution” (Discover the difference..., WPZ).

Chapter Three

The Art of Evaluation

“Art is a step from what is obvious and well-known toward what is arcane and concealed.” (Kahlil Gibran Quotes, ThinkExist)

*“Works of art have subject, form and content. We often identify a work by its **subject**: a landscape painting, a sculpture of a young woman, a lithograph of a cat. **Form** (or design), is the visual organization of the art work -how the artist has used line, shape, value, color, etc. **Content** is the impact or meaning of this work.” (Department of Art, WIU)*

Introduction

From my study of evaluation methodology, I have learned that there is an art to successful evaluation of educational programs. To meet its purpose, the evaluation design has to move beyond a single technique such as a questionnaire; it needs to take into account issues such as the program’s context, power dynamics, and budgetary constraints. Successful evaluation requires thinking beyond the obvious to include the indirect and sometimes obscure influences on a person, place, or program. In this way evaluation is as much as art form as any painting or piece of pottery. When an artist paints a person, for example, they have to look beyond the obvious facial features, to be able to paint what a person is feeling or thinking. Researchers performing an evaluation must look beyond the obvious, such as happy children running around Nature Exchange, to evaluate whether the NE goals are being met, just an artist looks beyond a face. In this chapter, using art as a metaphor, I will explore my understanding of evaluation

methodology as it relates to education. The history, subject, form, and content of evaluation will provide the focus for this analysis.

Before exploring evaluation in general I would like to provide a brief summary of my case study in terms of its subject, form, and content. In art, a subject is what is being painted or sculpted. A subject is essentially an object or person which is being evaluated through the eyes of an artist (Department of Art, WIU). In this case, the *subject* of my case study is the Nature Exchange Program at the Woodland Park Zoo in Seattle, WA. The Nature Exchange Program, created in 2006, exists in the Zoomazium at the WPZ and it provides an area for children to study and exchange natural history items such as rocks and leaves as described in Chapter Two. In art, the form or design is the organization of the piece of art, for example the colors and style of a painting or the texture used in sculpting. The *form* of my evaluation of Nature Exchange is a combination of a literature review, interviews, questionnaires, observations, participating in training sessions, and meetings. Finally, in art, the content is the impact or meaning of the work (Department of Art, WIU). When looking at a painting or sculpture the meaning which people glean from it or the questions which arise would be its content. The *content* of the evaluation is an analysis of Nature Exchange, including its goals, impacts, effectiveness, and possible improvements to the program. Because my evaluation incorporates multiple forms of study that seek to illuminate hidden contexts and influences, I hope it will be seen as thorough and valuable to the Woodland Park Zoo staff.

History

In general, in evaluations, an infinite number of subjects, forms, and content may be investigated. However, fully understanding these components requires some background on the history and basic characteristics of evaluation. I think it is also important to consider how changes in evaluation also changed teachers' and evaluators' methodology as well.

Evaluation is defined as, "the act of fixing or ascertaining the value or worth of," or "to examine or judge carefully; appraise" (Dictionary.com, 2007). Its overall purpose is to prove that something is working or to provide suggestions for improvement as necessary. The goal of an evaluation may be formative, which typically takes place in the process of program development, and the emphasis is improvement. The evaluation objective may also be summative, where the evaluation is focused on the outcome of a project or program (Nevo, 1983). In the case of my evaluation, of Nature Exchange at the Woodland Park Zoo, my study is partly summative since the program has already been developed, and I was asked to assess the strengths and weaknesses of the program. However, it is also formative in the sense that the NE staff may use my recommendations to continue to strengthen the program, or to improve certain aspects of NE programs.

One of the first formal methods of evaluation was created in 1932 by Ralph Tyler. Throughout his life he was a teacher, student, administrator, evaluator, and an educator. For his master's thesis, Tyler designed a science test for high school students. During this process he became aware of some of the drawbacks of the kind of testing that was based only on memorization instead of

interpretation or integration. He came to the conclusion that evaluation had to start with a specific objective or purpose if it was to be effective. From this conclusion came the Tyler Rationale (Riles Years, 1995).

The Tyler Rationale was focused on high school education, and it was a tool that was geared towards teachers. With his work, Tyler hoped to prove that progressive high school curriculum was just as effective as Carnegie-unit curriculum (Guba, 1992). A Carnegie-unit is defined as a, “measure of the amount of time a student has studied a subject” (Carnegie, 2007). Progressive high school curriculum focused more on interest levels and meeting objectives instead of on the time spent studying the subject.

The Tyler Rationale was designed to improve and modify educational curricula primarily in high school settings. Matrices were used to compare content attainment and behavioral outcomes, and then the methods used for testing were evaluated to see whether they were reliable, valid, and objective. From these evaluation approaches, strengths and weaknesses in the curriculum were identified, and the curriculum was modified as necessary. Perhaps more important than the specific methodology were the beliefs which Tyler had that governed his creation of the Tyler Rationale (Guba, 1992).

Tyler designated six basic stipulations as part of his rationale. First, before starting or creating an assessment, Tyler argued that any educational program needed a specific purpose. For instance, before creating a test, a professor should already have had a learning objective in mind. Second, multiple assessments and alternate assessments were, in Tyler’s view, not always

necessary. Additional evaluations were useful only when a new purpose is defined or an old purpose is redefined. Furthermore, the assessment must be based on objectives and on the students; the institution and the instructor can not be part of the assessment. Tyler believed that a test which was designed without considering the audience, made that test less effective. Put quite simply, giving a test to elementary students based on high school curriculum would obviously make that test ineffective. Tyler also argued that assessments must take into account contexts such as ethnicity, culture, and environment. This stipulation is especially prudent today with so many languages and cultures existing in the United States. Tyler's next belief was that a school's accountability had to be to the parent and student and not to any other entity such as government. Parents and students are the groups that will be affected by a school's assessment and therefore they should be able to contribute to the assessment-design process. Finally, Tyler contended that for the most effective learning and assessment there must be collaboration between schools, families, and communities. This final caveat ties in directly with programs like Nature Exchange at the Woodland Park Zoo which works to connect experiences with the outdoors with learning in school (Horowitz, 1995).

The Tyler Rationale was revolutionary, but of course, not perfect. In fact, in 1963, Lee Cronbach, an educational psychologist argued that in K-12 educational evaluation, decisions and who makes those decisions are more important than objectives. Cronbach stated that evaluators needed to look at who the decision makers are, what criteria they use, and what kind of decisions they

make. The main idea behind this type of evaluation was that improvements and refinements could be made to a course while it was being developed instead of after it was finished. Cronbach's views became particularly important in 1965, when the US government started mandating that the impact of all educational programs being funded by Congress be evaluated (Guba, 1992).

A few years later, in 1967, Michael Scriven rejected both Tyler's emphasis on objectives and Cronbach's belief in forming evaluations based on decision-makers. Instead, he argued that evaluations needed to be goal- and objective-free. Scriven felt that if evaluators were to go into evaluation work without a focus or goals, more discoveries might be made about a program's impact and consequences. In addition he believed that evaluation should be based on how well established needs were being met. Scriven also emphasized the differences between formative and summative evaluation. Formative evaluation takes place while the program is being developed and summative evaluation is typically employed after the program is completed. Formative evaluation is typically focused on improvement while summative evaluation seeks to describe or make judgments about outcomes or results. Differentiating between formative and summative evaluation is important in the design of evaluation, as it changes the timing, appropriate questions for analysis, and in some cases, even the way the results are used (Guba, 1992). Additionally, Scriven placed emphasis on differentiating between professional and amateur evaluators. Amateur evaluators typically have minimal training in evaluation, and evaluation is usually only one part or a secondary component of their responsibilities. Professional evaluators

have gone through extensive training and schooling in educational evaluation, and typically evaluation is their primary responsibility (Nevo, 1983). Depending on the type and context of an evaluation, either type of evaluator can be helpful. An amateur evaluator may be more connected to what is going on within a program since typically this individual is involved in multiple aspects of that program. However, a professional evaluator may be able to identify issues and ideas that an amateur evaluator may miss. In any situation, according to Scriven, it is important to know what type of evaluator you are working with or looking for.

In the timeline of evaluation methodology development, one of the next experts to enter the field was Egon Guba. Guba became prominent in the educational evaluation field in 1969 and continues to be so today. In 1969, Guba showed the anxiety evaluation can cause in students or in any other client who is being evaluated. Guba showed that anxiety can lead to a lack of responsiveness and therefore, ineffective evaluation. Guba also identified some of the weaknesses in the evaluation field such as the absence of a clear definition of evaluation and the lack of guidelines for how to complete an evaluation. Guba's insights were critical in helping to develop, expand, and improve the field of evaluation (Guba, 1992).

In more recent years, Guba and his colleague Yvonna S. Lincoln have moved on to identify the five types of information that effective evaluations should contain. Two of the critical types of information in an evaluation, according to Guba and Lincoln, are descriptive and responsive information. Descriptive information includes what the setting is for the program, who makes

decisions about the program, and what the program goals are. Responsive information is based on audience and stakeholder concerns. Guba and Lincoln also highlight the importance of collecting information regarding relevant issues, values, and standards for worth and merit. With these five types of information, Guba and Lincoln laid out a basic evaluation model which includes: initiation and organization, identification of issues, gathering of information, and reporting and making recommendations to the stakeholders (Nevo, 1983).

Following Guba's entrance into the world of educational evaluation, several new evaluation models were introduced. One of these models was "Stake's Responsive Model," which focuses on identification of the stakeholders associated with a given program and their audience. The stakeholder's concerns and issues are given priority in the evaluation which includes observation by the evaluator as one component of the evaluation (Guba, 1992). Stake's model focused on case studies, and will be explored in further detail later in this chapter and in Chapter Five since I have employed his model within my evaluation of Nature Exchange.

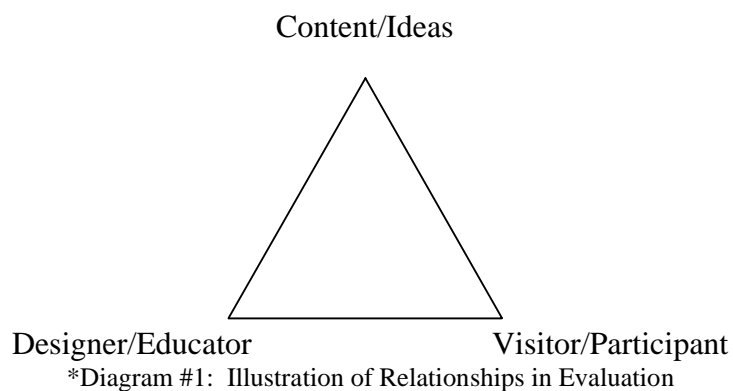
In the field of evaluation, another critical person is Darlene Russ-Eft, who has worked to propose several critical characteristics of effective evaluation, a few of which are as follows (Russ-Eft, 2001):

- Collaborative and Participatory → It is important to involve key stakeholders in the evaluation process. They can contribute valuable insights and ideas to the evaluation, and it will be more useful to the stakeholders if the evaluation addresses their concerns.

- Adaptive→ Evaluators must be open to change in the evaluation process. As the evaluation unfolds, new information may be discovered which may effect the evaluation. The evaluator has to take the new information into account and adapt to provide the most effective evaluation possible.
- Learning Oriented→ The goal of any evaluation, whether in the educational field or any other, is to produce results which can be learned from. These results may be helpful to evaluation participants or to other groups who run similar programs or tests.
- Contextual→ When preparing to do an evaluation and all the way through its completion, it is helpful to keep the context in mind since it may affect the results of the evaluation. The context could be environmental, cultural, money-based, or sociopolitical, just to name a few.
- Meaningful and Useful→ Before starting an evaluation, it is important to make sure that there is a clear and explicit reason for doing the evaluation. The evaluator needs to identify the goals behind the evaluation so that when completed, the evaluation will be as helpful as possible to the stakeholders.

In addition to Russ-Eft's characteristics of effective evaluation, it is also necessary to understand the relationship between those who are being evaluated in an educational or any other setting. Lynn Dierking, a prominent evaluator of informal learning programs in museums, illustrates the relationships in the

triangle shown in Diagram 1 below (Dierking, 1998). In terms of my work with the NE programs, this triangle helped me to visualize the relationships which exist within my study. I consider Kathryn Owen, Education Research Supervisor at the zoo; Mary Jackson, Education Research Specialist at the zoo; Jean MacGregor my thesis reader at The Evergreen State College; and myself to be the primary designers of this study. The participants or visitors are those people who completed my survey or who allowed me to interview them. The content and ideas include everything from my brainstorming session with zoo staff about their goals and questions about the NE program, to the actual survey to responses and suggestions that were received from visitors. By placing these three groups within one triangle, I am reminded of how they are all interconnected and how one group can affect another. For instance, the preliminary interview responses I received from visitors and staff gave me ideas which affected the content of my survey. To me, this diagram represents three critical areas of evaluation coming together so that the evaluation can be completed.



After exploring the history of evaluation, I am once again struck by what an art form educational evaluation is. Researchers and evaluators, the artists,

constantly have to interpret and reinterpret their studies, their art. There is never one set style or technique; it is a set of practices that are always changing and evolving. Evaluators constantly have to work to maintain a balance between the values and perceptions of each of the stakeholders involved in a study, just as artists are constantly struggling to balance the requests of their client with the ideas they have themselves. It seems though, in evaluation methodology the one constant theme is communication between the designer or educator and the stakeholders. With strong and thorough communication comes effective and constantly evolving educational evaluation.

I hypothesize that the development of the field of evaluation has affected our schools and our informal learning programs today. As evaluation methodology developed, so did teachers' and educators' methods of assessment. As teachers' and educators' methods of assessment change, so do their strategies for teaching. I believe that the enhancements made in the field of evaluation methodology have encouraged teachers and educators to use multiple methods in their classes and programs. So in some ways, the improvements in the field of evaluation may have actually led to improvements in the classrooms and informal learning programs. However, this also leads to improved results for programs, teachers, and students, when evaluations are completed.

Subject

In the case of evaluation in informal learning settings, the subject is the program or curriculum being evaluated, just as in art, the subject is the object or person being painted or sculpted. In this case the subject is the Nature Exchange

Program. Now that I have provided a brief history of evaluation methodologies, in this section, I am going to look at evaluation of learning in informal settings. Within the field of evaluation methodology in informal learning settings, there are basic characteristics of effectiveness for any program. I am going to focus on the five characteristics provided by Barbara Hatcher and I will briefly relate them to the Nature Exchange Program specifically (Hatcher, 1987).

1.) Informal learning settings can complement what children are learning in school (Hatcher, 1987). For example, the Nature Exchange Program encourages using observation, written, and research skills which are often part of science lessons in school. This allows for learning to be reinforced both inside and outside of school.

2.) Informal learning programs include adequate participatory activities and materials for their participants (Hatcher, 1987). The NE Program provides participants with activity sheets which invite combinations of drawing and writing observations about animals in the zoo.

3.) Successful informal learning programs must be effectively planned (Hatcher, 1987). For example, there has to be an attention-getter to draw children in and there has to be programming to keep children interested and curious. At Nature Exchange, the attention-getter tends to be some of the large artifacts and the research tent. Once they are drawn into the area, children have many age-appropriate activities and resources ranging from picture books and drawing on activity sheets to encyclopedias and research projects.

4.) Each informal learning program must provide sufficient personnel, who are properly trained, to interact with participants as necessary (Hatcher, 1987). NE works to have enough staff and volunteers available so that each child can have a one-on-one experience with a staff member. One of the key components of NE is the staff-child interaction once a worksheet is completed where the staff member will probe the child even further to increase the depth of their learning. At WPZ, all Nature Exchange volunteers must go through a training session before they interact with visitors.

5.) Finally, the informal learning program must be malleable and flexible depending on its audience (Hatcher, 1987). The NE Program has worksheets that are customized to accommodate the skill levels of elementary age children. When children are given worksheets to complete as part of NE those who are younger may be given sheets which require drawing. Those who are older and are more capable of describing their observations in writing are given sheets which require written work. In addition, when staff and volunteers are interacting with children, they tailor their explanations to the age of the child they are currently interacting with.

All of the above characteristics are benchmarks for effective informal learning setting programming. Successful informal learning programs complement what children learn in school, include hands-on activities, are well planned, provide sufficient staff, and are flexible as is needed. These characteristics also provide a good foundation for an evaluation of the program.

When selecting a subject for evaluation it is also important to look at whether the subject or program such as NE meets criteria which make it possible to evaluate the program. According to Wholey, if a program is going to be evaluated, there are four basic areas which need to be examined before a successful evaluation can occur. The first characteristic is that program goals need to be defined and accessible to the evaluator (Wholey, 2004). I identified four program goals for NE based on my discussions with staff and the review of the literature. These goals provided a framework for my evaluation. If the program does not have clearly defined goals, its success would be nearly impossible to evaluate.

Second, the program goals must also be attainable (Wholey, 2004). For the NE Program, one of its underlying goals is improving children's powers of observation, which is a reasonable expectation. However, a goal of turning all children who participate in NE into geologists would be extreme and unrealistic.

Third, if there are clear and achievable program goals, it is then important to look at whether relevant data can be gathered at a manageable cost. In any evaluation, budget is going to play a significant role; looking at whether the data that can be gathered within the budgetary constraints is essential to being able to conduct a program evaluation. For my evaluation, NE was selected because it was a program that I could evaluate within my time and budgetary constraints.

Fourth, if a subject is going to be evaluated, there needs to be a basic understanding of how information produced by the evaluation will be used and to whom the information will be reported (Wholey, 2004). For NE, the information

will be used both by NE staff and Zoo staff to improve the effectiveness of NE. It may also be used as a way to communicate with stakeholders who have contributed to the NE program.

To conclude, before a subject is selected for evaluation it is necessary to understand basic guidelines for what makes an education program in an informal learning setting effective. In addition, a program must be judged on several criteria (such as clearly outlined goals) before it is possible to identify whether or not a program can be evaluated. Based on these guidelines, NE is an acceptable program to evaluate and I should be able to glean useful data from the evaluation.

Form

In a work of art, the form is the “visual organization of the art work-how the artist has used line, shape, value, color, etc” (Department of Art, WIU). In evaluation, the form is the methodology that has been selected. In pottery, the shapes and textures chosen are what make the sculpture come to life; just as in evaluation the methodology is what brings the evaluation to reality. Form, then, in both art and evaluation is critical.

In my work with the Nature Exchange Program, I chose to use the case study approach as the form of my evaluation. In educational evaluation, the case study approach has gained increasing support over the past three decades. Some leaders in the field such as Robert E. Stake would argue that all evaluations are case studies. A case is a discrete project or program or, according to Stake, it is a “bounded system,” such as the Nature Exchange Program. The case study

approach emphasizes the importance of context and interpretation in an attempt to obtain the most accurate and comprehensive view of the program being evaluated. In this type of evaluation, temporal, spatial, historical, and personal contexts are just a few of the contexts which might be important to understanding the program and the results of the evaluation. The methodology for case studies includes direct observation by the evaluator while trying not to change behaviors or disturb activities. The researcher may also go beyond the role of a passive observer to be an active participant or consultant or even a storyteller in order to investigate the case more thoroughly.

The basic steps for a case study in an educational program evaluation generally include these: an initial contact or visit, preparation for observation (development of questions, key areas to study), data gathering and validation, data analysis, and finally sharing the information with the appropriate audience (Stake, 1995). The case study approach is not perfect, and it has some flaws. For example, when you, as a researcher, start looking at context, how do you decide which contexts to look at and which to ignore? It is nearly impossible to incorporate every context or interpretation of a case, but by selecting certain contexts to focus on, it is easy to create a bias. To cope with this issue, it is helpful to have a consultant or more than one person running the evaluation. For my evaluation of NE, I worked closely with the zoo's research staff on evaluation development and data collection to minimize any of my biases towards NE.

In addition to the case study, another approach to evaluation is the logic model. While I did not use the logic model for my evaluation of NE, I think it is

an important model which offers a different way of looking at evaluation than the case study approach. The logic model looks at two main areas of programs—how and why. The “how” section of a program includes the following: the resources which are put into the program, the activities which are part of it, and the outputs from the program. The “why” segment is composed of the short-term, intermediate, and long-term outcomes of the program. Graphically, when the model is drawn, it typically consists of “how” on one end and “why” on the other end. In between the two are the customers or participants in the program (Wholey, 2004). The logic model has several general stages which are laid out below.

- 1.) Identifying the purpose and goals.
- 2.) Learning what tools and resources are available.
- 3.) Figuring out the target audience and the best method for communication.
- 4.) Examining the outputs and feedback received.
- 5) Identifying whether the outcome of the program was successful, and what the impact of the program was (Marcinkowski, 2004).

Behind every model or approach are specific techniques for educational evaluation, and these techniques can be used individually or in combination. Surveys and questionnaires are often valuable tools for collecting data. For example, in my evaluation of the Nature Exchange Program, a questionnaire was the most effective method of collecting data for both qualitative and quantitative analysis. When creating a survey or questionnaire, it is imperative to consider the

purpose, who will use it, and any benefits or incentives which are gained from participating in the survey. While questionnaires and surveys are worthwhile techniques, they involve direct interaction with the participants. In addition, indirect interactions such as discreet observation can also yield a large amount of helpful information (Wholey, 2004). For example, as part of my evaluation of the NE program, I watched various participants quietly and discreetly. This allowed me to observe their behavior without the participants interpreting my questions or my actions. My discreet observations enabled me to watch participants while marginally affecting their behavior.

Interviews (one-on-one sessions between the researcher and a participant), focus groups (a group of participants answering questions or discussing a program), and role-playing (allowing an individual or group to act out their interpretations of what goes on in a program) may also be helpful techniques in evaluations. These techniques may improve the quality of information because they usually incorporate direct observation of participant behaviors and multiple meetings which help to validate the results (Dierking, 1998). These techniques can all be used to provide new insights or background information in regards to a specific program.

To enhance the form of an evaluation it is essential to combine multiple approaches and techniques. In essence, it is helpful to look at a program from many different angles, but only if you are able to keep the overall purpose of the evaluation in mind. If the purpose is lost or the form becomes too chaotic, then the evaluation will not blossom into a work of art but collapse into a pile of clay.

Content

“Content is the impact or meaning of this work” (Department of Art, WIU). In an art piece, such as a photograph in a show, the content is the message that people glean from the photograph. In evaluation, the content is the end result of the evaluation. It is the information that is shared with the public and other professionals, and just as a photograph, it too is open to interpretation.

Results can be produced in many forms such as narrative reports, presentations, and tables. The results could relate to the productivity, efficiency, quality, customer satisfaction, applicability or cost effectiveness of a program. When sharing findings the audience needs to be kept in mind. For instance, the length, depth, and type of briefing which would be suitable for the audience is important to take into account so that the evaluation can have the greatest amount of impact (Wholey, 2004). To provide one example of this, often evaluations will come out in two forms. The first is an Executive Summary, which is a brief representation of a study including the major conclusions. The Executive Summary is typically geared toward decision-makers and the general public. Then a full-length version of the study is released which is aimed toward professionals in the field who have an interest in the evaluation details. Here, there are two different audiences with different needs and expectations, so findings may be released in different forms to be as beneficial as possible.

When the content of evaluation is defined, it is important to keep associated risks to a minimum. Evaluations may come with the risk of exploitation, revealing identities, or deception just to name a few. Therefore, it is

important to make sure that participation on the part of the subject is voluntary and confidential, and that there is trust between both the participant and the evaluator to minimize these risks. One technique for minimizing risk is to provide an introductory letter or informed letter of consent to the participant. In many cases this is a requirement in evaluation practice (Silverman, 2006). At The Evergreen State College, in Olympia, Washington, in addition to creating informed letters of consent, students and staff are also required to fill out a detailed Human Subjects Review application, which outlines any risks in detail; this application must be approved by established and experienced science and social science research professionals (The Evergreen State College, 2007). To summarize, it is critical that the researcher consider how to relate results of an evaluation to the public and other professionals because this will effect how the evaluation is used and interpreted.

Conclusion

Throughout this chapter, evaluation has been presented and described in terms of its history, subject, form, and content as a work of art. I defined the subject as the program or case being evaluated. I showed that the form of an evaluation is the methodology selected to create the evaluation. The content of an evaluation is the results and how they are presented. Actually completing evaluation of a program requires preparation, exploration, and practice, just as a fine painting does. A focus on the research questions along with a combination of techniques such as surveys, observations, and interviews, leads to a successful evaluation process and a successful work of art.

Finally, when the results of the study are known, it is important to consider the art of communication in how those results are shared. The results may be extremely influential, but if they are not communicated in an effective manner to the appropriate audience, the influence the results hold may be lost as is illustrated in the following quotation. “The two words *information* and *communication* are often used interchangeably, but they signify quite different things. Information is giving out; communication is getting through” (Harris, 2006).

In the early 1900s when evaluation of informal learning settings was really just developing, the Woodland Park Zoo was also just developing. Both the Woodland Park Zoo and the field of evaluation methodology have continued to develop, expand, and improve into what they are today. Only a few years ago, Woodland Park Zoo added the Zoomazium and Nature Exchange to the zoo. Nature Exchange is one of the first permanent informal learning programs the zoo set up. Today, evaluation is a field that is accessible to professionals and students, such as me. Through their struggles and constant assessment of what evaluation meant and how it should be done, early creators of evaluation laid its foundation and identified its critical components which are used in evaluation methodologies now and within my own evaluation of Nature Exchange.

Chapter Four

Evaluation Methodology for Analysis of the Nature Exchange Program

“As educators trying to anticipate or tune in to students’ and museum visitors’ way of understanding, I find nothing more precious to keep than a connection with our own ways of seeing, our own confusions, our own conflicts between trying to succeed and trying to understand, our own surprises, our own feelings when we found new things and have to let go of old ones.” –Eleanor Duckworth (Dierking, 1998)

The primary purpose of this study was to evaluate the effectiveness of the Nature Exchange Program (NE) at the Woodland Park Zoo (WPZ) in terms of its success at reaching stated goals. The secondary purpose was to provide suggestions for improvements and recommendations for further research and evaluation. I considered the NE program to be effective if its goals were accomplished. The goals of Nature Exchange were determined through my interviews with staff members, and they are as follows (Staff Interviews, 5/9/07):

1. To foster an appreciation and understanding of the natural world.
2. To provide a space that encourages people to slow down to observe, think, reflect, and learn.
3. To create an experience for kids that translates curiosity into learning.
4. To teach kids about environmentally ethical collecting.

To determine success at reaching the Nature Exchange goals and to understand the outcomes of NE, I conducted interviews and surveys with both the NE staff and visitors to Nature Exchange.

Information Gathering & Preparation

To begin my evaluation of NE, I met with zoo staff for a brainstorming session on January 23, 2007. The purpose of this meeting, beyond introducing myself to potential stakeholders in my evaluation, was to select a program or question for evaluation that would provide valuable information for zoo staff. The staff generated a wide range of ideas about the educational programs they would like to see evaluated or the questions they had about certain aspects of specific projects. Some of the staffs' suggestions for evaluation within the zoo were:

- 1) What is the impact of naturalism in zoos—specifically allowing gorillas in trees—verses traditional exhibits (cages with bars, etc)?
- 2) What is the impact of having a Kenyan ambassador at the zoo? Is there an impact on the village in Africa when the Kenyan ambassador returns home?
- 3) Why is the West Gate of the zoo getting used more than it used to be? Is the Zoomazium having an effect on the increased use of the West Gate (Meeting Notes, Appendix A, 1/23/07)?

As the conversation progressed, Nature Exchange was selected for this evaluation because it involves children (the zoo's largest visitor demographic, 78% of all kids visiting the zoo are 8 years old or younger); it is a relatively new program (it opened in May of 2006); many different departments and personnel were and are involved in it; and, in general, it is one area which the zoo staff has not had a chance to fully evaluate (Meeting Notes, 1/23/07). As a graduate

student seeking a manageable evaluation project, I also had time and budget constraints to consider.

Once the relevant zoo staff and I decided to focus my evaluation on NE, I began my background research and information gathering. This included a literature review of free-choice learning in informal settings, current literature about learning in zoos in particular, and previous WPZ studies on the Zoomazium (the building where NE is located) and Nature Exchange itself. In addition to background reading, I visited the Zoomazium five times to make discreet observations of the activities at NE. During these periods, I observed children from approximately one-and-a-half years old to nine years old participating in NE and interacting with staff. Observations included watching and listening to interactions between staff, parents, and children. These observations provided background information as well as potential interview and survey questions. Additionally, I sat in on a training session for the NE program volunteers in order to acquire a more in-depth understanding of the NE goals and how they are portrayed by staff to volunteers and visitors. Refer to Appendix B for a full description of the NE training session.

During and after completion of the preparatory work, I formed specific questions to help guide the evaluation. The first and most basic question was this: is Nature Exchange successful in meeting its stated goals? Under this question were several sub-questions, including these: What is the ideal parent/child interaction while participating in NE? What improvements would benefit NE?

What visions for the future of NE exist? These questions provided the guidelines for both interviews of staff and visitors and questionnaires.

Evaluation Methodology

After developing my primary questions I decided on using the field-observation case study approach for my evaluation of Nature Exchange. While working within the case study framework, I used four different data gathering techniques: observations, surveys, interviews, and literature reviews. The approach I used was laid out by Robert E. Stake, a leading theorist and practitioner of case study evaluation. Stake wrote, "...all evaluation studies are case studies. The program, person, or agency being evaluated is the case. The study is, at least in part, a search for merit and shortcoming of that case." Stake also defined a case as, "a bounded system...a specific, complex, functioning thing," and to write a case is to tell the story of the functioning program. Reading through Stake's book and thinking about the above quotes in terms of NE led me to select field-observation case study as my method for performing my evaluation. More specifically, this approach was appealing to me for four reasons.

1) During this period of time, I was participating in one of my core class requirements at The Evergreen State College (TESC). The class was entirely about case studies. This class allowed me to take overwhelming and complex issues and break them down into small understandable pieces. I saw the case study methodology as a tool for solving the puzzle that many projects present. It helped me to see how each piece of the puzzle fits together in a logical fashion.

After studying case studies in class it became clear to me that Nature Exchange could easily be my case study.

2) Case studies incorporate the story or context behind the program or project being evaluated. They look at what influences a program and how each person affects the program. Stake believes in incorporating contexts such as those that are temporal, spatial, social, and personal (Stake, 1995). After brainstorming sessions, attending trainings, and talking to staff, I realized that I had many different stories or contexts to consider, and the case study methodology allowed me the freedom to look at each of these contexts and describe them.

3) As I was reading through Stake's book *The Art of Case Study Research*, I came across the steps that Stake recommends for performing a field-research case study. The basic steps are as follows: 1) anticipation/preparation for the first visit; 2) first visit; 3) preparation for observation; 4) conceptualization of the study; 5) data gathering; 6) data analysis; 7) occasion to provide the audience opportunity for understanding (Stake, 1995). I could see myself thinking in terms of these steps and constructing my evaluation process in this order.

4) Finally, I was interested in the multiple roles that Stake sets up for an evaluator in a field case study. This approach allowed me, the researcher, to play several different roles, as an observer, an interviewer, and a participant (in the actual Nature Exchange Program). These roles were all critical to my study design and my ability to gather both quantitative and qualitative data.

Using the Nature Exchange Program as my case, I then went on to follow the steps which Stake suggests for undertaking this approach. The first two steps were anticipation and the first visit. This was essentially the background work and preparation for evaluation. For me, this was my literature review, my initial brainstorming with WPZ staff, and my initial observations of the Nature Exchange Program. Next, Stake suggests further preparation and development of conceptualization. In my case study, this included several phone conversations with Kathryn Owen (the Education Research Supervisor at WPZ) to identify research questions and develop a survey which fit within my constraints and which would be useful to the zoo. It also included further observations and discussions with Nature Exchange staff. At this point, I moved on to data collection; my specific techniques are outlined in the section below (Stake, 1995).

After I completed data collection, I progressed to Stake's next step which is analysis of data. This was done through both quantitative and qualitative techniques which are described below. Finally, following Stake's model, I provided an audience opportunity for understanding through an oral presentation, the thesis itself, and continued discussion where necessary (Stake, 1995).

Data Gathering & Analysis

I used a mixed method approach for data gathering, with three methods. However, before I began to collect any data I submitted my survey design and plans to the Human Subjects Review board at The Evergreen State College; this process also satisfied any concerns the Woodland Park Zoo had about my work with Nature Exchange participants.

The first data gathering strategy was simple observations of interactions and children completing worksheets and scavenger hunts while participating in the NE program. These observations provided a realistic view of how the program is currently running.

The second method was interviewing. I developed the interview questions in conjunction with Kathryn Owen, the Education Research Supervisor at the Woodland Park Zoo. When performing an evaluation, key stakeholders must be included in the evaluation process in order to have a thorough and helpful evaluation (Russ-Eft, 2001). Six staff interviews were performed. I interviewed the two Nature Exchange Coordinators, one substitute for Nature Exchange, one Zoomazium Associate, and two Zoo Corps Interns. In addition to staff, I interviewed five parents whose children are regular participants in the NE program. The five parents had children ranging from three to twelve years of age. The goal of these interviews was to glean what visitors were actually learning and experiencing as they participated in the NE program. Below is a list of sample interview questions which were used with staff and/or visitors. My complete list of interview questions is included in Appendices C and D.

- How did you get involved with the NE program? How did you learn about it?
- What do you believe the primary goals of the NE program are?
- What improvements do you think should be made to the program?
- What is your vision—if money and other constraints were not an issue—for NE in the next five years?

- What do you feel is the most important part of NE?
- Can you describe a typical staff/visitor interaction with the program?

I customized these interviews for staff members and visitors. Interview data was kept confidential to minimize risk and increase the validity of the results.

The third method of data collection was the use of the questionnaire (see Appendix E). The questionnaire was developed in direct consultation with Jean MacGregor (Faculty Thesis Advisor), Kathryn Owen (Education Research Supervisor at WPZ), and Mary Jackson (Education Research Specialist at WPZ). The questionnaire was revised several times based on feedback from these individuals, which helped to provide more specificity and clarity of questions. The questionnaire included the following questions (response options are in parentheses):

- Are you a zoo member? (Yes or No)
- On average, how often does your child participate in Nature Exchange?
(once a week, once or twice/month, once or twice/3 months, less than once/6 months, other)
- What is the age & gender of the child (ren) who is participating in Nature Exchange?
- What type of school does your child (ren) attend? (public, private, homeschooled, too young for school, other)
- After participating in the Nature Exchange Program do you feel your child spends more time playing outdoors? (Yes or No)

- Do you feel the Nature Exchange Program has had an impact on your son or daughter in any way? (Yes or No) If yes, please describe the activities.
- In addition to your son/daughter, have other family members been involved in any activities related to the Nature Exchange Program? (Yes or No) If yes, please describe the activities.
- On a scale of 1-5 (1 being low and 5 being high) how would you rate availability of the staff to interact with you or your child, helpful & instructive staff, the NE area (research stations/tent/collections), knowledge gained from participation in the NE program, activities available as part of the NE program.
- In which of the following Nature Exchange activities does your child participate? (trading, scavenger hunts, field research projects, drawing/writing, research tent activities)
- If your child (ren) does bring in objects to trade, where do the objects usually come from? (home, backyard, park, other)
- On a typical visit, how much time does your child spend participating in the Nature Exchange Program?
- What do you see as the main purpose of the Nature Exchange Program?
- What if anything would you like to see done differently or included in the Nature Exchange Program?
- Is there anything else you would like to tell us about your experiences with the Nature Exchange Program?

The questionnaire was handed out to the parents of children visiting the Zoomazium, and twelve questionnaires were returned. Zoo staff also went through the Nature Exchange Database and sent out e-mail based survey requests to every family which had been to Nature Exchange three times or more in the past year. The first e-mail request was issued on August 3, 2007 with reminder requests issued on August 20, 2007 and September 22, 2007. On September 30, 2007, the survey period was officially closed. Between the hard copies and on-line copies, 121 surveys were filled out and returned.

The data collected from the three methods (observation, interviews, and the questionnaire) was primarily qualitative, although a section of the questionnaire included scaled responses and was quantitative. Quantitative data was analyzed primarily through simple descriptive statistics and graphs. The analysis of the qualitative data included the identification of similarities, differences, and patterns among results. In collaboration with Kathryn Owen and Mary Jackson, responses to open-ended questions were coded by theme for analysis. The initial coding was first done independently, and then we sat down jointly to reconcile differences in the coding of the responses.

To give one example of coding, question seven from the questionnaire asked the following: a) in addition to your participating child (ren), have other family members been involved in any activities related to Nature Exchange? (yes or no); b) If yes, please describe the activities. Part A, was a close-ended question with only a yes or a no answer. Part B however required coding because it was an open-ended question. The codes were based on the respondents answers and were

as follows: 1—other family/friends have now done NE activities (kids); 2—Parents/Family help with research; 3—Family goes on field trips/explores; 4—Fosters discussion at home and in nature; 5—I’ve told others about the program; 6—Parents/Family help finds objects; 7—Other. By coding the responses, it was possible to see which answer appeared the most frequently. It also allowed for graphing and calculating the percentage of a certain response. A full list of the codes used for each open-ended question can be found in Appendix F. Specific quantitative and qualitative results from my study follow in the next chapter.

I opened this chapter with a quote by Eleanor Duckworth about building connections and working through challenges. Like Duckworth, I think that creating an evaluation or being an educator in a program like Nature Exchange is full of its own challenges and confusions, but the effort we put in to evaluation and education is worth the end result.

Chapter Five

Findings: An Incorporation of Observations, Interviews & Questionnaire Data

“Nature Exchange is a fun way for you to learn about nature and teach us what you have learned. You can earn points by sharing your knowledge with us and trading in items you have collected from nature. Then you can trade those points in for a cool item from our collection to add to your collection.”

(Nature Exchange FAQ’s, 1/27/07)

In my evaluation of the Nature Exchange Program at Woodland Park Zoo I collected data in three ways: direct observation of the place and program, interviews with staff and parents, and a questionnaire given to parents in person or on-line. The purpose of my observations of participants in NE was to form a better idea of how the NE place and program worked. Interviews with parents of participants allowed me to shape the questionnaire, and interviews with staff provided me with insight into their perspectives of NE and where the program might go in the future. The questionnaire provided the most information due to the number of responses and the combination of both qualitative and quantitative data. All three methodologies provided valuable information and were critical in enhancing the evaluation of Nature Exchange. In this chapter, I will lay out the data from all three methodologies in the form of comments, quotes, statistics, tables, and graphs. In Chapter Six, I will provide an analysis of the data outlining its importance and what the data means to the Nature Exchange staff and to my evaluation.

Observations

I performed my observations at NE in an informal and discreet manner. I took notes from across the space that Nature Exchange occupies. Individuals were kept anonymous; I made no attempt to learn their identities. The staff was aware that I was doing observations and I explained my purpose to parents and children if they asked. For a more formal list of observations, please see Appendix G. Below I have broken my observations into three groups: children, parents, and staff.

Children

When children first enter the Zoomazium they see multiple play areas and an information desk (which also serves as the NE desk) to their left. On this desk is a wide array of activity sheets in multiple colors ranging from scavenger hunts to summary sheets about an item that a child might bring in to sheets with questions which children can answer just by thinking, drawing and/or writing. Children are invited to pick a sheet that looks interesting to them, although staff will encourage older children to pick worksheets that are a bit more challenging.

Children can then pick a place to work. They could sit in a research tent at a table surrounded by other children's NE projects or they could sit at a desk looking out a window at the outdoor surroundings. In NE, there are multiple books which range from books with only pictures and animal names to full-text encyclopedias. There is also a computer available for children to do research. Children can choose to work by themselves or with someone else. They also have

the freedom to leave the building and do the worksheet or scavenger hunt in the zoo, at home, or even in a local park.

I observed a child as young as 1 ½ years old using the NE area. This child was sitting with both parents looking at pictures of animals and was making (or at least mimicking his parents making) the sound the animal made. He sat and did this with his parents for approximately fifteen minutes, fully engaged by the encyclopedias provided in the Nature Exchange research area. This child seemed to be really enjoying this interaction. He giggled, clapped his hands, and he appeared to be very focused on what was going on. While not engaged in a traditional NE activity, this child was obviously making connections between animal pictures and sounds with the assistance of his parents.

Two other children, around 8 years of age, participated in a research tent activity that involved sorting rocks into any sort of pattern the child wanted. The children were then asked by the NE staff member who was overseeing the activity to fill out a form based on the pattern they created. One child chose to sort the rocks by their physical attributes such as solid vs. speckled or smooth vs. rough. Another child chose to make a design, but kept the rocks sorted by size within the design. Each child was very focused on the work he or she was doing, although sometimes they would confer with each other about an idea. The children were also encouraged to make verbal observation as they sorted such as comparing two different rocks or realizing that one is a crystal, not a rock. When the children were asked about the patterns they created, they seemed to take pride in their decisions and the pattern they created. They appeared to feel very self-

empowered by the activity, and they were very happy with their creations and accomplishments.

I also witnessed a more traditional Nature Exchange visit. In this case, a child around 5 years old came in with his mother. He had a sack of items he'd collected and saved to bring in to Nature Exchange. He chose an activity sheet that had three parts which included describing each item, identifying why each item is important, and coming up with three things he would like to know about each item. He chose to use a combination of writing and drawing to complete the sheet. He had his mom help out with the writing, but it was clear that in this interaction, the child was in charge. While he was working on the sheet, I could see on his face how important filling out the sheet was to him. He wanted it to be complete and thorough for his own satisfaction and so that he could get as many points as possible. Throughout this process, his mom was very supportive and offered him lots of praise with simple compliments such as "good idea" or "nice work."

After filling out the sheet he turned it in to NE staff who asked him questions about what he'd written down to help him think about his items in a new way. The staff member offered the child additional praise and reinforcement while he was working through the worksheet. The NE staff came across as warm, friendly, interactive, and accommodating. Finally, the child chose to give his rocks to NE and was able to pick out a new item from the NE collection.

Parents

The role of parents is not prescribed in Nature Exchange. Just as children are able to guide their own learning, parents are able to decide how involved they want to be in their child's NE experience. During my observations, I witnessed parents taking on one of the three basic roles while their child participated in NE.

The first was that of a guide. These parents chose to work side-by-side with their child. They didn't do the work for their child, but they were available to answer questions, encourage, and guide their child when necessary. These parents were focused on what their child was doing, and they were constantly providing support and encouragement to their child. In one case, I saw a parent agree to take turns writing with their child. The child was still dictating what to write, but the parent was helping the child to delve further into the activity. In these interactions, the children came across as very curious and absorbed in the activity. Each child seemed to be on a mission to complete their activity successfully.

The second role that parents took on was that of an authoritarian. They told their child what to do at every step of the way. They selected a worksheet for the child, instructed them on what order to do it in, and sometimes they even instructed their child on what to write down on the worksheet. When the child went to meet with the staff, sometimes the parents tried to step in to answer the questions for the child. In these cases, the children seemed more interested in completing the activity than really thinking about the activity. The parents' focus

seemed to be on getting the task completed so that they could move on to the next activity of the day.

The third position parents occupied was one of a bystander. Some parents talked on their cell phones, some read the newspaper, and others kept an eye on their other children from a distance. These parents were very removed from their child's experience. In essence, the child was participating in Nature Exchange completely independently of the parent. The children of these parents were focused the activity they were completing, and they seemed to enjoy the activity. Yet, the children did not seem very animated or excited when they finished their project or interacted with the staff. I did not quantify which role (guide, authoritarian, and bystander) was most prevalent, but I would say that the majority of parents acted as guides and the NE staff encourages that behavior.

Staff

Staff members who include full-time paid WPZ employees and part-time trained volunteers all acted more in the role of informal coaches or mentors than as formal instructors. They promoted inquiry-based learning by assisting and encouraging children where necessary. However, at other times, they also kept quiet and allowed children to move at their own pace and in their own ways.

To give one example, a staff member asked a child to describe a rock. After the child described its shape and color, it was hard for the child to add anything else to their observation. So the staff member asked the child how the rock felt and what the rock could be used for. This opened the child up to another

sense (touch) and to thinking about how things are connected. Throughout the interaction, the staff member was very focused on the child and it was clear that the child enjoyed the one-on-one attention from the staff member. As the exchange continued and the staff member provided the child with more compliments, the child grew more excited about the activity and discussion.

This conversational approach is widely used by staff and volunteers at Nature Exchange. In the NE training that I attended, this technique is emphasized because it allows the child to get more out of each experience at Nature Exchange. There was also an emphasis on encouraging the children who participate in NE to “think outside the box” and draw new connections. For example, in this training, we were asked to fill out one of the NE activity sheets using a rock as our object. We all completed our sheets describing the rock’s size, shape, and texture. Then we were asked why this rock was important. One reason a rock is important is because it provides a warm place for a snake to sun itself. Here, we were making a connection between a physical environment and a reptile that lives within it. We were asked to go beyond the basics and to look a little deeper. In other words we were “thinking outside the box.”

Staff also assisted children in picking out items from the Nature Exchange collection based on their point value. Sometimes, the staff simply had to open a drawer for a child. Other times, the staff had to ask questions about the object such as its size, color, and purpose, to help the child think more about what he or she really wanted. The NE staff was always quick to offer praise and encouragement to each child as they progressed through a worksheet or selected

their special item from the collection. It was also clear, that working with some of the children who came through NE required great patience and sensitivity on the part of the staff. Some of the children were shy and others were nearly incapable of making a decision about what item to take home. The staff worked hard at encouraging and drawing these children out through both conversation and praise.

Throughout the entire process, the most notable difference that I observed between staff and volunteers was the superior level of knowledge the paid employees possessed compared to the volunteers. Paid employees constantly were able to relate objects to natural history facts or concepts, while volunteers usually relayed very basic knowledge. As a whole, though, the entire group of staff came across as a group of knowledgeable and enthusiastic educators. In essence, the staff at Nature Exchange act as a compass—providing directions and suggestions where necessary, but they also allow children to find their own way through the program and discovery.

Summary of Observations

Through my observations I became more aware of the age range that NE can accommodate and the wide range of activities provided. From a child who can not even read to pre-teens who are doing take-home research projects, it seems that NE caters or at least attempts to cater to children who are anywhere from 1.5 to 12 years. It also became clear that staff take on the role of a coach or mentor whenever possible. Parents had the most variable role ranging from an engaged guide, to a directive authoritarian, to a passive bystander.

I also discovered that NE was a place where children could be creative, self-directed, and where they were encouraged to think creatively and expansively. Children were encouraged to make connections that went beyond the obvious physical characteristics of an object. Children who were creative and came up with unique ideas were also rewarded. In NE, most of the time, questions are not asked nor are activities performed with black and white answers. For example, going back to rock sorting, children were not required to sort the rocks by size in neat rows; they could sort the rocks in any way that they wanted as long as they could explain their reasoning.

During my observations, I started to form potential questions for the survey such as whether parents saw an impact on their child after participation in NE, whether they thought NE was meeting their child's needs, and what staff and parents saw as the goal for NE. These observations were helpful in formulating interview questions, guiding brainstorming discussions, and creating the actual survey. The observations also provided helpful background information and insight into the NE program.

Staff Interviews

I interviewed five staff members, as recommended by Kathryn Owen, Education Research Supervisor at WPZ. The interviews took place in person, in the Zoomazium offices on May 9 and May 12, 2007. I had eleven questions for each staff member, although due to time constraints and question overlap, I was unable to ask each staff member every single question. The full list of questions and staff interview responses are listed in Appendices C and H.

The first question I asked zoo staff members was, “How did you get involved in the Nature Exchange Program?” I found that of the staff I interviewed, most of them had previous Woodland Park Zoo jobs as zookeepers, cashiers, or volunteers, and eventually they transferred in to the Zoomazium and the Nature Exchange Program. Overall, it seemed that one motivating factor for working with NE was the opportunity it provided to combine education and environmental messages. One staff member said, “I started out as an animal keeper, and then I got interested in early childhood education. NE was a good fit with both education and conservation.”

The second question was, “Do you feel that any of your childhood experiences influenced your decision to work with the NE program?” Almost every staff member mentioned spending time outdoors or having a pet as a childhood experience which influenced their career choice. Staff mentioned field trips, catching frogs, going camping with parents, and growing up on a farm as childhood experiences which influenced their career decision. One staff member said the following when asked how childhood influenced the decision to get involved with the NE program,

“In 6th grade I went on a field trip to an island and I can remember every aspect. This spawned an interest in biology, conservation, and education.”

The next question I asked was, “How do you define ‘success’ of the Nature Exchange Program?” Staff members said that success was defined by “[creating] an experience for kids that translates from outside to learning,” and “[fostering] an appreciation and understanding of the natural world.” Other

answers focused on themes of making participants more aware of nature, wanting children to be interested in their environment, and getting kids outside to explore.

During my interviews, although I had not written the questions in this order, I asked staff the next question as a follow-up to the one before, “What do you think the goal of the NE program is?” Not surprisingly, the goals that staff members described were very similar to the definitions of success that they provided. One staff member said the following when asked what the goal of Nature Exchange was:

“to teach the process of scientific inquiry...to inspire learning and reflecting...enhance the mission of the zoo...increase depth and connection to the natural world...to have a space that forces people to slow down—think, reflect, observe, learn, take responsibility, and change behavior.”

Another staff member said this:

“to provide opportunities for learning, to turn curiosity into learning, to heighten kids’ interest in nature, to give kids ideas about what to do outside, and to teach about ethical collecting.”

From the interviews, I gleaned four main goals for Nature Exchange which are as follows:

1. To foster an appreciation and understanding of the natural world.
2. To create a space that forces people to slow down to observe, think, reflect, and learn.
3. To create an experience for kids that translates from curiosity into learning.
4. To teach kids about environmentally ethical collecting.

These goals also fall in line with Nature Exchange Press Packets and website information.

The fifth question was, “What visions do you have for the future of the NE program?” Staff mentioned hopes of more collaboration—with other parks, with other parts of the zoo, and with other activities in the Zoomazium building as one of the visions they had for the future. They were excited about creating satellite stations, developing outreach programs with schools, expanding the website, and helping people to increase their level of connection with their surroundings. The staff also said they hope to expand the NE collection and have their first million point celebration for a repeat trader. They felt that collaboration and growth would enhance Nature Exchange and the impact it was having on participants and their families.

The staff was then asked, “What influences do you see NE having on visitors at this point? What about the influences on you as one of its staff?” Unfortunately, this question was skipped with most of the staff due to time constraints, but one staff member who did answer said, “The public loves it and sees it as a community learning resource.” Another staff member said that it was rewarding for both employees and the kids who participate in the program.

In the interview, the next question, which every staff member had an answer for was, “What improvements do you think should be made to the program?” Multiple staff members responded to these questions by saying one improvement that was needed was more staff. Due to increased visitor volume in the summer, on weekends, and during holiday periods, staff said that it was

difficult to interact with children because there were so many children around who needed help and supervision. One of the critical components of NE is the availability of staff to act as a guide for children and with such a high child-to-staff ratio during high volume visitor periods; it is hard for staff members to interact with each child. The staff is concerned about the children getting a high quality experience at all times regardless of the number of visitors.

Staff members also hope for more activities for children. They see a lack of activities for young children (preschoolers) and older children (11-13 yrs). Staff suggested creating stations around zoo grounds where children could do mini-activities throughout the day and then come to NE as the final stop. Staff found that the activity sheets currently available are too easy for older children and too challenging for younger children. They would like to see worksheets created for both of these age groups. The staff is also interested in having workshops for older children that go beyond what the worksheets would cover.

In addition, staff mentioned that Nature Exchange—both the physical space and the concept—need to be more clearly defined for visitors. They suggested enhancing the website, improving the signs, or having a staff member to immediately explain the program to every child who comes in to Nature Exchange. Finally staff suggested streamlining the point system so that it was easier for staff, parents, and children to understand. This would also increase point consistency, which is especially important when siblings come to participate in NE.

I decided to ask staff the next question as a follow-up to my observations. I was curious to see how my observations would line up with the staff members answers to the following question, “Can you describe a typical staff/visitor interaction with the program?” One member said that it was important to let kids tell their stories, let them build connections, and provide a

“...one-on-one interaction that leaves room for creativity but is consistent...The staff should act as a guide and spend five-ten minutes with each child.”

Another staff member described a typical interaction this way,

“Kids bring in an object and we talk to them about it. We ask questions about where it was found and what makes it special. We try to teach them something, and we try to get them to look outside.”

The ninth question was, “What do you feel is the most important part of NE?” Due to time constraints and question overlap, only one staff member answered this question. The following was the staff member’s response:

“...getting kids outside, raising their interest, and increasing their feelings of security in the outdoors.”

The second-to-last question I asked was, “What do you think the role of parents in a Nature Exchange visit should be?” I asked this question after seeing how many different roles parents took on during my observations and realizing that the parents were given no guidelines in NE that covered how they should or shouldn’t be participating. Most staff members said they hoped that parents would act as role models and guides for their children. They feel that parents should assist children but allow them to do the learning and discovery. Staff felt that when parents were in the role of an advisor for the child, the participants got the most out of the program. Although this did not end up being a primary focus

of my evaluation, since it could be an evaluation within itself, I found it important in shaping interview questions and understanding the Nature Exchange Program as a whole.

The final question was, “Do you have any other comments/questions that would be helpful in my analysis of the NE program?” The staff was excited about the potential of NE, and one staff member also felt that it is important to recognize that the program has value for younger kids in preschool. One staff member also mentioned the importance of people understanding zoos and their mission of conservation overall within and outside of Nature Exchange. The questions and information gleaned from these interviews provided me with a framework around which to shape my questionnaire.

Participant Interviews

On May 30 and June 11, 2007, I interviewed five parents whose children were participants in the Nature Exchange Program. All of the interviews were telephone interviews. The parents were selected by Kathryn Owen and Nature Exchange staff. The contact information existed in the Nature Exchange database, and parents were first contacted by Woodland Park Zoo staff to ask for their permission to be interviewed. All of the interviewees have children who visited Nature Exchange three times or more, and they are referred to as “repeat traders.” Parents were asked ten or less questions during each interview (depending on time constraints). The full list of questions and parent responses can be found in Appendices D and I.

The four most basic interview questions were, “Are you a zoo member; How often do you visit NE; How long is a typical visit; What age are the children who participate in NE?” All five interviewees were zoo members, and most said that they visit NE two to three times per month, with visits ranging from twenty minutes to three hours. On average, the visits lasted thirty minutes to an hour. The ages of their children ranged from three to 12 years. I asked these questions as a source of background information and because the zoo has made the assumption that most Nature Exchange repeat traders are zoo members.

After gathering this background information, I asked interviewees the following, “On a scale of 1 to 5 (1 is low and 5 is high) how would you rate the following?” There were five main areas of Nature Exchange that interviewees were asked to rate: availability of staff to interact with your child, the Nature Exchange area, the Nature Exchange activities, opportunities for your child to learn new things, and staff expertise and instruction. Asking interviewees about these areas was a result of staff interviews and discussion with Kathryn Owen. Unfortunately, only three respondents answered this question in detail due to time constraints. The results were as follows.

Table One: Parent Ratings of Five Aspects of Nature Exchange

Area Rated	Score Given (1-5, 1 is low, 5 is high)			Average
Availability of staff to interact with your child	4	5	3	4
Nature Exchange area	5	5	4	4.6
Nature Exchange activities	4	4	3	3.6
Opportunities for your child to learn new things	4	5	4	4.3
Staff expertise & instruction	4	5	4.5	4.5

The lowest mark given was a three in the areas of staff availability and Nature Exchange activities. Almost every parent interviewed suggested additional activities for Nature Exchange both for younger (preschool) and older (preteen children) as well as a more diverse range of activities. The two highest marks were given to the Nature Exchange Area and Staff Expertise and Instruction.

Next, interviewees were asked, “In addition to your participating child (ren), have other family members been involved in any activities related to Nature Exchange? If yes, please describe the activities.” All of the parents said that they noticed a change in their child after participation in Nature Exchange including more awareness of things outside, greater interest in different aspects of science, and more complex thoughts about things that they are seeing. Several families of participants have also started collecting items together since their child has started participating in Nature Exchange.

Interviewees were then asked, “In which of the following NE activities does your child participate (trading, scavenger hunts, field research projects, drawing/writing, and research tent)?” All five parents responded to this question and all five said that their children participated in trading. Four out of five respondents’ children participated in field research projects and research tent activities. Only one respondent said that their child participated in scavenger hunts, and no parents said that their child participated in drawing or writing.

Just as staff was asked about the goal (s) of NE, so were parents. Parents were asked, “What would you say the goal of NE is?” Below is a selection of the goals these parents identified:

“...get kids interested in science (biology and chemistry) and nature as a whole...how things work...how things grow...with hope that it will manifest itself in school.”

“...to get kids interested in the outdoors and the environment, teaching without knowing they are being taught.”

“to introduce kids and encourage them to look around and think about what they see.”

Interestingly, many of the themes that staff outlined (building connections, appreciating the natural world, and increasing learning) are themes that parents identified themselves when asked this question. However, I also chose to include this question on the formal questionnaire to see if these themes would be picked up by parents in my larger pool of survey respondents.

Finally, parents were asked, “What, if anything, would you like to see done differently in NE?” Parents suggested more challenging activities or classes for older children and providing more books for younger children. They also suggested additional staff during high-volume periods and more consistency on points. One parent also suggested having more programs where animals were brought in to interact with the children.

The information gathered from both the parent and staff interviews and observations helped to customize the formal questionnaire. It also provided preliminary evidence that on a basic level, what staff and parents of participants

see as NE's goals are similar. In addition, the information from the parent interviews showed that the goals are being met at least partially based on the impact that Nature Exchange is having on the participants and their families.

The Nature Exchange Program Questionnaire

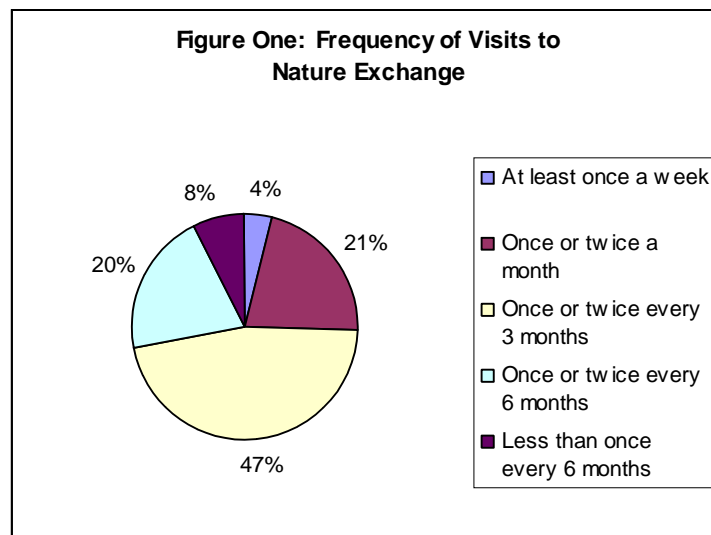
The NE Questionnaire was developed after the observations and interviews were completed in consultation Kathryn Owen (Education Research Supervisor, WPZ) and Jean MacGregor (Thesis Advisor & Faculty, The Evergreen State College). The questionnaire was developed with the hope of providing useful information for the zoo, and more specifically the Nature Exchange staff. Several drafts were created and modified before its final completion and distribution. It was handed out to parents visiting the Nature Exchange Program area and on-line. It was available to NE participants during August, 2007, and it was available on-line from August 3-September 30, 2007. Zoo members were able to access the survey on-line via e-mail invitation and reminders, which Kathryn Owen sent out at three intervals during August and September 2007. In all, 121 questionnaires were filled out and returned, with a majority of them coming from on-line participants.

The questionnaire was a combination of open- and close-ended questions. Open-ended questions allowed for the participant to provide any response they chose. All open-ended question responses were coded based on general themes; each theme was assigned a number so that the responses could be analyzed quantitatively.

Close-ended questions had yes/no answers or specific choices for answers that participants had to select. The full questionnaire is available in Appendix E.

1) *Are you a zoo member?* This was a close-ended question so respondents could only check yes or no. Of those who responded, an overwhelming 92% or 108 out of 118 respondents were zoo members.

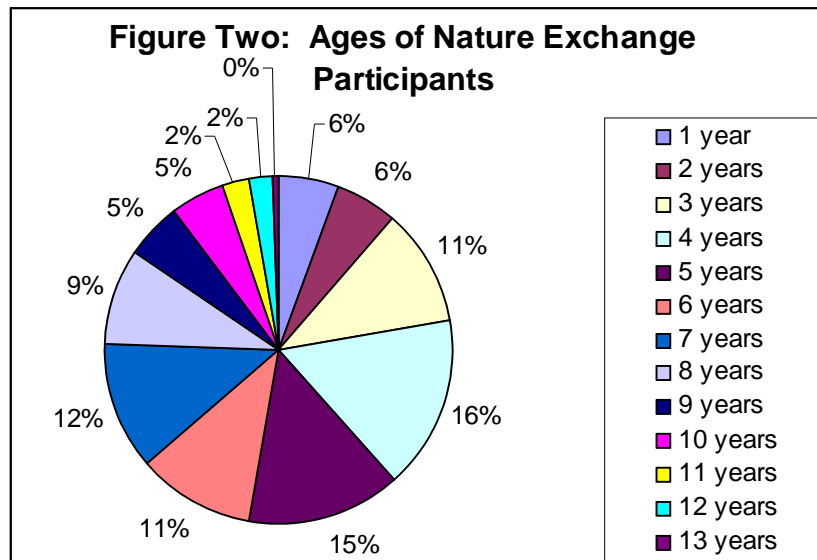
2) *On average, how often does your child(ren) participate in the Nature Exchange Program at the Woodland Park Zoo?* This was also a close-ended question with five response options ranging from at least once a week to less than once every 6 months.



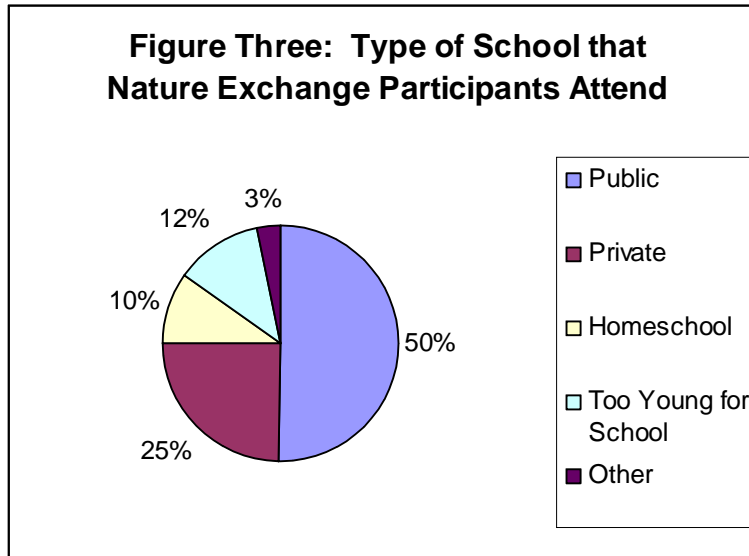
Based on the results, the average participant (46% of respondents) comes in once or twice every three months. Beyond this answer the two most common answers (20-21% of respondents each) were once or twice a month or once or twice every six months.

3) *What is the age and gender of your child(ren) who participates in Nature Exchange?* Between, males and females, there were nine more males than females out of 201 participants. This means that males comprise just over 50% of

NE participants. In terms of the age of participants, there was a range of 1-13 years. The largest percentage (approximately 31%) of children was between the ages of four and five years old. Seven, six, and three year olds comprised approximately 10% of visitors. Children under three and older than seven had the smallest number of participants. Based on this survey, children between the ages of three and seven years are the majority of Nature Exchange participants.



4) *What type of school does your child (ren) attend?* This was the final demographic question. The overwhelming response given by fifty percent of the respondents was public school. Private school, home-school, too young for school, and other, were the additional categories that participants could choose from.



Children being too young for school had the third highest response rate which makes sense based on the ages of the children listed above.

In October 2007, there were 45,581 students enrolled in the Seattle Public School System (OSPI, Public 2007). For the 2006-2007 school year (the most recent year with posted data) there were 16,104 children enrolled in private school within the Seattle Public School System area (OSPI, Private, 2006-2007). It is difficult to track the number of homeschoolers because some are homeschooled through institutions supported by the Seattle Public School System and other alternative education sites. However, when you compare the percentages of public and private school students in the Seattle Public School System they line up closely with Nature Exchange participant breakdown.

The first four questions were asked to provide background information on participants and to help NE staff identify what age their programs should be geared toward and when they should take place.

5) *After joining Nature Exchange, do you feel your child(ren) spends more time playing outdoors?* Seventy percent of parents (80 out of 114 responses) said that their child did not spend more time outdoors since starting to participate in Nature Exchange. However, it should also be noted that 30 percent of parents said their child did spend more time outdoors after they started participating in Nature Exchange.

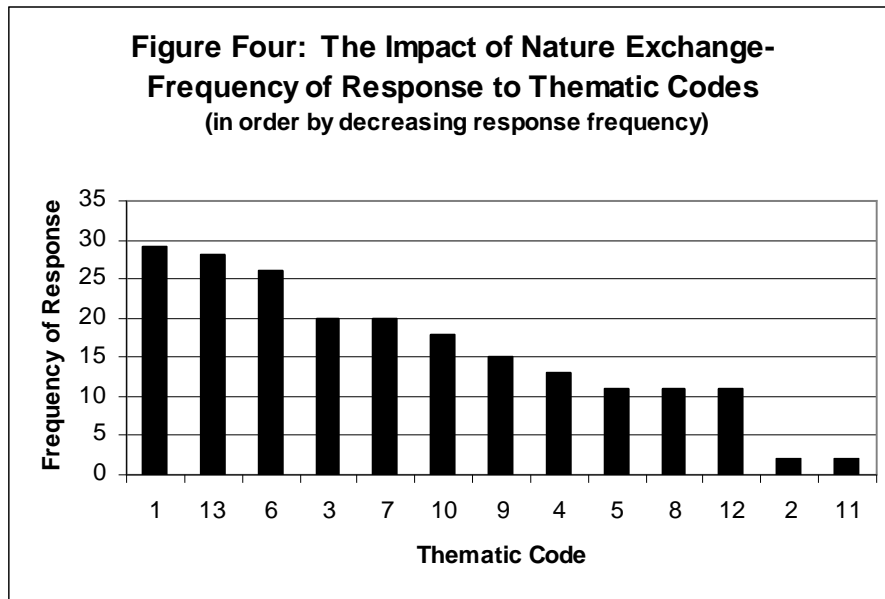
6a) *Do you feel the Nature Exchange Program has impacted your child(ren) in any way?* In response to this open-ended question, approximately, eighty-nine percent (89%) of parents said that Nature Exchange had impacted their child. Out of 114 total responses, only twelve respondents (11%) said that Nature Exchange had not impacted their child.

6b) *If yes, please describe.* To code this answer, 13 themes from the respondents were identified as follows:

- 1→ Interest in/Curious about nature/surroundings
- 2→ Explore outside more
- 3→ Observation Skills
- 4→ Communication Skills
- 5→ Asking questions/thinking/building connections
- 6→ Learning about Nature/New Things/Animals
- 7→ Positive Reinforcement/Points
- 8→ Research Skills
- 9→ Have fun/really likes it
- 10→ Other
- 11→ Other, negative
- 12→ Enjoy zoo more/looks forward to the zoo
- 13→ Likes to look for object/collect/start collection

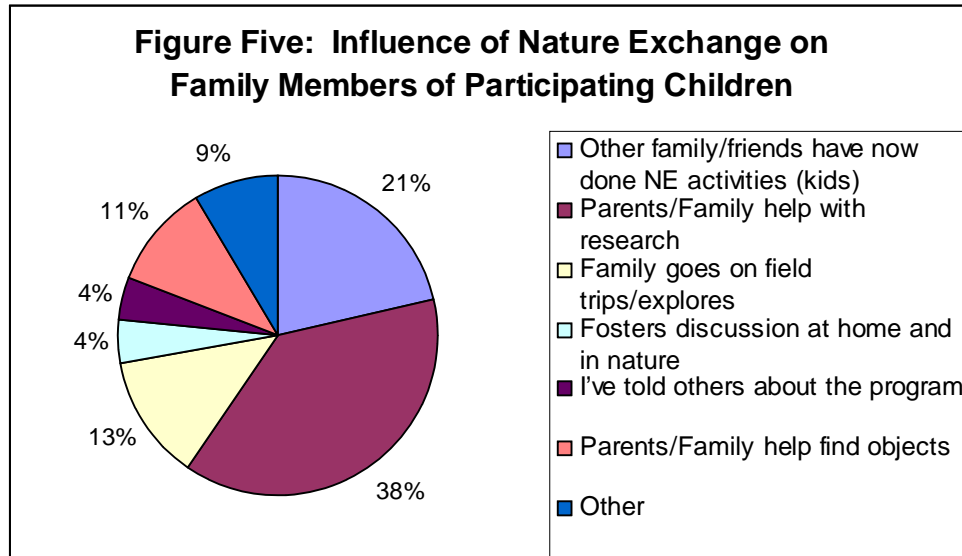
As the chart below shows codes one, thirteen and six had the three highest response rates. Those codes were: interest/curious/about nature/surroundings (1), likes to look for object/collect/start collection (13), and learning about nature/new

things/animals (6), respectively. The codes with the two lowest response rates were explore outside more (2) and other/negative (11). The codes in the middle of the range covered themes such as: communication skills (4), research skills (8), and positive reinforcement/points (7).



7a) *In addition to your participating child(ren), have other family members been involved in any activities related to Nature Exchange?* Out of 116 total responses, 75 respondents (approximately 65%) said that other family members had not been involved in other activities relating to Nature Exchange.

7b) *If yes, please describe the activities.* Of the 41 respondents (35%) who said that other family members (non-NE participants) had been involved with activities related to Nature Exchange, approximately 38 percent said that the parents or family have helped with the research. The pie chart on the next page describes the full range of themes which came from parent responses to this question.



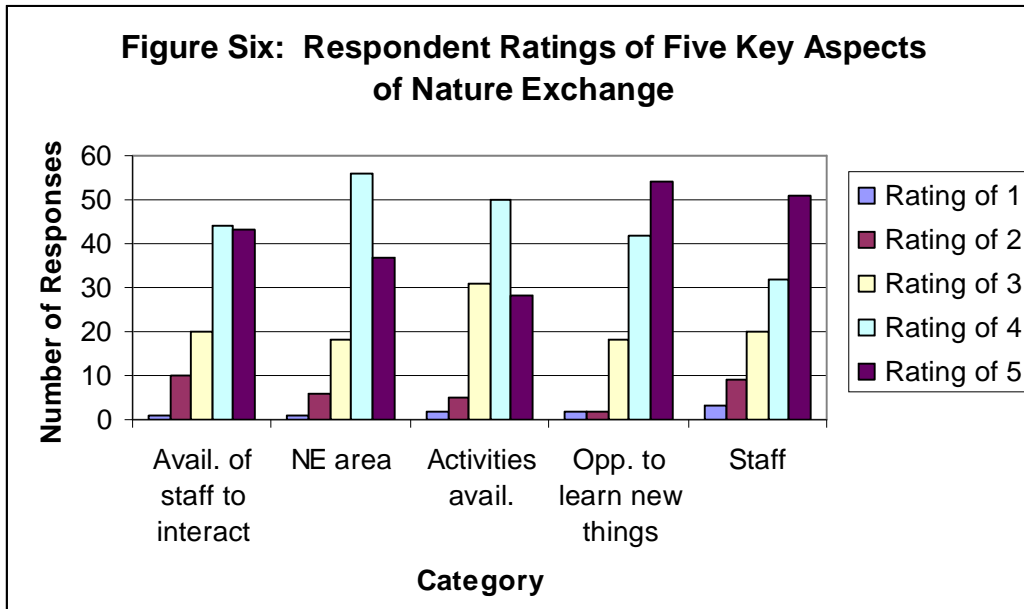
These questions listed above delve into some of the overarching goals of NE without actually stating the goals (parents are asked to state the goals later). These results, and the reasons for them, will be discussed in more detail, in the next chapter.

A summary of the top response to each of the first seven questions appears in the table on the next page.

Table Two: A Summary of Responses for Questions One through Seven on the Nature Exchange Questionnaire

Question	Response with the highest selection
Are you a zoo member?	92% are zoo members; 8% are not
How often does your child participate in NE?	46% visit once or twice every three months
What is the age and gender of your children who participate in NE?	52% male; 48% female 31% were 4-5 years old
What [type of school] does your child attend?	50% attend public school
After joining Nature Exchange, do you feel your child spends more time playing outdoors?	70% do not spend more time outdoors, but 30% do.
Do you feel NE has impacted your child in any way?	89% NE HAS impacted their child
Have other family members been involved in activities relating to NE?	65% say other family members have not been involved; 35% say other family members have been involved.

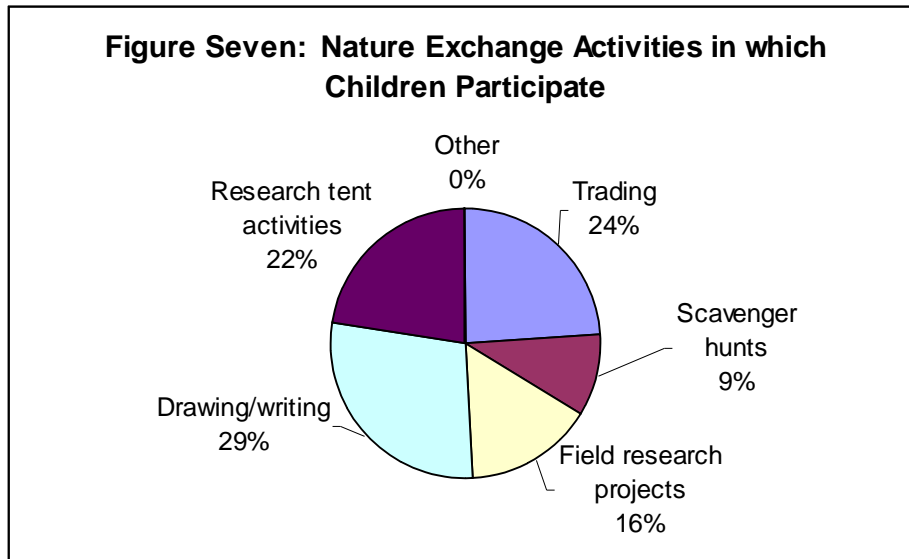
8) *On a scale of 1 to 5, how would you rate the following? (please circle your answer with 1 being low and 5 being high)* The categories that I gave the respondents to rate were very similar to the categories given in the phone interviews with NE parents, although they were tailored slightly to minimize redundancies. The five areas which could be rated were: *availability of the staff to interact with you or your child, helpful and instructive staff, the NE area (research stations/tent/collections), knowledge gained from participation in the NE program, and activities available as part of the NE program.* For each of the five areas, a rating of one was the lowest response option and a rating of five was the highest response option. The chart on the next page shows the ratings that each category received.



For all five categories a majority of respondents gave a 4 or a 5 as a response. However, all of the categories also received at least one ranking of one (the lowest option given) meaning that there were a small number of respondents who felt that there is room for improvement or suggestions. This question provided the NE staff and me with a good idea of how the public feels about Nature Exchange and their experiences while participating in it. Question thirteen will show the respondents’ suggestions for change or improvement within the NE program.

9) *In which of the following Nature Exchange areas does your child(ren) participate? (Trading, Scavenger Hunts, Field Research Projects, Drawing/writing, Research Tent Activities, Other)* Question number nine was the final close-ended question. Responses showed that the top Nature Exchange activity, with approximately 28% of the responses, was drawing or writing, often

on the NE-provided activity sheets. The second highest activity on the list was trading with 24% of responses, and the third was participation in research tent activities (23% of responses). There were a total of 316 responses for this question; parents could select any or all of the five categories. The remaining two categories were scavenger hunts and field research.



From this question, it is clear that a majority of participants come to Nature Exchange to draw or write using the activity sheets and to trade their items.

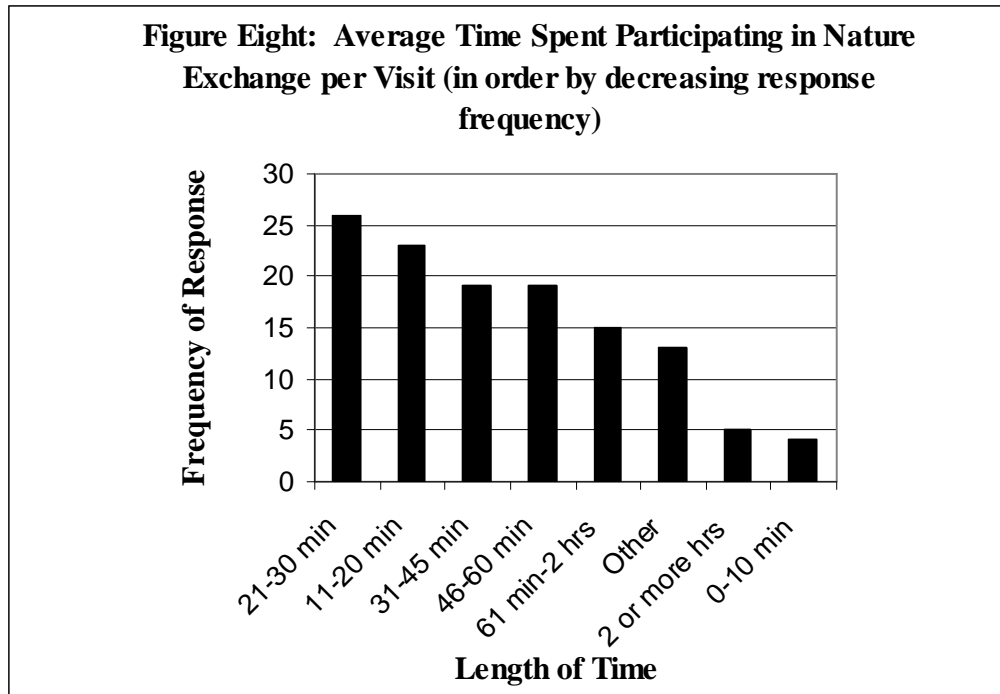
10) *If your child(ren) does bring in objects to trade, where do the objects usually come from? (Home, Backyard, Park, Other)* This question was created because the fourth goal of Nature Exchange, as identified by staff members, was ethical collecting. This was an open-ended question and based on the responses, eight codes were created.

Table Three: Nature Exchange Trading—Locations Where Participants Collect Objects From

Code	Frequency of Response (%)
7-Backyard	30.1
8-Park	23.1
6-Home	20.5
1-Beach	8.3
2-Trails/Hiking	6.4
4-Camping/Wilderness	5.1
3-Vacation	4.5
5-Other	1.9

This table shows that most participants are using their own backyard, a park, or their home area for collecting NE objects.

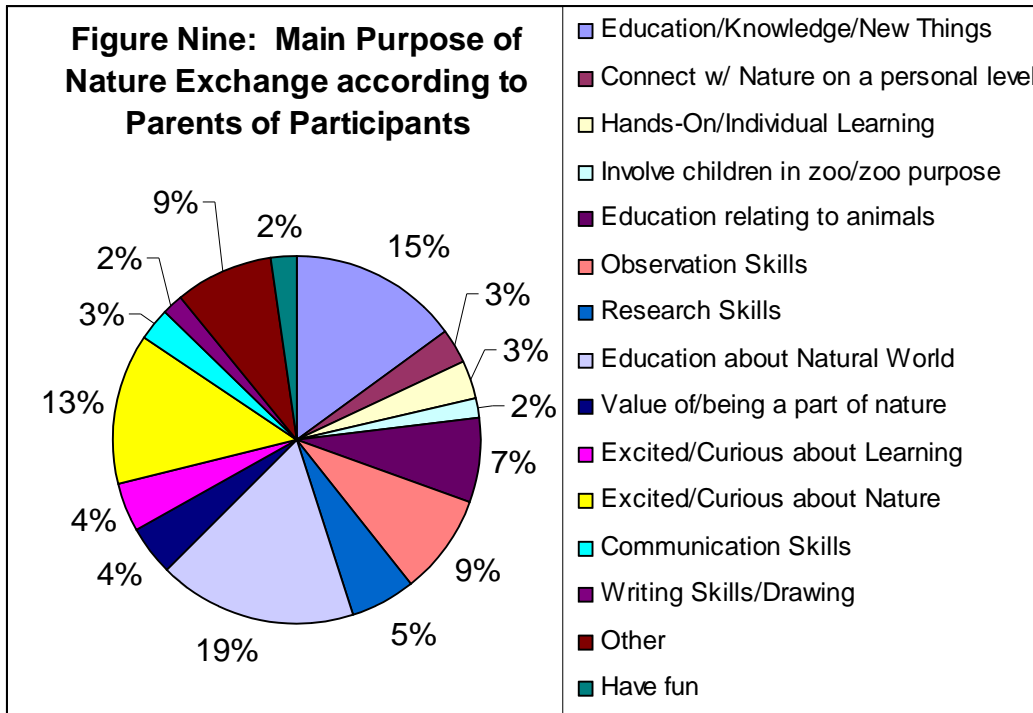
11) *On a typical visit, how much time does your child spend participating in the Nature Exchange Program?* My observations and parent interviews made me curious about how long an actual visit to Nature Exchange typically lasted. The duration of a visit would obviously have an effect on what type of activities a participant completes, how the participant interacts with staff, and how much the participant is getting out of the program.



On Figure Eight, the “other” category represents responses that did not include a unit of time, were left blank, had a question mark, or could not otherwise be coded due to a lack of information. Figure Eight shows that for a majority of respondents an average visit lasts from twenty-one to thirty minutes. This information might be helpful to staff when they are planning programs and creating new activities.

12) *What do you see as the main purpose of the Nature Exchange Program?* I asked this question in every interview whether with parents or staff. I see it as a critical question in understanding Nature Exchange and whether it is a successful program that reaches its goals. In total, 111 people responded to this question. Coding this question, and separating individual codes out of answers, was complex. Each respondent had anywhere from one to five codes within their answer.

In the end, 15 codes were created to cover the themes given by parents in response to this question.



The goals most frequently mentioned were education about the natural world; education/knowledge/new things; and excitement/curiosity about nature. These answers fit well with goals outlined by Nature Exchange staff during my interviews. Parents also described other goals such as observation skills, research skills, writing skills, hands-on learning, valuing nature, having fun, and getting children more involved in the zoo and zoo purpose. There was substantial variety in responses but they all focused on themes related to nature, learning, and growth. A few quotes from parents, defining the goals of Nature Exchange are listed below.

“...to educate children about nature and get them excited and active in the outdoors and their environment to look at their surroundings in a new, fresh way.”

“...invite children to observe and connect with the natural world; particularly for Seattle children, to recognize even urban wilderness; to invite children to return to the program repeatedly, hopefully with more depth and connection each time.”

“Engage children in hands on learning. Connect children to natural objects. Explore new interests that they might not have considered previously.”

“...help observation skills and deeper understanding of the connected-ness of all things.”

“Getting children to be interested in and feel themselves to be an integral part of, nature, the environment, and the world around us.”

13) *What if anything would you like to see done differently or included in the Nature Exchange Program?* Eighty respondents out of 121 (66%) answered this question, and of those who did respond, the majority of responses offered only one suggestion. There were three overarching themes, according to parents, that need improvement, and they are as follows:

- 1) More resources (books, website, classes)—12 respondents, 11.4% of responses
- 2) More diversity of activities overall—12 respondents, 11.4% of responses
- 3) More communication and better explanation of points, activities, and age appropriateness of each activity—12 respondents, 11.4% of responses

In addition, parents suggested increasing the number and training of staff, increasing the trading collection, and figuring out how to be more consistent with the amount of points given out to each child. Parents identified simple issues they had with the Nature Exchange experience including the lines being too long and points being inconsistent. Primarily, though, as a response to this question, parents offered suggestions for how to improve the overall Nature Exchange experience such as increasing the number of staff and creating larger trading.

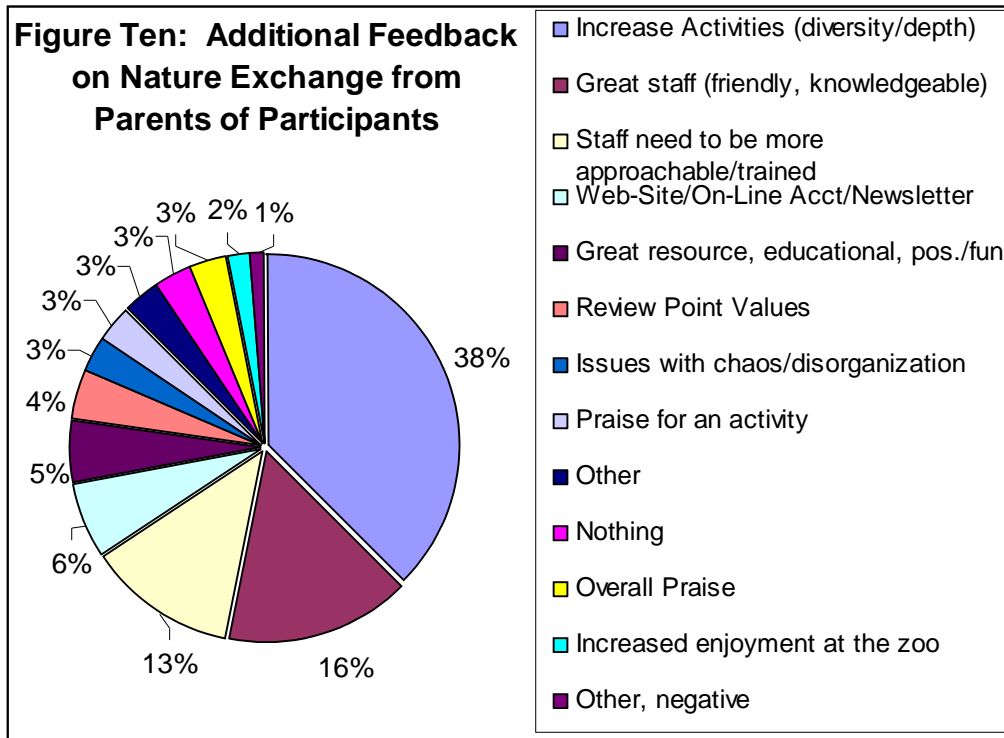
Only one parent had a completely negative experience with NE and chose to share it as a response to this question. Below is an excerpt of that parent's response to this question.

“Not be so harsh in the expectations of information the younger children need to have to qualify to earn points. When my daughter was barely 5 she was expected to do research on the Internet at the zoo since she didn't know exact information about her object. She did know a lot of general information about it that was age appropriate. She and I tried together for about 20 minutes and couldn't find the information. I tried talking to the person at the desk but they wouldn't budge...Unless we had the answer to their question...she could not get any points. She finally got bored and wanted to quit, so we never did get the points. It ended up being a frustrating and tedious experience.”

It is notable that of eighty responses, this was the only mention of a significant problem.

14) *Is there anything else you would like to tell us about your experiences with the Nature Exchange Program?* Seventy-six people responded to this question. Out of the seventy-six respondents, sixty-four percent of the codes used fell into the categories of overall program praise and staff praise. There were, however, some additional complaints about inconsistent and unexplained point values, disorganization and chaos within the NE area, and insufficient

staff/volunteer training.



While the responses to this question were primarily positive or provided constructive criticism, there was also one very negative experience described.

The quote below is an excerpt from the respondent’s critique of Nature Exchange.

“The staff clearly needs additional training in dealing with ‘special needs’ children...Our daughter, from all outward appearances, does not look as though she fits into this category and so no effort was made to ascertain what her abilities and/or needs are. Instead she was shamed and humiliated by staff when she tried to do the things she enjoyed and was capable of doing...No effort was made on the part of the staff to ask us—her parents, who were close by and available at all times, whether this was a feasible option. We are incredibly unhappy at the lack of sensitivity, respect, and basic common decency that this showed.”

Conclusion

In the next chapter, I will provide a deeper analysis of this data and what it means both in terms of my evaluation and the next steps for Nature Exchange.

I will interpret the results and offer suggestions for improvements based on parent and staff comments.

To conclude, I've pulled four quotes from parents out of the parent comments from the questionnaire that contrast the Nature Exchange Program's strengths and weaknesses.

“I would like to see the approach done in a way that is more accommodating of the needs and abilities of each child as an individual rather than training the staff in a way that causes them to make assumptions that may or may not be accurate.”

“Wonderful that it exists! The need to write answers has helped my reluctant writer to see that trying to draw and write letters is useful and worth the effort.”

“The tent activities are well done but the space is often chaotic everywhere and a confusing chair-to-table space ratio....I have had issues with the point system. After learning about it my kids each did a descriptive page on something they found. One did it on a plant, the other on a rock, and the one who brought in the plant got something like 100 points, while the one who did it on the rock got 800 points. A little more clarity in how the points are distributed would be nice.”

“It is fantastic, our kids are so excited and motivated to explore nature and ask questions as a result. They haven't even used their points yet but really look forward to bringing things in. It has been an outstanding and horizon broadening experience for our kids.”

Chapter Six

Analysis, Recommendations, and Evaluation Limitations

“In philosophy, it is not the attainment of the goal that matters, it is the things that are met along the way.”

(Havelock Ellis Quotes, ThinkExist.com)

The purpose of this chapter is to explain what the data from Chapter Five is revealing to me. I will also provide recommendations for Nature Exchange and will explore what limitations my evaluation may have had. The goals of Nature Exchange are again listed below as they have provided a framework for each step of this evaluation and are important within this analysis as well.

1. To foster an appreciation and understanding of the natural world.
2. To create a space that forces people to slow down to observe, think, reflect, and learn.
3. To create an experience for kids that translates from curiosity into learning.
4. To teach kids about environmentally ethical collecting.

Since my interviews and observations were all part of the questionnaire development, to draw conclusions from the data I went through each question on the questionnaire individually as is described below. Then I extracted suggestions, study limitations, and possibilities for further study. Finally, I returned to the above goals to see if these goals had been met.

Individual Question Analysis

Question one asked whether NE participants were zoo members. The overwhelming majority of participants (92%) stated that they were zoo members. I believe that this is due to the fact that Nature Exchange exists within the zoo, and to participate in NE you must pay for admission into the zoo. *Possible Implications for NE:* Does the NE staff want to continue to focus on zoo members or do they want to broaden the NE demographic by creating a special NE membership? In addition, if the zoo staff wants to expand the reach of NE, they may need to consider whether zoo admission should be reduced or even required to participate in NE.

The second question asked NE participants how often their children participated in the program. Out of the 121 respondents, 109 of them were NE participants who had provided their e-mail addresses to NE staff. The 12 other respondents completed the questionnaire while their child was participating in NE. The average participant visits NE once or twice every three months. This gives NE staff the opportunity to work with repeat visitors on a semi-regular basis and it shows that the current programming at NE is interesting enough to keep participants coming back throughout the year. *Possible Implications for NE:* Would a special monthly or bi-weekly event encourage repeat participants to visit NE more often? The rationale here is that the greater the number of visits the greater the chance the NE staff has of meeting all of their goals.

The next question looked at the NE demographics. There was almost an even split on male vs. female participants. In terms of age, 31% of participants

were between the ages of 4 and 5 years, with three to seven-year-olds being the NE participant predominant age group. I hypothesize that this is partially because 4- and 5-year-olds were such a large percentage of the demographic due to the fact that most of them are not yet in full day schooling. In addition, 78% of all children visiting the zoo are under the age of 8 years, which means that NE demographics closely parallel the demographics of the zoo (Meeting Notes, 1/23/07). NE provides an opportunity for learning and entertainment for this age group. This gives the NE staff a focus area for their program development.

Possible Implications for NE: Should NE staff offer more programming for the predominant age group or more programming for children outside the predominant age group? The longer NE can be in a child's life the more chance there is of NE impacting that child. However, there are also time, staffing, and monetary constraints to consider when deciding where program development and expansion should take place.

As a follow-up to the previous question, parents were asked to identify what type of school their children were in. The majority of participants (50%) are currently in public school. Twenty-five percent of NE participants attend private school. This means that 75% of NE participants are school children. Based on school schedules, this means that a majority of NE visits will happen in the late afternoon, on weekends, or on holidays. *Possible Implications for NE:* Should NE staff design a schedule that allows for more staff and volunteers to be available during the late afternoon, on weekends, and on holidays? This would

allow for more staff-child interaction and hopefully a deeper learning experience for the participant.

After answering the basic demographic questions, parents were asked questions specifically related to NE goals and programming. The first of these questions asked parents to identify whether their children spends more time playing outdoors since joining NE. Seventy percent of parents said that their children did not spend more time playing outdoors, but that means that thirty percent of parents do think their children spend more time playing outdoors since starting to participate in NE. In my opinion, this means that NE is helping at least some children to enjoy and appreciate the outdoors more than they used to.

In reviewing this question and the responses, I also came up with several additional questions that may have provided more clarity had they been asked or thought about before distributing the questionnaire. First, I wonder how parents measure the length of time their child spends outdoors. I am also curious whether parents would give a different response based on the time of year the question was asked, due to weather conditions. In addition, I wonder how many months or years of visits led to children spending more time outdoors and if there are any patterns among participants. NE is also a new program, and I would be curious to see if this number changes a few years from now. I think that this could be a fascinating area for more research and evaluation.

Question six asked parents if they felt that NE had impacted their child in any way, and if it had they were asked to describe the impact in their own words. Eighty-nine percent of parents said that their child had been impacted by NE.

That is a hugely positive sign for NE staff, and it means that the program is successful with a large number of their participants. The top three types of impact that parents identified were interest/curiosity in nature, looking for objects/starting a collection, and learning about nature, animals, and new things. With respect to the stated goals of NE, these answers were very important. They illustrate that parents believe that their children are showing an interest in the natural world and that they are translating curiosity into learning. It may also show an increase in understanding ethical collecting, but that cannot be concluded from the responses since, in responding to this question, the parents did not specify the objects collected or from where they were collected.

Parents were then asked whether or not other family members have been involved in activities related to NE, and if they answered yes to this question, they were asked to describe the activities. Only 35% of respondents said that other family members had been involved in NE related activities. Of these, the two most common forms of involvement were helping with research and having other family or friends do NE activities (i.e.—go to NE activities) with the original participant.

When looking at this data, I was reminded of my original observations and a question from the staff interviews. In my observations, I witnessed a variety of parent/child interactions during NE participation, where parents acted either as guides, authoritarians, or bystanders. When interviewing staff members, I asked them what they thought the role of parents should be in NE. A majority of the staff said that the parents should act as guides or mentors to their child. I wonder

if, in most cases, other family members were not involved in NE related activities because they were trying to allow the child to learn and experience on their own without taking over or controlling what was going on. It is also possible that there is one regular parent who takes their child to NE or parents may just want one-on-one time with their child. I also wonder if other family members, such as siblings, were either too young to be involved or too old to be interested in the activities. Overall, I think that minimal involvement allows the child to learn and explore at their own pace, and ideally parents should be, as staff mentioned, acting as guides for NE activities.

The eighth question gave parents the opportunity to rate five areas of NE. The five stated areas were: the availability of staff to interact with you or your child, helpful and instructive staff, the NE area, knowledge gained from participation in NE, and activities available as part of the NE program. The category with the highest rating (based on a 1-5 scale with 5 being the highest) was the knowledge gained from participation in NE. The staffing category had a wide variety of responses and I wonder if that variety was affected by when parents and their children visit NE. If participating during a peak time, children may have had less time to interact with busy staff. Every other area (except knowledge gained) had a majority of respondents rate it with a 4. However, in every category, there were also some ratings at the 1 or 2-level. So, overall, NE participants are satisfied with the five areas that they evaluated, but there is room for improvement in each of the areas. *Possible Implications for NE:* Can staffing be increased during peak visitation times? Should NE training for volunteers be

increased or expanded? Could staff meet with multiple children at once (instead of just one child) during peak times?

Question nine asked parents to identify which NE activities (Trading, Scavenger Hunts, Field Research Projects, Drawing/Writing, Research Tent Activities, and Other) their child participated in. The top activity was drawing or writing, often on the NE-provided activity sheets. The two activities with the lowest participation were the scavenger hunts and field research projects. Most NE activities include drawing or writing so it makes sense that this category would have the highest level of participation. Three probable reasons for low participation in scavenger hunts and field research projects are as follows. First, both scavenger hunts and field research projects involve leaving the Zoomazium. Often parents have other children playing in the Zoomazium or parents are busy while the children are occupied in the Zoomazium; leaving the building may be perceived as more difficult or inconvenient. Second, both of these activities require additional research and writing which may limit the age of the child who can complete these activities. Third, I wonder if parents are not fully aware of the many different types of activities that are available at Nature Exchange. I interviewed some parents whose children were repeat participants, who indicated that they were unaware of the activities children could do at home for NE credit—such as research projects. *Possible Implications for NE:* Should NE staff do more to explain to parents and participants what activities are available? Would additional signage be helpful? Should additional activities only requiring simple drawing and writing be created since they are the most popular activities?

The 10th question on the questionnaire intended to discern whether ethical collecting was taking place. Parents were asked to identify the original location of the objects their children were collecting for NE trading. Home, backyard, park, and other were the four locations listed for parents to choose from in this question. If they chose “other,” they were asked to identify what “other” stood for. The top three responses were backyard, park, and home, respectively. They were followed by locations such as the beach, trails, and wilderness. From the responses to this question, we know that a majority of the objects traded in NE are coming from a backyard or home area. That means that we can assume that the objects are being collected from personal property and overall objects are being ethically collected. I suspect that the reason most objects come from a backyard or home is because these locations are convenient, accessible, and this type of collecting does not require taking a special trip to another location. Objects that are being collected while camping or hiking may or may not be being ethically collected. *Possible Implications for NE:* Should NE staff do more to educate parents, children, and zoo visitors about ethical collecting and its importance?

Next, parents were asked how long a typical visit to NE was. The two most frequent answers were 21 to 30 minutes and 11 to 20 minutes. The duration of a visit provides an important framework for structuring current activities and creating new ones. It also gives staff a reference range for how long they have to work with the average child. I would be curious to see if the time range changes over time especially if the staff chooses to expand activities to include more children who are younger than three or who are older than seven.

Question twelve was one of critical importance to the study. Parents were asked to describe in their own words what they saw as the main purpose of NE. This was important because it allowed staff and me to see if the parents' concepts about NE were consistent with the staff goals for NE. The top three purposes given were education about the natural world, education/knowledge/new things, and excitement/curiosity about nature. As stated at the beginning of this chapter, the goals gleaned from staff interviews were very similar to parent responses. The good news is that parents also picked up on secondary themes included under the primary goals such as reading, writing, and valuing nature. The only goal that did not come up in parent responses, even indirectly, was ethical collecting. *Possible Implications for NE:* Should the NE staff emphasize ethical collecting more explicitly? Would a hand-out be helpful or could an activity be created that would specifically deal with the importance of ethical collecting?

The final two questions asked parents if they would like to see anything done differently with Nature Exchange and if they had anything else they wanted to share that they thought was important for zoo staff to know. In response to these questions Nature Exchange and its staff received a great deal of overall praise. To be sure, there were also a couple of participants who shared stories of negative NE experiences, but I believe these were isolated incidents and not an illustration of any systemic problem. Some parents voiced basic complaints about a lack of staff training, inconsistency in the point system, and a lack of diverse activities for young children or pre-teens.

Sixty-six percent of the respondents offered suggestions for improvement. The three suggestions with the highest frequency were: 1) the need for more resources, 2) the interest in more diversity of activities, and 3) more communication and explanation of the activities available, the ages that the activities are suitable for, and the point system. The other common suggestion was increasing the number and training levels of staff. My assumption would be that the staff members who need more training are actually the unpaid NE volunteers, not the paid staff members. The need for an increased number of staff came up during my observations and interviews as well: at certain peak periods, I observed a line of children waiting for staff assistance.

Overall Suggestions

The interview and questionnaire responses revealed there were four suggestions that came up repeatedly from parents or staff.

1) *More Staff*—Staff and parents suggested having more NE staff members available. While this may not be possible all of the time, I do think it is important to have more staff members at the high-volume times of Zoomazium visitation. Some parents noted that their children became discouraged if they had to wait in a line to interact with staff. Adding staff would increase the level of organization, the quality of staff-child interactions, and it would improve the overall NE experience for many participants.

2) *Increased Volunteer Training*—While most parent respondents found the NE staff knowledgeable, some parents found them not to be sufficiently

informed. I hypothesize that this variation is due to whether parents interacted with paid staff members or volunteers. Perhaps, deepening volunteer training and oversight would allow for more consistent participant satisfaction and it might allow the volunteers to gain more from their experience as well.

3) *Increased Diversity of Activities*—A majority of respondents requested an increased number of activity options. Some parents wanted activities geared towards very young or older children. Other parents wanted more types of activities that would allow their children to engage in additional hands-on projects or research. Parents were also interested in regular workshops or encounters at scheduled times with staff. It was suggested that a schedule be created that would announce when the research tent would be staffed and with what activities. If this evaluation was repeated, I would recommend analyzing which groups are requesting an increased diversity of activities. For example, is the request coming primarily from repeat visitors, zoo members, or is there no correlation at all?

4) *Enhanced Explanation and Communication*—Some parents revealed that they did not know what activities were available to their children or how the point system worked. They expressed an interest in learning more about what NE has to offer and they requested some guidelines that explained the point system. To achieve better communication, several parents suggested a newsletter, additional signage, and the creation of a special NE website.

It is important to note that although there were suggestions for improvement and development, parents were, on the whole, very positive about their children's' NE experience. A large percentage of these parents have

children who are repeat participants and they are enjoying watching their children grow with Nature Exchange as part of their lives.

Study Limitations

When I was creating my Nature Exchange study, I had to constantly evaluate and modify my plan to stay within time constraints. For example, I had to limit the questionnaire to a small number of questions to allow data analysis within a reasonable amount of time.

In addition, I believe that some of the questions may have been too vague for respondents. One question asked respondents whether their children spent more time outside after participating in NE. This was a valid question with helpful responses, but I believe if I had provided specific measurements of time or asked how many total visits had taken place, the data gathered would have been more beneficial. It also would have been helpful to have a baseline of how much time the children spent outside before ever participating in NE. In addition, if I could have correlated the age of the child with the responses to this question, I might have discovered a pattern.

I interviewed a total of five WPZ staff and volunteers, and five parents of NE participants. I also did several observations. If I had had the time, I believe the study would have benefited from additional interviews and observation periods. Increasing the number of observations would have provided me with more information on volunteer vs. staff interactions with NE participants, on how high-volume times and how they are handled, and on the central elements that

draw children and parents to NE. If I had completed more interviews with parents of newer NE participants, I could have compared their responses to my interviews with parents who have long-term NE participants. Overall, I hope that my study will provide the NE staff with new and valuable information that they might not have otherwise obtained.

Potential Future Research and Evaluation Topics

While conducting my evaluation and analyzing the results, I came up with several additional questions that the NE staff or future students may want to investigate. First, I think it would be beneficial to come up with a strategy for evaluating volunteer expertise and experience working with children. Once that strategy has been created I think it would allow NE staff to create expand or deepen their volunteer training programs in certain ways. If the volunteer levels of knowledge and experience working with diverse groups of children can be raised, this will improve the quality of the NE program and visitor experience.

Second, several parents mentioned they would like to see more activities for children younger than three and older than seven. I think it is worth researching whether there is enough interest that it would be worth creating a pre-K or pre-teen NE program focused on these age groups?

In addition, I wonder if having a trial evaluation period for new and existing activities would be beneficial to the program. It might allow staff to figure out which activities are the most popular and it could also show staff which activities should be modified.

Furthermore, I believe that it is worth researching whether a paid zoo admission should be required to participate in NE. Requiring zoo admission limits the range of participants in NE. If NE had a separate fee structure would this increase or decrease NE participation? Could those fees be put towards NE program development such as a website or new activities? Is there a fee structure that would encourage attendance by first-time participants?

I also acknowledge that this study was completed after NE at the Woodland Park Zoo had only been open for a couple of years. I think it would be valuable to repeat this study every few years. This would allow for continual program improvement and it would provide staff with a chance to re-evaluate the NE's direction and programming.

Conclusion

At the beginning of this chapter, I listed four goals of NE. Towards the beginning of this thesis, I said that NE would be successful if the NE staff were meeting or striving towards meeting these goals. The first goal of NE as stated at the beginning of the chapter is, "to foster an appreciation and understanding of the natural world." The questionnaire and the data clearly demonstrate that this goal is being met. A substantial number of parents reported seeing their children spending more time outdoors and they noticed that their children were learning and drawing connections.

The second NE goal is, "to create a space that encourages people to slow down to: observe, think, reflect, and learn." 79% of NE parents rated the area

with a 4 or a 5 (on a 1-5 scale). Parents were also asked about the activities their child participates in at NE and a majority of the responses mentioned drawing and writing which are two tasks that require observing, thinking, reflecting, and learning. While activity in the NE space is sometimes chaotic, overall parents and participants seem to be finding it to be a space that works well for Nature Exchange.

The third goal is, “to create an experience for kids that translates from curiosity into learning.” In the volunteer training, volunteers are asked to help kids think beyond the obvious. Instead of just asking, “What color is the rock?” volunteers are encouraged to ask “What could this rock be used for?” When volunteers have this interaction with children they are encouraging them to take their natural curiosity and develop it into learning and knowledge. A majority of the parents noticed that their children had a new excitement about nature and they were drawing new connections between items found in nature.

Finally, NE staff hopes “to teach kids about environmentally ethically collecting.” Within the questionnaire, I learned that most objects traded at NE come from the home or the backyard, which is a good sign. However, learning about ethical collecting was not listed by parents as a goal of NE in their responses to the questionnaire. I believe this is an area where NE staff might revisit this goal and its importance, and they may want to consider whether to emphasize ethical collecting more prominently. Since the start of this study, NE staff has added a description of ethical collecting to their website which I think is a great step towards making parents and participants aware of this goal.

From my study, I find Nature Exchange at Woodland Park Zoo to be very successful at this point in time. I'm curious to see where the program will be in 2, 5, or 10 years. I wonder what will grow, change, and how the goals will expand or contract as the program continues to develop.

Chapter Seven

A Conclusion

*“I know not what the future holds, but I know who holds the future.”
~Author Unknown (Quote Garden, 2007)*

The Nature Exchange Program at the Woodland Park Zoo in Seattle, Washington is one of the zoo’s informal learning programs that educate children about our environment. Through the hands-on activities, staff/child interactions, and self-directed learning children have the chance to build connections and think about nature in a new way. The hope is that through the Nature Exchange activities and discussion, children will become more aware of their environment and this will lead them to want to conserve and protect it. In meeting with the WPZ staff it became clear that evaluating the Nature Exchange Program would be helpful to them. Evaluating Nature Exchange also fit within my time and budget constraints as a graduate student.

Through this study, the data revealed that overall Nature Exchange is an effective program and participants are gaining a lot from it. Some of the important conclusions that I drew from my data were:

- Nature Exchange is impacting its participants and it helps some of the participants to enjoy and appreciate the outdoors more than they used to.

- A majority of Nature Exchange objects are collected ethically, meaning primarily children are finding them on personal property not in national parks or other restricted areas.
- Parents understand the goals of Nature Exchange. From watching their children participate in the program and interacting with staff, parents were able to identify goals such as learning about the natural world and gaining an excitement and curiosity about nature.
- Nature Exchange helps children develop their observation and communication skills.
- Overall, Nature Exchange is being viewed as a positive program that is enhancing participant's lives, but there is room for improvement.

My data revealed several suggestions for improving what is already a well-regarded program. To enhance the Nature Exchange Program, staff may want to consider ways to deepen volunteer training, increase the number of staff during peak visitation periods, and enhance communication and explanations with respect to the point system and with respect to the variety of the activities available to Nature Exchange visitors.

Within Nature Exchange, a myriad of opportunities exist for future research and program development. For example, it might be helpful to look into the zoo admission and see if there is a benefit to creating a separate fee structure for Nature Exchange participants. In addition, I believe it would be worth looking

into the feasibility of creating new activities for pre-school students and pre-teens (as several parents mentioned). Expanding the age-range of the program would allow for more impact on participants' lives. Nature Exchange staff may also want to investigate strategies for connecting the themes of Nature Exchange with school curriculums. Finally, I think repeating this study in a few years or one similar to it would provide valuable information and allow for continuous Nature Exchange Program development.

My findings have deepened my beliefs about the importance of informal education programs, and they have opened my eyes up to the importance of evaluating these programs. It is my hope that we will see a growth and expansion in programs such as Nature Exchange, programs that reach out to children through hands-on, interactive learning. I look forward to seeing informal education opportunities grow in zoos, aquariums, nature centers, bookstores, and anywhere else where there is an opportunity to enhance children's' knowledge, experience, creativity, and ability to draw connections. As these programs grow, I hope that evaluation strategies and methodologies will also continue to develop, expand, and become more accessible to the staff that runs these programs.

At the beginning of this concluding chapter, I used the following quotation, "I know not what the future holds, but I know who holds the future" (Quote Garden, 2007). It is my belief that our children hold the future (complex as it may be), and it is our job to educate them now, to prepare them for their futures as the next generation of employees, employers, parents, and leaders.

Children have great opportunities to learn in formal classrooms, but they also need the chance to learn outside the classroom, experientially, from their own backyards, community organizations, and their local zoo, if they are going to have the skills they need to problem solve and think creatively in the future. Nature Exchange is just one example of a program that strives to enhance children's knowledge, skills, and understanding of the world around them. I look forward to seeing more Nature Exchange Programs as well as other engaging informal programs in nature education.

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Appendix A

Notes from Brainstorming at Woodland Park Zoo, January 23, 2007

Attending: Jean (Faculty Reader), Kathryn (Education & Research), Sara (Nature Exchange Coordinator), Frank (Zoomazium Project Director), Gregg (Zoomazium Manager), Kristy (Student)

Audience Research and Evaluation: Front-End (pre-exhibit); Formative; Summative

- Demographics, psychology of visitors (ages); highest group of visitors is under the age of 18
- Looking at the Zoo as a social experience
- It may provide someone's first encounter with animals.

Possible Research/Sources

- Murdock Grant
- Conservation Psychology Network
- Brookfield Zoo
- Hammell Family Play Zoo

Zoomazium

- Designed for children eight and under
- Indoor building to facilitate experience
- **Nature Exchange**
 - Children bring and trade artifacts from nature
 - Spend more time outdoors
 - Nature writing
 - Ethical Policy
 - How does it connect/encourage family time in nature

Naturalism in Zoos

- Gorillas outdoors with trees (first exhibit to do this)
- Provides a long range vision for the zoo
- What's the impact? Context for animals
- Natural vs. other exhibits

African Savannah

- Ambassador at zoo and in Kenya (Kakota Hamisi)
- Select what they (Kenya) want to have reflected as part of their culture
 - Emphasizes and explains E. Africa's relationship with animals
 - Impact on them and the impact on the village in Africa

What Can You Do?

- At each exhibit
- Connection: needs to be personal and meaningful
- How do you get people to give when they can't see results?
- Bev Clevenger (education director)

Zoomazium Part Two

- Connecting kids to nature
- 78% of all kids are 8 and under, 60% of those are 4 and under (demographics of zoo visitors)
- Play-learning tool: all animals go through it, why not kids?
- Kids playing in a naturalistic place, dream of wild lands
- Invest in kids
- No primary shuffles, no signs—minimal interpretation
- Toddler Zone—babies with parent involvement
- What's the difference between play in Chuck E. Cheese vs. the Zoomazium? How did kids play naturally?
- Visitors: 2,000 on the weekend, 400,000 since May of 2006
- Nature vs. technology: naturalistic technology/communication, used to bring experiences in zoomazium even more alive
- **Nature Exchange**
 - Children share what they know about what they bring in.
 - They're prompted to use resources to learn more.
 - Points: trade-in for something (fool's gold, shells, etc)
 - Drawing, photos, writing are all equally valid
 - Ethical collecting
 - Science, observation skills
 - Guided activities: Sorting, ecosystems, rocks, mineral, animals, botany
 - Database for points
 - Integrated: writing, drawing, research, public speaking, math, science
 - 6000 active traders since May
 - Validates interest with nature

Potential Questions

- Development: is it working? Are all seasons having visitors or is it just a spike in winter?
- Does nature matter more to parents and families who participate in zoomazium than those who don't? Is there a significant difference?
- Does the connection changes with age/level of involvement?
- Impact of repeat vs. significant visits
- Are we making a change or doing something that sets up a change?
- Are the people walking in indifferent? If they come for the play then what do they stay for?

- Why do parents yield to bringing them here than somewhere else?
 - Increase in regular visitors
 - Why are they coming back?
 - Are they getting a deep understanding of nature vs. play?
 - Are they just coming here or visiting the zoo?
 - What's the whole experience?
- Why is the West Gate getting used more—is zoomazium impacting it?
- Does the visit to zoomazium effect how people see the animals?
- Who decides when it's time to leave zoomazium?
- If nature exchange acts partly as an info desk—and encourages a focus towards specific exhibits—are visitors going deeper or getting more new knowledge?
- What do parents do while kids play?
- Could parents be educated while kids are playing? Would they be open to that? Can it be done while they are keeping an eye on their kids?
- How are parents engaging with their children?
- What facilitates parents and kids being together vs. not?
- What do parents want? What is the role of parents in the zoomazium?
- Can children's self-discovery be balanced with parent education?
- Is zoomazium a break for parents?
- Can parents be introduced to other places to take their kids?
- Return Traders: Are they whiz kids or regular kids? Why do they come back? What are the impacts of their visits? How often do they come? Who is Nature Exchange pulling in or reaching?
- Are people who participate in NE spending more time out in the zoo or in nature?
- Does interest in nature extend beyond “rocks” to a new field (animals, ecosystems, etc)?
- Zoomazium→Zoo Exhibit→Zoomazium: is it changing how you look at nature (backyard, neighborhood)?
- How does nature exchange add value to a zoo exhibit? Does it replace going to the zoo?
- What does participating in NE do for your child? Connection to nature, sense of authority?
- What are participants eager to learn about back home?
- How does NE relate to what's going on in school? (from both parent and children's points of view)
- What does success of NE look like?

Appendix B

Notes from the Nature Exchange Training Session, January 27, 2007

Goal: Have fun with kids; Get kids excited about nature.

- Identification is not critical
- NE is all about not having limits and boundaries, let kids set their own.

History

- Science North started in Ontario, Canada about 20 years ago—it was the first NE program.
 - NE can be used in zoos, education centers, museums, etc.
 - WPZ: most unique NE location
 - Growing faster than any other—6000 registered traders since 5/19

Ethical Collecting

- Tread a fine line: sea urchin shell is okay without a whole sea urchin
- Shells are accepted if they are byproducts but not from a local park
- Important in identifying specific, non-competitive messages
- It's your responsibility to know your park's rules.
- Take one shell instead of a bucket from the beach.
- Then take none because you can draw, read, photograph etc.
- Defined by WPZ: collection of items and experiencing nature while leaving ecosystems and living things as they were before collecting
- You can't collect anything from zoo grounds, people are asked to put items back but still get points for learning about the item.

More NE Details

- Depth of knowledge and learning is important; quality vs. quantity
- Reward knowledge more than stuff/items
- Can give points for show and tell even if the child wants to keep an item; they will display what you give them.
- The hands-on element is critical
- NE items were acquired by: purchasing, donating and trading
- Dialogue with child: we're here to listen if they want to talk
 - Sometimes parents guide kids with research, other times the staff has to take over.
- 3 Sections: Plants, Rocks/Fossils/Shells/Minerals, Animals
- Kids need to be successful
- Research Tent
 - Build-a-bug→creates a bug—asks about what it eats, how it travels, etc.

- How to convey that it's okay to touch but that NE is not a store
- Zips/Zaps (Tues-Fri, 3:00pm)
- Senses: what do you see, feel, hear, etc
- Building observation skills: compare to yourself, other things in nature
- What is it—very hard to identify rocks, etc: the answer to that question often stops dialogue and learning
- Just because something is common doesn't mean it's not interesting
- Staff to get kids to describe more: I'm from another planet; I don't know what rabbit means.
- Interweaving stories with learning, knowledge, comparisons, etc.
- Emphasis on the Scientific Method
- "Let Nature teach you"
- "Go outside and enjoy it"

Issues/Scenarios

- Age appropriate A\activities
- Parents (brain dump vs. discovery, involved vs. uninvolved)
- Kid Issues/Sibling Issues—working together vs. separate; different vs. same amount of points
- Point mongers—how to challenge them to earn their points
- Live animals—keep animals in nature where they belong; talk about it; return it to its home
- Large trades—pick one thing out of a bucket to learn about; take others home, do research, and bring it back
- Time management

Appendix C

Questions used for interviewing the Nature Exchange Program Staff

Staff Interviews Took Place on May 9 and May 12, 2007

- 1.) How did you get involved with the Nature Exchange Program?
- 2.) Do you feel that any of your childhood experiences influenced your decision to work with the NE program?
- 3.) How do you define “success” of the Nature Exchange Program?
- 4.) What visions do you have for the future of the NE Program?
- 5.) What influences do you see NE having on visitors at this point? What about the influences on you as one of its staff?
- 6.) What improvements do you think should be made to the program?
- 7.) Can you describe a typical staff/visitor interaction with the program?
- 8.) What do you feel is the most important part of the NE program?
- 9.) What do you think the goal of the Nature Exchange Program is?
- 10.) What do you think the role of parents in a Nature Exchange visit should be?
- 11.) Do you have any other comments/questions that would be helpful in my analysis of the NE program?

Appendix D

Questions used for interviewing the Nature Exchange Program Participants

Participant Interviews Took Place on May 30 and June 11, 2007

- 1.) Are you a zoo member?
- 2.) How often do you visit Nature Exchange?
- 3.) What age are your children who participate in Nature Exchange?
- 4.) After participating in Nature Exchange do you feel the program has impacted your child (ren) in any way?
- 5.) On a scale of 1 to 5, how would you rate the following? (1 is low and 5 is high)
 - Availability of staff to interact with your child(ren)
 - The Nature Exchange area (tent/research stations, etc)
 - Activities available through the Nature Exchange Program
 - Opportunities for your child to learn new things
 - Staff expertise and instruction
- 6.) On a typical visit, how much time does your child spend participating in the Nature Exchange Program?
- 7.) In addition to your participating child (ren), have other family members been involved in any activities related to Nature Exchange? If yes, please describe the activities.
- 8.) In which of the following Nature Exchange activities does your child (ren) participate?
 - Trading
 - Scavenger Hunts
 - Field Research Projects
 - Drawing/Writing
 - Research Tent Activities
- 9.) What would you say the goal of Nature Exchange is?
- 10.) What, if anything, would you like to see done differently or included in the Nature Exchange Program?

Appendix E

The Woodland Park Zoo: Nature Exchange Program Questionnaire

We appreciate your honest feedback on your child’s experiences in the Nature Exchange Program at Zoomazium. Thank You!

- 1.) Are you a zoo member? Yes No
- 2.) On average, how often does your child participate in the Nature Exchange Program at the Woodland Park Zoo within the past year? once a week
 once or twice/month
 once or twice/3 months
 less than once/6 months
 other, please specify: _____
- 3.) What is the age & gender of the child (ren) who are participating in Nature Exchange? _____
- 4.) What type of school does your child attend? (Please make a check mark for each child)
 Public Private Homeschool Too Young For School Other
- 5a.) After participating in the Nature Exchange Program do you feel your child spends more time playing outdoors? YES NO
- 6a.) Do you feel the Nature Exchange Program has had an impact on your son or daughter in any way?
 YES NO
- 6b.) If yes, please describe the impact.

- 7a.) In addition to your son/daughter, have other family members been involved in any activities related to the Nature Exchange Program? YES NO
- 7b.) If yes, please describe the activities.

- 8.) On a scale of **1-5** (1 being low and 5 being high) how would you rate:
- Availability of the staff to interact with you or your child _____
 - Helpful & Instructive Staff _____
 - The NE Area (research stations/tent/collections) _____
 - Knowledge gained from participation in the NE program _____
 - Activities available as part of the NE program _____

9.) In which of the following Nature Exchange activities does your child participate?

- Trading
- Scavenger Hunts
- Field Research Projects
- Drawing/Writing
- Research Tent Activities

10.) If your child (ren) does bring in objects to trade, where do the objects usually come from?

- Home
- Backyard
- Park
- Other:

11.) On a typical visit, how much time does your child spend participating in the Nature Exchange Program?

12.) What do you see as the main purpose of the Nature Exchange Program?

13.) What if anything would you like to see done differently or included in the Nature Exchange Program

14.) Is there anything else you would like to tell us about your experiences with the Nature Exchange Program?

Thank you for your participation.

Appendix F

Thematic Codes for Open-Ended Response Survey Questions

Thematic Codes for Open-Ended Responses

Based On Themes Identified by: Kristy King and Mary Jackson

Question 6B (*describe impact*)

- 1→ Interest/Curious in/about nature/surroundings
- 2→ Explore outside more
- 3→ Observation Skills
- 4→ Communication Skills
- 5→ Asking questions/thinking/building connections
- 6→ Learning about Nature/New Things/Animals
- 7→ Positive Reinforcement/Points
- 8→ Research Skills
- 9→ Have fun/really likes it
- 10→ Other
- 11→ Other, negative
- 12→ Enjoy zoo more/looks forward to the zoo
- 13→ Likes to look for object/collect/start collection

Question 7 (*other family members involved in activities relating to NE*)

- 1→ Other family/friends have now done NE activities (kids)
- 2→ Parents/Family help with research
- 3→ Family goes on field trips/explores
- 4→ Fosters discussion at home and in nature
- 5→ I've told others about the program
- 6→ Parents/Family help find objects
- 7→ Other

Question 10 (*where do traded objects come from*)

- 1→ Beach
- 2→ Trails/Hiking
- 3→ Vacation
- 4→ Camping Wilderness
- 5→ Other

Question 11 (*time spent in NE*)

- 1→ 0 to 10 minutes
- 2→ 11-20 minutes
- 3→ 21-30 minutes
- 4→ 31-45 minutes
- 5→ 46-60 minutes
- 6→ 61-2 hours
- 7→ 2 or more hours
- 8→ Other

Question 12 (*main purpose of NE*)

- 1→ Education/Knowledge/New Things
- 2→ Connect with Nature on a personal level
- 3→ Hands-On/Individual Learning
- 4→ Involve children in zoo/zoo purpose
- 5→ Education relating to animals
- 6→ Observation Skills
- 7→ Research Skills
- 8→ Education about Natural World
- 9→ Value of Nature/being a part of nature
- 10→ Excitement/Curiosity about Learning
- 11→ Excitement/Curiosity about Nature
- 12→ Communication Skills
- 13→ Writing Skills/Drawing
- 14→ Other
- 15→ Have fun

Question 13 (*anything done differently in NE*)

- 1→ More training of the staff in general
- 2→ More academic development for staff
- 3→ More training for staff in working with kids
- 4→ More choices of items to trade
- 5→ Line too long/disorderly
- 6→ More staff
- 7→ More live animals
- 8→ More communication/Better Explanation (points, act. avail, what age group, etc)
- 9→ Consistency of Points
- 10→ More diversity of activities overall
- 11→ More activities for young kids
- 12→ More activities for older kids
- 13→ Other
- 14→ Nothing

- 15→More resources (books, website, class)
- 16→More time with staff/staff-led activity
- 17→Other, negative

Question 14 (*anything else about NE*)

- 1→ Increase Activities (diversity/depth)
- 2→ Great staff (friendly, knowledgeable, etc)
- 3→ Staff need to be more approachable/trained
- 4→ Website/On-Line Acct/Newsletter
- 5→ Great resource, educational, positive/fun
- 6→ Review Point Values
- 7→ Issues with chaos/disorganization
- 8→ Praise for an activity
- 9→ Other
- 10→ Nothing
- 11→Overall Praise
- 12→Increased enjoyment at the zoo
- 13→Other, negative

Appendix G

Notes from Informal Observations of Participants in the Nature Exchange Program

Observations Took Place in March, 2007

Activity in Research Tent: Rock Star

- Children were encouraged to sort rocks into some sort of pattern or scheme. Some children chose to start sorting rocks on their own, without any encouragement, others needed more prodding.
- The staff asked questions about why children sorted the rocks in specific ways and why the rocks were different from one another.
- Each child was encouraged to fill out a form based on the activity they completed, as a way to take pride in what they had accomplished.
- Some children sorted the rocks based on physical characteristics such as size and color. Others created a pattern, such as solid vs. speckled or smooth vs. rough. One child made a design while keeping the rocks sorted by size.
- While working on sorting the rocks children made observations such as: crystals are not like rocks, this one is a lot larger than the other ones, etc. As children continued to sort, they also started making more observations about the rocks.
- The activity was staffed by a Nature Exchange volunteer who took on the role of a helper or guide.
- During my observations, parents or kids, not staff, initiated interactions.

Nature Exchange Research Area

- I observed a child who was approximately 1.5 years old sitting with both parents looking at pictures of animals and identifying what animal it was. The parents were encouraging the child to make the sound the identified animal made.
- The child sat and did this with the parents for approximately 15 minutes.

Nature Exchange Staff Interaction One

- A child entered with a paper sack of collected items. He picked up an activity sheet which asked for: a description of each item, why it's important, and three things that the child would like to know about his item.
- He asked his Mom if he should write or draw and his Mom said that he could do either. While filling out the worksheet the child counted (the number of rocks), observed his rocks (feel, size, colors), and worked at having the correct spelling. His Mom took turns writing but he always dictated.

- Once the sheet was filled out they went up to the Nature Exchange Desk to discuss it with the staff. The NE staff member asked where the child found the objects and asked the child to describe what he had written down on the sheet. During the interaction there was praise given such as “that’s really cool” or “great job.” The staff member also continued to probe the child to think a little more about the rocks, such as what different animals could use them for.
- At the end of the interaction, the child was given the choice of keeping or giving the rocks to Nature Exchange. In this case the child gave the rocks to Nature Exchange, and was able to use his points to obtain a new object.

Nature Exchange Staff Interaction Two

- This child chose to participate in a scavenger hunt activity. She was approximately six years old. She’d come in earlier in the day and picked up a worksheet which had questions about animals that could be found in the zoo such as, find something in the zoo with spots.
- After completing the worksheet, the child came in to the Nature Exchange Desk. The staff member followed up with questions such as: where does the animal live, how many legs does it have, and what does a spider make?
- After successfully answering the questions, the staff member helped the child pick out an item from the Nature Exchange Collection based on the points earned. The staff member helped the child pick out the item by asking questions such as: do you like it, what’s it called, what does it do?
- At the end of the interaction, the staff member praised the child for doing a great job.

Parent Involvement

- Some parents were very involved, and they worked at directing each step the child was working on.
- Multiple parents spent the visit to Nature Exchange on their cell phone.
- Some parents read the paper, but made themselves available to answer their children’s questions as necessary.
- Other parents oversaw all of the activities and acted as a guide. Then they praised their children at the end.
- Parents also chose to work side-by-side with their children, asking questions along the way, assisting with big words, and taking turns writing when children ask.

Appendix H

Summary of Staff Interviews

<i>Question (summary)</i>	Staff #1	Staff #2	Staff #3	Staff #4	Staff #5
<i>How did you get involved with the NE Program?</i>	Assisted in the planning and fundraising for Zoomazium.	I started out as an animal keeper & then I got interested in early childhood ed. NE was a good fit with education & conservation.	I interned at WPZ as a cashier and then I started teaching classes, and now I work with NE.	I started as a member of the Zoo Corps before working in Zoomazium and with NE.	I started as a member of the Zoo Corps and this is one of the sections I volunteer in.
<i>Do you feel that your childhood influenced your decision?</i>	In 6 th grade the staff member went on a field trip to an island, and can remember every aspect. This spawned an interest in biology, conservation, & education.	I spent a lot of time catching frogs, snakes, and lizards. I had lots of pets, and was always interested in every aspect of life.	I always had pets, and always enjoyed exploring. My dad took me camping and fishing a lot.	My Dad was a botanist and I grew up on a farm.	N/A
<i>How do you define “success” of NE?</i>	“...to create an experience for kids that translates from outside to learning.”	“...to foster an appreciation and understanding of the natural world.”	“...getting kids outside to explore nature.”	“...getting kids interested & wanting to learn about their environment.”	“...greater awareness of nature.”
<i>What visions do you have for the future of NE?</i>	<ol style="list-style-type: none"> 1) More well known 2) Increase number of dedicated traders 3) Celebration when a trader earns 1 million points 4) More collaboration among NE with local parks 5) More NE programs 	<ol style="list-style-type: none"> 1) Creating satellite stations 2) Outreach programs with schools & home-schools 3) Build more connections to other parts of the zoo 4) Hire more staff with experience. 	<ol style="list-style-type: none"> 1) Shift to having more repeat traders 2) Get kids to do more activities at home 3) Expand the web-site to include projects and pen-pals. 4) Run mini-classes such as GIS. 	<ol style="list-style-type: none"> 1) Help people to increase their level of connection with their surroundings. 2) Maintain a high level of personal interaction. 	<ol style="list-style-type: none"> 1) More items for trading 2) Get people to bring in higher quality items to motivate others.

Question (summary)	Staff #1	Staff #2	Staff #3	Staff #4	Staff #5
<i>What influences do you see NE having on visitors at this point? What influences does it have on you?</i>	N/A	The public loves it and sees it as a community learning resource	The experience is very rewarding and educational for staff and the kids.	N/A	N/A
<i>What improvements do you think should be made to the program?</i>	<ol style="list-style-type: none"> 1) More Staff 2) Figuring out how to mesh with the nature of the building 3) Figuring out how to stay true to the program and interactions with large amounts of kids 5) Getting exposure out about NE 6) Clearly defining the space 7) Have a staff member to explain the program, follow behavior, and assist each child 	<ol style="list-style-type: none"> 1) There's confusion about whether NE is a store, an exchange, or a learning space. We need to make this clearer. 2) Create more drawings, field notes, observation sheets, etc. 	<ol style="list-style-type: none"> 1) Improve the website 2) Get the word out about NE 3) Create a catchier, short way to explain NE 4) Create little stations around zoo grounds 5) Have NE be for the final trade rather than activity completion. 	<ol style="list-style-type: none"> 1) Have more programs, such as 1 workshop/month 2) Create planned times for discussion 3) Focus on native plants and animals 	<ol style="list-style-type: none"> 1) Have more activities that get people out on zoo grounds and in nature so that more application of what they are learning is happening. 2) Streamline the point system; have written up guidelines and a range of points for each project. 3) Pair two people when one person is brand new for enhanced training.
<i>Can you describe a typical staff/visitor interaction?</i>	...let the kids tell their stories, let them do the talking, build connections...a one-on-one interaction that leaves room for creativity but is consistent. The staff should act as a guide & spend 5-10 minutes w/ each child	N/A	N/A	Kids bring in an object and we talk to them about it. We ask questions about where it was found and what makes it special. We try to teach them something, and we try to get them to look outside.	N/A

<i>Question (summary)</i>	Staff #1	Staff #2	Staff #3	Staff #4	Staff #5
<i>What do you feel is the most important part of NE?</i>	Getting kids outside, raising their interest, and increasing their feelings of security in the outdoors.	N/A	N/A	N/A	N/A
<i>What do you think is the goal of NE?</i>	“...to provide opportunities for learning, to turn curiosity into learning, to heighten kids interest in nature, to give kids ideas about what to do outside, and to teach about ethical collecting.”	“...to teach the process of scientific inquiry...to inspire learning and reflecting...enhance the mission of the zoo...increase depth and connection to the natural world...to have a space that forces people to slow down—think, reflect, observe, learn, take responsibility and change behavior.”	“To increase understanding and appreciation of nature.”	“...getting kids interested and wanting to learn about their environment.”	“...to get involved in nature, learn to love it, and trick them into learning greater awareness.”
<i>What do you think the role of parents in a NE visit should be?</i>	1) Support outdoor activities 2) Be involved so that they can be reinforcers 3) Assist in guided play at the Zoomazium	N/A	Parents should be role models for the kids, and participation allows for family time. However, parents should not take over the learning process.	Parents need to stop answering kid’s questions. Parents also need to help take the message of NE to the outdoors and into the family’s life.	Parents should guide their children’s’ discovery. NE is a time for family growth, not a daycare. Parents should take messages from NE to somewhere else.
<i>Do you have any other comments/questions/thoughts that would be helpful?</i>	This program has value for young children—a 3 year old can get it, they can experience a positive effect.	N/A	NE has a lot of potential. We are hearing and seeing excited kids.	N/A	More people need to understand zoos and the conservation mission—if you don’t know how can you save?

Appendix I

Summary of Parent Interviews

<i>Question (summary)</i>	Parent #1	Parent #2	Parent #3	Parent #4	Parent #5
<i>Are you a zoo member?</i>	Yes	Yes	Yes	Yes	Yes
<i>How often do you visit NE?</i>	2-3 times/month	5-6 times/month	2 times/month	1 time/week	2-3 times/month
<i>What age are the children who participate in NE (yrs)?</i>	4, 6, 8, 12	5 & 7	10	3	5 & 7
<i>After participating in Nature Exchange, do you feel the program has impacted your child in any way?</i>	Yes, they notice things outside a lot more. For example, on the way to the beach they identify NE projects as they walk	Yes, they work on projects at home more to get larger prizes. They are also drawing, writing, and reading for other projects.	Yes, he's more interested in taxonomy and classifications.	Yes, it makes her think about what she's looking at and why it has certain characteristics.	Yes, they do more of the activities they enjoy anyways (like observations).
<i>On a scale of 1 to 5 (1 is low and 5 is high) how would you rate the following?</i> a) Availability of staff to interact with your child b) Nature Exchange Area c) Nature Exchange activities d) Opportunities for your child to learn new things e) Staff Expertise & Instruction	a) 4 b) 5 c) 4 d) 4 e) 4	N/A	a) 5 b) 5 c) 4 d) 5 e) 5	N/A	a) 3 b) 4 c) 3 d) 4 e) 4.5

<i>Question (summary)</i>	Parent #1	Parent #2	Parent #3	Parent #4	Parent #5
<i>How much time does your child spend in NE (per visit)?</i>	1 hour	30 minutes	1 hour	30 minutes to 3 hours	20-30 minutes
<i>Have other family members been involved in any act related to NE?</i>	The whole family participates in NE.	Yes.	Yes, we collect rocks together, look at fossil records, and press plants.	Yes, we go to the beach, collect shells, flowers and rocks to bring in.	Yes, we work together on reading/writing and ant observations at home.
<i>In which of the following NE activities does your child participate? (Trading, Scavenger Hunts, Field Research Projects, Drawing/Writing, Research Tent)</i>	All	Trading, Field Research Projects	Trading, Field Research Projects, Research Tent	Scavenger Hunts, Research Tent	Trading, Field Research Projects, Research Tent
<i>What would you say the goal of NE is?</i>	"... To get kids interested in the outdoors and the environment, teaching without knowing they are being taught."	"...to introduce kids and encourage them to look around and think about what they see."	"...teaching kids about different aspects of nature...teaching him to notice things and respect aspects of nature aside from animals.	"...get kids interested in science (biology and chemistry) and nature as a whole...how things work...how things grow...with hope that it will manifest itself in school."	"...to give kids more excitement...motivate learning and conservation."
<i>What, if anything, would you like to see done differently in NE?</i>	1) More programs where animals are brought in. 2) More formal programs.	1) Something more challenging and concrete for older children	1) Science classes for older children	1) Have more staff or more organization on the weekends and holidays.	1) Put more books out for younger kids. 2) Make the computer more accessible to young kids. 3) More consistency on points 4) Spruce up worksheets

