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Through the Eyes of Visitors: Understanding the Contexts of the Visitor Photo Study at the Denver Museum of Nature & Science

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THROUGH THE EYES OF VISITORS: UNDERSTANDING THE CONTEXTS OF THE VISITOR PHOTO STUDY AT THE DENVER MUSEUM OF NATURE & SCIENCE

A Thesis
Presented to
the Morgridge College of Education
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Master of Arts

by
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Abstract

This case study describes the analysis of the Visitor Photo Study, a study in which visitors to the Denver Museum of Nature & Science documented their visit through pictures. The origins, implementation, and findings of the Visitor Photo Study are considered within the contexts of the fields of Community-Based Research (Strand, Marullo, Cutforth, Stoecker, & Donohue, 2003b), Visual Studies (Marshall & Rossman, 2011; Pink, 2007), and Visitor Studies (Visitor Studies Association, 2012). This study considers the extent to which the principles and elements of each of these fields were present in the Visitor Photo Study, which elements were not fully realized or were missing from the study, and ways in which the Visitor Photo Study extends each of these fields. The value of this type of analysis and implications for museums, faculty, and students are also discussed.
Acknowledgements

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Chapter 1 Introduction

A museum of nature and science is a unique environment with a diverse mix of people. Children, families, students, scientists, curators, anthropologists, collections managers, researchers, and many others all collectively enjoy and benefit from their interaction with the museum’s collections and exhibits, and with each other. Places that started out as repositories of collections and places of scientific learning and experimentation have evolved into multi-dimensional spaces of learning, study, and entertainment, with a multitude of purposes within each of these facets. Understanding how these spaces are utilized and explored is important to effectively engage audiences, secure funding, and develop new exhibits. These goals all intertwine in various ways to form a complete understanding for museums as a whole. As a result, a study that is undertaken at a museum will, by necessity, have many different purposes and frameworks for its different audiences. Like the museums themselves, studies done within them involve complex combinations of research frameworks.

This thesis describes how a study of photos taken by visitors at the Denver Museum of Nature & Science that I conducted during the summer of 2011 can be framed in terms of three different fields: Community-Based Research (CBR), Visual Studies, and Visitor Studies. It explores the contexts of each of these three areas, how they uniquely came together through the Visitor Photo Study, and how this study compares to the
principles and elements of each of these fields. The guiding questions that directed this study are:

1. What were the origins, implementation, and findings of the Visitor Photo Study?

2. What principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies were present in the Visitor Photo Study?

3. What principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies were not fully realized or missing in the Visitor Photo Study?

and

4. How does the Visitor Photo Study extend the principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies?

These questions are addressed by framing the Visitor Photo Study as a retrospective case study. I looked back on all aspects of the design and implementation of the study that was undertaken during the summer of 2011 and reconsidered it in terms of these three fields of research.

**Origins of the Visitor Photo Study (The Case)**

The Department of Visitor Research and Program Evaluation at the Denver Museum of Nature & Science (DMNS) is an innovative department which seeks to understand the visitor experience. Their mission reflects these desires and their commitment to both the visitor and the museum itself:

The Department of Visitor Research & Program Evaluation is committed to proactive and rigorous examination of Museum programs, products and services.
Through an array of quantitative and qualitative methodologies (including surveys, interviews, focus groups, and observation), this work elevates the visitor voice and advocates for a continuous cycle of internal reflection, growth, and improvement. Using front-end, formative, remedial, summative, and process evaluation alongside testing and prototyping, the Museum is able to be both reflective and responsive to its varied audiences and publics—both within its walls and beyond (A. Giron, personal communication, February 13, 2012).

The studies that the department undertakes and the results that they produce are clearly guided by this desire to seek the visitor voice and consistent improvement of the museum experience.

In the summer of 2011, I served as an intern in the Department of Visitor Research and Program Evaluation at DMNS. I accepted this internship because it would allow me to determine whether the field of visitor studies was something I was interested in pursuing after completion of my degree, and also because it fulfilled my practicum requirement for my Masters of Arts in Research Methods and Statistics at the University of Denver. Working with Kathleen Tinworth, Andréa Giron, and Laureen Trainer, who are all staff in the Department of Visitor Research & Program Evaluation, I was charged with developing and implementing the Visitor Photo Study over the course of the summer.

The Department of Visitor Research & Program Evaluation at DMNS was interested in developing a new type of visitor study, a visitor photo study. They envisioned the purpose of the study to be to “see” the museum through the eyes of its visitors (A. Giron & K. Tinworth, personal communication, May 17, 2011). The study would document what the visitors see while they are at the museum, determine their paths through the museum, and help the department to understand what interests and engages visitors, in order to improve learning and entertainment experiences for children.
and adults. Visitors would be invited to document their experience at the museum by taking photographs throughout their visit using digital cameras provided by the study.

Another purpose that the museum staff envisioned for the Visitor Photo Study was to determine whether a photo study could be implemented in a museum the size of DMNS. A photo study had only been undertaken in a museum setting once before, by Rob Jakubowski in the Buffalo Bill Cody Museum in Cody, Wyoming, which is a small, one room museum (K. Tinworth, personal communication, May 17, 2011). Undertaking this project at the DMNS brought the study to a new scale and magnitude, as undertaking a photo study in a one room museum is very different from implementing it in a large multi-level museum housing over twenty permanent exhibits and multiple traveling exhibitions each year. A small test study was conducted by staff from the Department of Visitor Research & Program Evaluation in the summer of 2010, but this test did not move beyond the collection of data, as a coding scheme and protocol had not yet been developed. No results were reported in writing; rather informal results were provided anecdotally as I began the study (L. Trainer, personal communication, June, 2011).

Other purposes of the Visitor Photo Study were to determine whether and how photos could be used to track the level of visitor traffic in exhibits, to calculate the length of time visitors spend in different exhibits, and to map typical routes through the Museum. The study also sought to determine whether levels of visitor engagement in different areas and exhibits could be measured by considering the length of time and number of pictures taken within different areas of the Museum, as well as through examination of the types of pictures that visitors took during their visit. Developing a greater understanding of visitors’ perceptions of what is significant and important about
their visit to the museum was another goal. This information could be used to help improve the quality of visitor experience at the Museum, to focus Museum funding and initiatives, to improve learning experiences based on what holds the attention of visitors, and to develop exhibits that are tailored to meet the needs of different visitors based on demographic characteristics.

In developing the study, I took into account the goals and purposes that the Department of Visitor Research and Program Evaluation envisioned achieving from the study. I met with the team once a week for the first several weeks of the internship, to get a sense of what they were looking for from this study and what they wanted the final product to be. At the same time, I worked independently to develop the tools and protocols that would be needed to implement the study. Once the study began in late June, I met with the staff in-person less frequently. We held a meeting in the middle of data collection (mid-July) to problem-solve some issues that had arisen, and to confirm that the coding scheme that I had developed was what they were looking for. For most of the data collection, however, communication between the team and me took place through email and phone calls. This communication was key to my development and implementation of the study, and reassured me that I was on track with what the department was looking for throughout the process. Working with the team also allowed for input from each person involved in the study, and helped to ensure that important decisions were made collaboratively. It was through this process of developing the study, and the time spent in implementation and analysis, that cemented my knowledge of how the study did and should work, and opened up my eyes to the possibilities for future studies. Following the final submission of the findings report to the Museum and through
meetings with my advisors, I came to understand the potential to shape the significance of the study in terms of the fields of Community-Based Research, Visual Studies, and Visitor Studies, and began to consider the Visitor Photo Study as a retrospective instrumental case study.

**Significance of the Visitor Photo Study**

This type of photo study with museum visitors had never been undertaken before in a large city museum and the staff and I had several expectations for its’ utility. Through this innovative study of visitor experience, we would be able to understand what visitors experienced in the museum in new and innovative ways, and obtain valuable insight into the visitor experience to share with educators, curators, and other museum staff. This information would also have the potential to lead to improvements in the educational and entertainment experiences of visitors at DMNS. The study might open new doors for the Museum to understand where their visitors were going, what they were looking at, and where they were spending their time, without relying upon the traditional but costly methods of tracking and timing of the visitor experience.

We hoped that visitor-generated images would allow for larger amounts of data collection to occur simultaneously, limited only by the number of cameras available. This study would provide not only quantitative data about lengths of time spent in and popularity of exhibits, but also visual representations of visitor experiences and interactions with museum exhibits through their own viewpoints, rather than only through the separate viewpoint of the observer.

We also anticipated that the data obtained from the Visitor Photo Study would also provide opportunities for further research, such as delving deeper into the
photographs taken in different sections of the Museum to further understand movement and experiential processes within individual exhibits. We hoped the use of photos would allow for the development of common paths through the Museum and promote the expansion of resources and the creation of learning experiences based on typical visitor patterns of exposure and interaction. Visitor-generated images might also be used to advocate for certain types of learning experiences which have been shown to hold visitors’ attention to be brought to the museum. The study might also be used to improve the educational quality of the typical museum experience by making exhibits more accessible and approachable.

We were curious whether combining visitor studies research with visual studies research in this way would allow for new doors to be opened and new conclusions to be drawn. The use of the “voice” of the visitors through the images which directly share their museum experience with the audience was a new strategy of visitor studies and opened potential opportunities for and uses of the data. Meanwhile, the use of images generated by the visitors themselves would expand the potential of visual qualitative research into the field of visitor studies.

However, it was only after the study was completed that I began to realize that the partnership between myself as a student researcher and the DMNS, along with the insight and opinions of the visitors themselves, contained elements of the fields of CBR, Visual Studies, and Visitor Studies. It is the juxtaposition of these three fields of study, along with the potential new understandings of the experiences of museum goers, that makes this study a significant addition to each of these fields, and proposes future directions for
combining these distinct types of research in the future. The final report submitted to DMNS following the Visitor Photo Study is included in Appendix A.
Chapter 2 Literature Review

The Visitor Photo Study serves as the case for this case study that is framed within the three fields of research: the purposes, practices, and implementation of community-based research; the use of visual data in qualitative research; and the use of visitor studies methodologies to understand museum visitor learning and experience. These three fields form an interesting dynamic and provide a more complete picture of the Visitor Photo Study, and its unique ideas and implications for all three fields.

Community-Based Research

Community-Based Research: What is it and why is it relevant? The field of Community-Based Research seeks to “create or discover knowledge that meets a community-identified need” (Strand, Marullo, Cutforth, Stoecker, & Donohue, 2003a). It stems from traditional research methods, but diverges significantly in terms of its’ goals and outcomes. With CBR, the ultimate goal is to provide useful knowledge and information to a community organization, as opposed to traditional research approaches, where studies are so often undertaken simply for the creation of knowledge without collaboration with the people whom the knowledge is being created about or for (Strand, Marullo, Cutforth, Stoecker, & Donohue, 2003b). In CBR, it is the community itself that identifies the problem or issue that they are interested in understanding, and works closely with the research practitioner to discover solutions (Selove, Scammell, & Holland, 1998). The goal is for the partnership between the researcher and the
community organization to clarify the issue, and generate supporting evidence for how it could be changed or resolved (Stringer, 1996).

Another key facet of the field of CBR is the collaboration of community partners with universities (Puma, Bennett, Cutforth, Tombari, & Stein, 2009). Universities have the resources and the research skills, along with students seeking practical experience, and community organizations have the understanding of their populations and their unique situations and goals. Bringing these two groups together creates a partnership that can combine all of these assets to achieve their desired results. Further benefits to community organizations and to students involved in these types of research projects will be explained below, in the sections labeled Benefits to community organizations and Benefits to students.

Community-Based Research is relevant and valuable to the present-day research community because of its ability to return results that are directly applicable to the issues at stake. The topics of the research originate with the community organizations, and the research methodology is developed to directly inform the activities of the organization (Nyden, Figert, Shibley, & Burrows, 1997). Community-Based Research is also flexible. If the original methodology is not meeting the needs of the community organization, the partners will change the research design, in order to ensure that the study results in useable data. Qualitative and quantitative approaches are both valued in CBR, along with more creative data collection methods, such as video or photography (Strand et al., 2003a). Use of these different methodologies ensures that study results are accessible to the community that the research is serving. Clearly, CBR is more interested in alleviating
the problem or understanding the issue than it is in proving a hypothesis incorrect (Sclove et al., 1998). It is an iterative process, with cycles of research, reflection, and action on the part of the partnership group (Marshall & Rossman, 2011).

The three key facets of CBR are collaboration between research practitioners and community partners; democratisation of knowledge, with the understandings of each partner valued equally; and social change, where the result of the research is positive change, development, or capacity building for the organization (Strand et al., 2003a). The following sections will discuss each of these facets in more specific detail.

**Collaboration.** Collaboration between community partners and research practitioners is essential for the success of CBR projects. It is this collaboration that ensures that the study is focused correctly and that the results will meet the needs of the community partners and community organizations. Collaboration should occur at every stage of the research process, from developing the research methodology to writing the final report (Strand et al., 2003a). Often, this means that each stage of the process takes longer, as it is always necessary to come to consensus (Strand et al., 2003b). While this level of collaboration is not always possible, it is the ultimate goal of CBR. However, in practice, the level of collaboration between all members of the team at each stage of the process depends on factors such as time, expertise, and interest on the part of the community and university partners (Strand et al., 2003b). Ultimately, it is very important that full collaboration occur at the crucial stages of identifying the research questions and the need for the research, and during the final dissemination stage of the findings (Strand et al., 2003b). This ensures that the unique perspectives of all partners are included in the
critical design, dissemination, and implementation phases, while the collaboration at other stages may be on an as desired basis. Collaboration is often more enjoyable for the community partners and the students involved in the process than more traditional research approaches, because this collaboration allows their voice to be heard, and allows for direct participation and understanding of each stage of the research process (Nyden et al., 1997).

Democratization of knowledge. Community-Based Research is intentionally collaborative and democratic. Researchers work directly with the community partners, and value their ideas and understandings of the problem as equal to their own (Greenwood & Levin, 2007). The needs of all potential users are taken into account as the study is designed and implemented (Puma et al., 2009). Each person in the group learns from each other, and builds their own understanding of the issue and the contexts that surround it. Democratization of knowledge goes beyond prioritizing the input of all partners in the research process equally, however. It also means that the methodologies that are selected are chosen based on their ability to contribute meaningfully to the study. This means that unconventional approaches to data collection and analysis are often used, and the methods are developed based on a desire to obtain the most useful and relevant information for the question at hand (Strand et al., 2003a). Deciding on the types of analysis to be done is also an iterative process, with all members participating equally to determine additional directions as a greater understanding of the data emerges (Strand et al., 2003b).
**Social change.** Community-Based Research also has a specific goal of achieving social change as a result of the work that is done. This may involve improving programs, ensuring new resources, or providing a greater understanding of the needs of a specific population (Strand et al., 2003a). A CBR project should also empower the organization to be able to continue to tackle the issues that it faces, and encourage them to change processes and structures that limit opportunity (Strand et al., 2003b).

**Benefits to community organizations.** The use of CBR provides many tangible benefits to the community members who partner with the research practitioners. First, the capacity of the organization is strengthened (Strand et al., 2003b). Working with a research team gives the community organization valuable research experience and an understanding of the process needed to find actionable results. The results of CBR projects also help to ensure that the organization’s resources are used effectively and efficiently, and CBR itself is generally more cost effective for the community organization (Nyden et al., 1997; Sclove et al., 1998). Participation in research also opens up new opportunities and access to further resources and connections for community organizations. These connections can help to continue to strengthen the organization, and ensure that changes made as a result of the research projects are implemented effectively, with long-term results taken in to consideration (Strand et al., 2003b). Along with these connections, the community organization often develops a lasting network of connections that they can call upon when challenges arise, leading to future research partnerships (Nyden et al., 1997).
Community partners also directly benefit from having their experience and expertise called upon and applied throughout the research process (Strand et al., 2003a). This not only validates their experience, it also empowers them to continue to engage in the research process, and to use the results. Perhaps most significantly, CBR projects produce useful and usable results (Patton, 2002). By partnering directly with the community they are studying, and tailoring the project to meet their unique contexts and local needs, CBR projects ensure that the results that they achieve will be meaningful to the communities, because they directly affect their lives and situations, and will also be used, because buy-in for the project has been maintained throughout through the inclusion of the community partners themselves.

**Benefits to students.** Community-Based Research provides students with hands-on, practical, and memorable experience in research that differs significantly from what they learn in the classroom (Nyden et al., 1997). This practical experience can cement a desire to pursue further research in the community. Students also gain an understanding of the experience of research outside of traditional academic pathways. They learn:

- the capacity to think critically about social policies and conditions, the ability to access and evaluate information, the skill to work with others on projects that recognize and require multiple contributions, and a sense of politically efficacy that will drive one to take on the challenges of active citizenship in a participatory democracy (Strand et al., 2003a, p. 216).

This understanding and experience of the world outside of the classroom is invaluable to ensuring that research remains relevant for the student. Students also learn the importance of understanding the contexts of the research they are involved in (Stringer, 1996). Community-Based Research ensures that they are working directly with the community
members themselves, who can relay a direct and intimate understanding of the research setting and the need for the project in the first place, and the multiple uses for it.

Participation in CBR projects also directly increases students’ skills and knowledge. Students gain an understanding of the community and how to gather data within a specific context, and learn through being involved in the analysis of actual data that will be used to make changes in programs (Strand et al., 2003b). Writing up results and seeing the actual application of findings assures students of the relevance of their work as well. Students also learn management and project organization skills, as the collaborative nature of CBR projects ensures that they will be involved with these aspects of the project, at least to some degree (Nyden et al., 1997). Lastly, working on CBR projects allows students to develop an overall sense of efficacy about their own skills and abilities, and allows them to realize that they have real and tangible contributions to make to the research project (Strand et al., 2003a). This sense of efficacy will almost certainly carry over into future projects that students work on, giving them the confidence to meaningfully participate in research endeavors.

**Preparing students for CBR participation.** Preparing students to engage in CBR is another key component of the process. Positive student outcomes depend not only on the quality and fit of their connection with the community organization, but also on their preparation and ability to effectively engage with the organization and the research process as a whole (Strand et al., 2003a). According to Strand, Marullo, Cutforth, Stoecker, and Donohue (2003b), there are four key challenges to implementing CBR with students: finding a disciplinary connection, building CBR into the curriculum, ensuring
student readiness, and structuring the CBR experience. Attending to these elements ensures a more productive experience for all parties involved in the CBR project. In finding a disciplinary connection, instructors working with students on CBR projects should ensure that the project is applicable to the subject matter of the student’s discipline. Often, CBR projects work well with courses that focus on research methods, or work as internships, practica, or as dissertation or thesis work (Strand et al., 2003b). Building CBR into the curriculum involves a certain level of flexibility, as it can be challenging to fit into the traditional school cycle, and often involves a greater time commitment from the instructor, to ensure that the projects remain on track and are meeting the needs of the community organizations. This may mean that a CBR project taken for credit will need to span over a summer and a semester, or over multiple terms, to ensure that the project is given adequate attention (Stocking & Cutforth, 2006).

Preparing students for CBR projects involves making sure that students not only understand the principles of CBR, but also that they have an understanding about the community that they are entering into. Research skills are also important, but can be modeled and developed throughout the CBR process (Strand et al., 2003b). Structuring the CBR experience involves developing course requirements which are flexible and capable of dealing with the complexities of the CBR experience, which is by nature less structured than other research projects. It is also essential that instructors are available to students, both through structured meetings and informal communication, to navigate challenges as they arise. A third key component of structuring the experience is to define the parameters of what is expected of the students for both the community partners and
the students themselves, so that everyone is on the same page about the level and amount of work that will be done. This is especially necessary given student time constraints in light of their other classes and outside time constraints (Strand et al.). Along with understanding the parameters of the project, instructors should facilitate student collaboration on community-based research. Allowing students to partner with one another through the research project provides them with a support system as they work through the project, someone whose skills can complement their own (Strand et al.).

Research also indicates that it is important for students to understand the nature of CBR work before they get involved with it. This means that students need to understand not only that things will not always go as planned, and also that there is more at stake when working with community partners, who expect and deserve an finished outcome to the research within an acceptable time frame. This may mean that the success of a student’s CBR experience may rest largely on their own commitment to the experience. As Stocking and Cutforth (2006) explain, “[i]t is clear that CBR cannot be successful without flexible, talented students who are motivated to make a difference for their community partners through research and who are willing to gain the skills necessary for project completion” (p. 62).

Clearly, there is much that can and should be done to ensure that students are prepared for CBR projects. However, there is still room for further discussion about how to best support students throughout the process, especially in light of the fluid and emergent characteristics of CBR. Though the Visitor Photo Study was not explicitly designed as a CBR project, it includes many elements common to CBR. The
collaboration between myself and the Department of Visitor Research and Program Evaluation represents the coming together of a student and a community organization. Though the department is quite capable of conducting research and evaluation projects in its own right, the amount of time involved with the Visitor Photo Study would have been prohibitive to the department if I had not worked alongside them on this project.

Elements of the principles of collaboration, democratization of knowledge, and social change were all present to some extent in the Visitor Photo Study, which will be explained in chapter 4. Additionally, both myself as a student and the Museum gained tangible benefits through working on this project together. Thus, it is clear that despite the fact that the Visitor Photo Study was not explicitly designed as CBR, it benefited from the inclusion of many of the elements of the field.

**Visual Studies**

Visual Studies is a unique field within qualitative research. It is used less often than other qualitative methodologies, but can provide fascinating and distinctive data, as is the case with the Visitor Photo Study. Image data differs significantly from other forms of qualitative data. Through a visual study, researchers learn about the experience of participants through images, and possibly the participants’ explanation of the images. These images reveal different insights than purely verbal or written accounts of experience. As Gillian Rose (2007) explains in *Visual Methodologies*, “Photos allow you to believe that an abstract tale has real flesh, blood, and life” (p. 247).

In using visual data, the researcher allows photos to do work that cannot be done by other means (Rose, 2007). Photos present the experiences of the participants in more
concrete ways than other methodologies. Yet, images may be infinitely more complex as well, and paradoxically resist single interpretation by either the participant or the researcher. But these visual representations are also evocative, and allow the researcher to experience the world through the worldview of the participants themselves, while at the same time considering their own interpretations and understandings of the experience (Marshall & Rossman, 2011). Images reveal the subjectivity of the individual reality, which is known only as it is experienced by the individuals themselves. Yet, the images also reveal a deeper understanding of how this reality is produced, and provides researchers with a closer view of the worlds that people live in (Pink, 2007).

A study of images engages the researcher in a different way than written data, permitting and even encouraging these varying interpretations and understandings of the images. Looking at images produced by participants may provide the researcher with new insights into subtle relationships and characteristics that might otherwise be downplayed or completely overlooked (Prosser & Schwartz, 1998). They may also encourage and provoke the researcher into reconsidering categories and understandings that were taken for granted (Banks, 2007). This pull toward a deeper, richer, understanding of the human experience is exciting and intriguing. In fact, studying visual data leads research in “new directions in a way that matches the fluidity and flux of human experience itself” (Banks, 2007, p. 120).

Are photographs meaningful? Photographs are made at a specific point in time and represent that specific point in time. There is a belief that their images mirror reality, and as such they possess a certain credibility that other visual data (such as artistic
representations) lack (Ball & Smith, 1992). Yet, interpretations of photographs are also arbitrary and subjective, with meanings often dependent on who is looking at the images. Visual ethnographer Sarah Pink (2007) describes analysis of photographic data as an understanding of the “connection between visual images and experienced reality [that] is constructed through individual subjectivity and interpretation of images” (p. 32). This construction may be made by the participants themselves, or may be made by the researcher, whose academic meanings given to the photograph are also subjective, and created in the context of particular methodological and theoretical agendas (Pink). As such, it is important for the researcher to consider all of these competing agendas (of both participant and researcher), and not prioritize one interpretation over the other. These layers of meaning and context make photographic data particularly rich evidence, and considerably different from data collected through other research methods (Marshall & Rossman, 2011).

**Analysis of visual data.** Historically, visual data in social science research was not used analytically, but rather as evidential data to provide further representation of a finding or theme that had already been made explicit through written analysis of qualitative or quantitative data (Ball & Smith, 1992). However, as the field of visual research has grown, analysis has become a more essential component of visual data’s use in research. While there is little general agreement on the way that specifically visual analysis should proceed, practitioners agree that the general principles of strong qualitative analysis should apply to visual data (Emmison & Smith, 2000; Prosser & Schwartz, 1998). These include an explicit research design, standards of evidence and inference, and logical connections to research questions. Like analysis of other forms of
qualitative data, analysis of visual data involves inductive analysis throughout the project, beginning during the data collection process (Prosser & Schwartz, 1998).

Visual data may be considered in terms of the binary oppositions present, the frames an image is presented within (context), the genre of the image, the narrative of the image, through a process of “decoding” the image, or through the identity that is involved with a particular image, or the way that people relate to the image. Visual data can also be quantified using a systematic coding scheme (Emmison & Smith, 2000). However, “scientific approaches to social research tend to categorize images are most commonly analyzed in terms of their content and chronology” (Pink, 2007). I would add that context is also a vital categorization component of visual data. Analysis of visual data in terms of content, context, and chronology will be further elucidated below.

**Content.** Content analysis strives to determine the frequency in which themes and categories appear (Ball & Smith, 1992). When content analysis is done with visual data, analysis is done on the activities, people, and objects that are in the image. Representation and meaning of the images (both by the participant and the researcher) are also taken into account (Pink 2007). Often, this is considered to be arbitrary, as different meanings can be subscribed to the content by different viewers (Banks, 2007). However, in a study like the Visitor Photo Study, the content of the images can be revealing on a necessary level, because they allow the researcher to see exactly where the participant was at a particular time, and also to see what they were looking at, even if this should be considered generally. While the researcher cannot construe what the participant was
thinking at any given point in their visit, the images provide tangible evidence of what they saw.

**Context.** Another key aspect of analyzing visual data is the context. It is important to consider not only the context within which the image is produced, but also the context in which the image is viewed and analyzed (Pink, 2007). Understanding both of these contexts and how they influence understanding of the content of the images is important. It is through this context that photos get their meaning, and through context that interpretations of images are validated (Prosser, 1998).

**Chronology.** The third key factor in the analysis of images is chronology. Through the chronology of images, the researcher can understand a narrative of the images as they were created. This chronology of images, considered in their original order, helps to center the images in the research process (Pink, 2007). While it has been suggested that the order in which events are experienced may different from the way that they are spoken about and remembered, in the context of the Visitor Photo Study, chronology does share something very important about the visitor experience: the order that the visitor moved through the Museum. In addition, it is the noting of the chronology through the use of the time stamp that makes the photo data so interesting, because it allowed me to see what time it was when visitors reached certain areas of the museum, and also how long they stayed in different exhibitions (Emmison & Smith, 2000).

**History of visual data in qualitative research.** Using photographic data as evidence is historically linked to the fields of anthropology and ethnography. In these fields, images taken by the researcher were used as systematic recordings of events and
cultural groups (Marshall & Rossman, 2011). However, its legitimization as a way to report research findings has been questioned, and has only recently started to be recognized as a scientific source of data (Prosser 1998).

Currently, the use of visual data in research has become more popular. Researchers are realizing the potential of photography and video as a way of exploring individual and subjective experiences, and also as a unique way of engaging participants (Pink, 2007). As Emmison and Smith (2000) explain, photographs can be used to provide insight into the “character of relationships between groups or institutions” (p. 63). They caution, however, that these images should not be seen as an accurate source of information about behavior and lifestyles. Photography in qualitative research has also grown in popularity because of its collaborative nature (Banks, 2007; Rose, 2007). People may choose how they respond when a photo is being taken of them, and if they are given the camera, they are provided with a clear outlet for self expression. These two different forms of visual research, images produced by the researcher and images produced by the participants themselves, are both commonly used, though with distinct end results.

Images produced by the researcher are often used when a systematic recording of behavior or interactions is desired (Emmison & Smith, 2000). Fields such as anthropology and ethnography often use the technique of photo documentation, in which images are systematically made by the researcher. In this methodology, each image is carefully linked to the research topic. These images include field notes, and they are generally coded for content and to validate and confirm other types of analysis (Rose, 2007). However, some criticism of researcher-generated images arises from the fact that,
just as with other forms of observation, when a researcher takes photographs they are always from the perspective of the researcher, who has decided what to focus on and how it should be interpreted (Marshall & Rossman, 2011).

As a result of criticism of researcher-generated images, the use of participant-generated images has grown. Participant-generated images are powerful and useful for several reasons. They allow the researcher to see parts of participants’ lives that are not easily visible or are unavailable to the researcher (Banks 2007). They provide the participant with a sense of ownership of their experience with the research, allowing them to reveal what is important to them and select the aspects of their experiences that they want to emphasize (Marshall & Rossman, 2011, Pink, 2007). They also allow the researcher to see the world from the position of the participant (Schratz & Stiener-Loffler, 1998). Several studies have provided cameras to children and allowed them to document their experience with science, with their classroom, or with their world outside of school (Cook & Buck, 2010; Quigley, Cook, Escobedo, & Buck, 2011; Schratz & Stiener-Loffler, 1998). These studies not only provided students with a way to actively engage in the research experience, but they also allowed them to grow in their understanding of their own worlds, and to reflect on their everyday experience in a way that they do not normally do (Quigley, et al., 2011). Cook and Buck also found the photo study to be a “powerful tool for engaging students in building their higher order thinking skills, decision making skills, and their understanding of scientific knowledge” (p. 38).

Participant-generated images have also been used in community settings to gain a greater understanding of the world views of a group or culture (Emmison & Smith, 2000).
This use of images in school and community settings has become known as part of a new participatory methodology known as photovoice. Photovoice is a methodology that allows people to record aspects of their lives from their own perspective, and uses photography to document social and community issues in order to influence social policy (McIntyre, 2003). It privileges the experience of the participant, and treats seriously what these participants notice and document as a part of their lived experience (Ball & Smith 1992). Photovoice specifically seeks to be empowering to the participants, allowing their images to be part of a call for change and improvement in their communities (Marshall & Rossman, 2011; Photovoice, 2012). Through the use of photovoice, research is seeking to specifically empower disadvantaged groups to improve and change their situations through participatory community action.

The Visitor Photo Study at the DMNS is uniquely situated within the field of Visual Studies. The images that visitors created not only have the potential to track the path of the visitor group through the museum, but also to tell the “story” of the group’s visit, allowing the museum to see not only where they went in the museum, but what they were looking at while they were there. The images provide a glimpse of what the visitors found interesting and engaging, and allow the museum to see it on the level of the visitor as well. Images that were taken by children clearly reflect their worldview and level of understanding of what they encountered in the Museum; images taken by parents reveal the interactions of their children and family with the exhibition content; and images by couples or groups of adults reflect their own unique level of interest and engagement at the Museum.
This study moves beyond the use of the researcher-generated images in qualitative research, expanding directly into the use of participant-generated images, which allow the researcher to understand the experience of the participants in a uniquely personal manner. The study is participatory in nature, allowing visitors to shape their own experience with participation in research, and also to provide their own insights into what they think is important at the Museum. It also draws upon aspects of the empowering photovoice methodology, in that it allows the researcher access to the experience of the visitor, which they would not otherwise have, as it is intrusive to the visitor experience to follow visitor groups for extended periods of time, and impossible to follow one than one group at a time. The use of participants’ images allows for the researcher to understand the experience of multiple distinct groups who visited the Museum during the same time period.

The use of visitors to generate their own data, sharing what is important and valuable to them also connects with the community-oriented goals of CBR, indicating that the use of visual data within this context provides a distinctive way to encourage participation in community research.

**Visitor Studies**

**History and purpose of Visitor Studies.** Understanding the role that museums play in the life of individuals and communities is a fascinating and complex subject. This understanding of how museums impact society is the role of museum studies (Schwarzer & Edson, 2001). More recently, the focus of many museums has turned from museum studies to understanding the way that people relate to and learn within museums. This
The visitor-centered rather than museum-centered approach is known as the field of visitor studies (Schwarzer & Edson, 2001). With the financial challenges museums face from less availability of public funding for support and maintenance, museums have had to focus much more intently on attracting and maintaining a visitor base (Falk, 2009). This has meant a shift in the focus of the museum role from maintaining and preserving collections to also meeting the multiple needs of visitors for a functional, comfortable service environment (Packer 2008).

Initially, Visitor Studies focused on the management of visitor behavior while in the museum. Understanding how to maintain an enjoyable experience for visitors despite large crowds in small spaces was a primary topic, and studies focused on aspects such as how to draw the attention of visitors to less publicized routes through behavior management techniques such as the natural tendency to turn right at an intersection (Shackley, 2000). While behavior management strategies are still an important aspect of study for museums and other historic sites, especially extremely busy ones with large numbers of visiting tourists each year, the field of Visitor Studies has also shifted to focus more directly on the experience of the visitor while at the museum. This has resulted in research and strategies to provide quality experiences for many different types of museum visitors and audiences (Doering & Pekarik, 1996).

Another focus of Visitor Studies has been to understand the visitor experience in order to better understand how to attract visitors. As John Falk (2009) explains,

If we knew the answers to the questions of who goes to the museums, what do people do once they are in the museum, and what meanings do they make from the experience, we would gain critical insights into how the public derives value
and benefits from museum going, which we could use to improve museums (p. 21).

Understanding the experience of visitors, from their decision to visit a museum to the end of their visit, requires museums to acknowledge that going to a museum as a leisure activity, as most visitors outside of school groups do, is very different from going to the museum with specifically defined learning goals (Doering, 1999). It is the museum’s responsibility to be receptive to the unique agendas of individual visitors, who come to museums with their own backgrounds, perceptions, and understandings of the world, through which they perceive the museum, and which shape their museum experience (Doering). Through acknowledging the complexity of these multiple relationships museums can understand how to engage visitors in the learning process, and help them to “build bridges” between their current knowledge and understanding and their new found connections to ideas (Mastai, 2007).

Encouraging visitors to make these connections means that visitors need to become quickly engaged in their experience, getting some meaningful, provocative, or relevant feedback quickly, or their attention will turn elsewhere (Serrell, 1997). Understanding how to engage visitors quickly is a key facet of Visitor Studies, together with the search for how to best understand how visitors move through museums. How visitors move through the museum “determines what visitors will see, where they will focus their attention, and ultimately, what they learn and/or experience” (Bitgood, 2006, p. 463).

**What do we know about the visitor experience?** Visitor Studies has developed an extensive body of knowledge about the visitor experience. Studies have discovered
some of the reasons that visitors come to museums, the influences of social and personal contexts, and factors that influence the visitor path through the museum and visitor learning. Each of these facets of the visitor experience will be explained below.

**Why visitors come to the museum.** Several demographic factors influence museum attendance. First, the level of an adult’s formal education has been shown to be a predicting factor for museum visits, with those adults with more formal education tending to visit museums more often (Doering & Pekarik, 1996). Other factors influencing museum attendance include social class (wealth equates to more visits), age (younger people are more likely to visit), gender (women are more likely to visit than men), and race (Caucasians visit more than minority groups) (Falk, 2009). Interestingly, advertising has been shown to have little impact on visitor attendance at museums, with advertising resulting in only about 20% of total museum visits (Falk 2009).

**Social context.** The social context of the museum experience is an important component of the visitor experience. Visitors experience museums as social experiences, where interacting with others in their group is a key component and aspect of the experience (Silverman, 2010). Social contact also refers to the visitor’s interaction with other museum visitors, as well as museum curators and other staff (Rennie & Johnston, 2004). These components impact many aspects of the visitor experience, from the paths that visitors take to the knowledge they gain, to the connections they make.

**Personal connection.** Personal aspects that museum visitors bring with them also greatly affect the visitor experience. What visitors see and understand in art galleries and in museum exhibits is influenced by the knowledge that they already have about the
subject (Schloder, Williams, & Mann, 1993). Personal experiences, memories, and emotions allow visitors to contextualize the museum experience into their current narratives and understandings of the world (Doering & Pekarik, 1996). Visitor preferences have also been shown to be significant. Visitors may connect most to ideas, objects, or people, and exhibits that directly convey each of these types of approaches will influence the most types of visitors (Pekarik & Mogel, 2010). Overall, the most satisfying museum experiences for visitors are those which “resonate with their experiences and provide information in ways that confirm and enrich their existing view of the world” (Doering & Pekarik, 1996, p. 47).

Visitor paths through the museum and time spent. Like its influence on the level of the visitor’s satisfaction with their museum experience, visitors’ movement patterns through the museum are also influenced by prior knowledge and interests (Bitgood, 2006; Mastai, 2007). The museum’s design and other physical aspects such as amounts of open space and the placement of exhibits have also been shown to influence visitor movement (Sandifer 1997).

The amount of time that visitors spend looking at an individual exhibit varies greatly, but studies have shown that it generally ranges between five and fifteen seconds (Falk, 1983). While this amount of time may seem small, Visitor Studies practitioners caution that the visitor experience must be considered more holistically than simply through time, which should not be used as an indicator of the quality of a museum visit (Schloder, Williams, & Mann, 1993). This is especially evident in light of the numerous
other aspects that influence the museum experience, including social and personal contexts.

**Learning.** Visitor learning is another key aspect that interests Visitor Studies researchers. Studies have considered the factors that influence learning, including health, personal motivation, level of literacy, age, gender, and past museum experience, among others (Falk, 1983). Studies have also addressed how active participation in museum experiences combines social interactions with factual knowledge to create new and engaging learning environments (Wood & Wolf, 2008). Practitioners have also focused on the uniquely personal aspects of learning, especially in the museum context, in which, because there is no formal learning goals, visitors construct their own learning based on their interests and experiences (Doering, 1999; Rennie & Johnston, 2004).

**Types of visitor studies.** Understanding the visitor experience can be difficult. Often, measures that are used to track visitors are time- and labor-intensive, and can be intrusive to the visitor group. Site records are often unreliable, so getting accurate information about the numbers and types of visitors can be very difficult as well (Shackley, 2000).

Traditional methods of understanding learning experiences can also be difficult in museum settings as pre- and post-tests are “inappropriate for museum visitors, who are under no obligation whatsoever to learn anything” (Serrell, 1997, p. 109). Thus, more studies have focused on understanding the experience of the visitors than have sought to determine levels of learning.
Participation surveys are often deployed when the museum is interested in understanding visitor characteristics and demographics, or the self-reported quality of the museum visit (Kirchberg, 1996). Visitor panels are also used when museums need quick feedback in order to fine tune displays or experiences, making immediate changes based on the feedback from the visitors (Fischer, 1996). Qualitative interviews provide a more complete picture of what visitors did, and why they made the decisions that they made (Wood & Wolf, 2008).

A method known as tracking and timing has been used quite extensively in Visitor Studies. In tracking and timing studies, a researcher follows a visitor at a distance, and makes notes of where they go, how long they stay there, and what types of behaviors they display. Often, a researcher will code for engagement behaviors as a way of understanding what visitors are interacting with throughout their visit (Wood & Wolf, 2008). Tracking and timing practitioners assert that the amount of time that visitors spend in an exhibition, along with the number of individual stops at different exhibits within the overall exhibition, are systematic measures, and could be used as indicators of learning based on understanding the numbers and types of engaging behaviors visitors exhibit during a specific time (Serrell, 1997). These studies are generally undertaken in an individual exhibit rather than an entire museum visit, however. The timing aspect of tracking and timing is considered to be an important measure of visitor engagement. The amount of time spent at an exhibit has been correlated with greater visitor recall about and interest in their experience (Sandifer, 1997).
Understanding more about the nature of visitor groups, rather than focusing on individual visitors, has been a focus of visitor studies in recent years. Studies have begun to focus on the family knowledge that is brought to an exhibit, and shared across generations, and on understanding how families interact with their children during their museum visit (Strerry, 1996; Wolf & Wood, 2008). Understanding the differences between family groups and non-family groups in terms of time and experiences is another focus of the research on visitor groups (Sandifer, 1997).

**Engaging the visitor in Visitor Studies.** Another key aspect of Visitor Studies in recent years has been determining how to best engage the visitor in the research and evaluation process. Museums have come to recognize the critical importance of the voice of the visitor in the design and implementation of museum exhibits, and also in understanding the visitors’ own experiences (Silverman, 2010). This has led to studies that focus more closely on the visitor’s point of view, rather than that of the museum. It has also influenced how carefully museums work to understand the true intent and meaning of visitors’ comments and actions, and applied these understandings to improvements within the museum (Doering, 1999; Schloder et al., 1993). In the most concrete sense, this means that the data that museums obtain about visitors and their experiences must at some point come directly from the visitors themselves. As Rennie and Johnston (2004) explained in their article “The Nature of Learning and its Implications for Research on Learning from Museums,” “there is a sizeable inferential gap between observing and interpreting. Seeing through the eyes of the visitor means that, at some stage, data must be collected from the visitor, and this requires self report
data or recording what visitors both say and do” (p. S8). This is shift from the observational methods of tracking and timing to methods that clearly engage the visitors themselves in the research project. However, there is also potential for this level of engagement to impact the visitor experience and change the visitor’s behavior (Rennie & Johnston). Museums are still grappling with the best ways to engage visitors without fundamentally changing their experiences.

Other applications of engaging the visitor include providing visitors with opportunities to advise museums, by sharing their ideas and opinions and helping to shape museum projects and directions (Silverman, 2010). This type of engagement also allows the museum to more closely understand what the community and its members’ needs, and to help the museum to meet those needs. In these contexts, the role of the visitor in the research process has moved outside of the visit experience, and allows the visitor to engage with the museum in a different capacity, thus negating the impact their participation has on the museum’s understanding of the visit itself.

Clearly, Visitor Studies is an interesting and engaging field that has a long and varied history of seeking to understand the visitor experience, including what engages visitors, how to promote learning, and how to understand how visitors move through the museum, and the reasons for their choices. Yet, the field still has much to learn about the best ways to engage visitors, and allow them to play a greater role in the direct understanding of the visitor experience.

The Visitor Photo Study clearly includes elements of Visitor Studies throughout the study. Beginning with the location of the study and continuing through the inclusion
of elements of understanding the visit, visitor engagement, visitor learning, understanding visitor groups, and engaging the visitor in the research process, the Visitor Photo Study includes enough elements of each of these areas, which will be further explored in Chapter 4.
Chapter 3 Method and Analysis

This chapter details the method that was used to understand the Visitor Photo Study within its own origins, implementation, and findings, and through the lenses of the fields of CBR, Visual Studies, and Visitor Studies. It also describes the way that the data was analyzed to produce the findings provided in Chapter 4.

Method

The case study method explores a bounded system over a certain period of time (Creswell, 2007). This bounded system is known as the case, the unit of analysis for a case study. The case study method studies a case in great detail through many different forms of data collection and seeks to create a detailed description of the case. This may include detailing the history of the case, the chronology of events that occurred, or a narrative of the typical activities that occurred (Creswell). As Robert Yin (2009) explains in Case Study Research, “the central tendency among all types of case study is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result (p. 17). Ultimately, a case study presents an extensive description of the case, and then reports the meaning of the case (Creswell). This can mean understanding the intrinsic uniqueness of a case (this is known as an intrinsic case study), or it can mean looking at a single case and drawing meaning from it which can then be applied more generally to similar situations (this is known as an instrumental case
study. The case study may also report themes that are unique to the case, or that symbolize something more general about the phenomenon overall.

One important value of an instrumental case study is that it focuses on a single case to illustrate an issue, idea, or concern that is generalizable to a larger context. It illustrates the issue in great detail, and shows how it is indicative of the larger issue or idea (Creswell 2007). This is known as a naturalistic generalization, in which people can learn from the case either for themselves or to apply to a population of cases (Creswell).

Another value of the case study method is its ability to bring greater understanding to complex and often “messy” issues by incorporating and analyzing not only the case itself, but the context surrounding it (Yin, 2009). While other qualitative methodologies require a focus on the main theme or issues, the case study considers all aspects of the case in its search for the meaning and applications of the case.

I used a case study approach because framing the Visitor Photo Study in this way drew the reader into the unique case and experience that is this study. It allowed audiences to understand the project as a unique, holistic entity that is both intrinsically valuable on its own, but also instrumental in that it can provide insight into other research of this type (Patton, 2002), whether one’s focus is CBR, Visual Studies, or Visitor Studies. This focus also allowed each of the fields to be considered individually and in their entirety, as intertwining components of the larger picture that forms the unique case. Additionally, the instrumental case study allows generalizations about the subject to be made based on the extensive description and analysis of a single case. In the instance of the Visitor Photo Study, being framed as a case study allowed the study to display
insights into other similar cases, and also contextualizes the study within each of these three fields. The “lessons learned” component of many case studies was also applicable to this case study, as I considered the case within each of the three fields of CBR, Visual Studies, and Visitor Studies to understand how this case would have been different had different elements of each of these fields been included, and also to understand how each of these fields impacted the overall implementation of the Visitor Photo Study.

This retrospective case study used literature review, the findings of the study, and the lessons learned to frame the Visitor Photo Study within the contexts of the fields of CBR, Visual Studies, and Visitor Studies.

Analysis

In order to determine how and whether the Visitor Photo Study met the criteria for the fields of CBR, Visual Studies, and Visitor Studies, I developed a matrix to compare the Visitor Photo Study to the essential components of each of these fields. The matrix included the essential components of each of these fields as the first column, and then included columns which listed whether the principle or element was present in the study. The options for whether a principle was present in the study were “Not present in the Study,” “Some elements present in the Study,” “Most or all elements present in the Study,” and “Study extends CBR (or Visual Studies or Visitor Studies).” I then categorized the Visitor Photo Study by noting to what extent each principle or element was present.

For CBR, the matrix analysis considered the Visitor Photo Study in terms of the principles of collaboration, democratization of knowledge, and social change. The fields
of Visual Studies and Visitor Studies did not have clear principles that a study should adhere to like CBR did. Thus, I used my literature review of these two fields to develop a set of elements for each which characterize these types of studies. For Visual Studies, the elements I used to compare the Visitor Study were unique data, evocative data, more complex data, encourages varying interpretations of the data, represents a specific point in time, interpretation depends on the interpreter, visual analysis, images produced by the researcher, images produced by the participants, and the photovoice method. For Visitor Studies, I compared the study to the elements of understanding the visit, visitor engagement, visitor learning, visitor groups, and visitor participation in the research.

Using a matrix to categorize how well a study fits the criteria of a research field comes from previous work in the field of CBR. The successful implementation of CBR and CBPR principles have been the subject of some documentation (Braun, et. al., 2011; Puma et. al., 2009; Scarinci, Johnson, Hardy, Marron, & Partridge, 2009). These articles characterize how the successes and failures of a project in terms of the principles of CBR. However, the article “Operationalization of Community-Based Participatory Research Principles: Assessment of the National Cancer Institute’s Community Network Programs,” went further, utilizing a tool developed to measure adherence to community-based participatory research (CBPR) principles (2011). This study developed specific criteria for each principle of CBPR and had users rate their level of adherence on each specific element of the principles. The ratings were then used to determine how well the projects met the overall criteria of CBPR. Because this article focused on CBPR rather than CBR, I did not use their exact criteria for each principle to consider the Visitor
Photo Study. I chose instead to use the principles of CBR for my matrix analysis of the study.

Also, given the distinct nature of the three different fields of research that I compare the Visitor Photo Study to, and because I am looking at one project rather than multiple projects, I kept my classifications more generic. I simply indicated if the principle was present, if some elements of the principle were present, if the element was not present, or if the study extends the principle. In order to make these classifications, I also considered the importance of the elements and components within the larger principles and elements. Elements and components that were more important overall received more weight in my final determination of the extent to which the larger element or principle was present in the Visitor Photo Study. This meant that if key components of the element were not present in the Visitor Photo Study, the element overall would not be considered to have most parts of the element present. Rather, these elements were classified as having either some parts of the element present, or as not present in the Visitor Photo Study. This weighing of the elements allowed more crucial components of each of the fields to carry more weight in the final designation of the element than less crucial components, both when the components were present and when they were not. I also provided qualitative support about each element rather than a quantitative response. Once I had rated each element of a principle, I rated the principle overall in terms of its presence in the Visitor Photo Study. Then I used the matrix tables that I had developed as the basis for the findings of the Visitor Photo Study in terms of each of the three fields of CBR, Visual Studies, and Visitor Studies.
Based on the results of these findings, I considered the value of understanding the Visitor Photo Study as a combination of each of these three fields. I considered the value of the analysis in terms of understanding a study retrospectively, the value of understanding how the three fields of CBR, Visual Studies, and Visitor Studies complement each other within the Visitor Photo Study, the value of learning whether and how a hybrid of all of these fields is feasible and desirable, and the value of considering the Visitor Photo Study in this way in terms of future research design. These findings are detailed in Chapter 4.
Chapter 4 Findings

This chapter presents the findings of the analysis of the Visitor Photo Study in terms of the fields of CBR, Visual Studies, and Visitor Studies. It illustrates the ways that the Visitor Photo Study included the principles and practices of each of these three fields, the ways that the principles and practices of each of these three fields were missing from the Visitor Photo Study, and the ways that the Visitor Photo Study extends the principles and practices of these three fields.

Terms

Because this chapter considers how well the Visitor Photo Study meets the criteria of the fields of CBR, Visual Studies, and Visitor Studies, and because there are many different components to these criteria, it is necessary to describe the levels of terms that I am using. Because CBR has concrete principles against which to evaluate the Visitor Photo Study, the term “principle” is used to describe the three key areas of CBR: collaboration, democratization of knowledge, and social change. The term “element” is used to describe criteria that fall under the larger principles. The term “component” is used to describe aspects of elements. Because Visual Studies and Visitor Studies do not have concrete principles, these fields are described in terms of elements and components only. Any use of the proper noun Museum refers to the Denver Museum of Nature & Science specifically, while museum refers to museums more generically. The term Museum staff refers to the staff in the Department of Visitor Research and Program
Evaluation at the Denver Museum of Nature & Science, who I worked with directly on this project.

**Community-Based Research**

Community-based research is characterized by the three main principles of collaboration, democratization of knowledge, and social change (Strand et al., 2003b). In order to determine the extent to which the Visitor Photo Study incorporated CBR principles, I compared the study with each of these three principles, along with the many specific elements of each of these principles. In the following sections I will elaborate on whether the Visitor Photo Study met, did not meet, or extended the principles of CBR. Table 1 illustrates which principles of CBR were present in the Visitor Photo Study. For further explanation of how the specific elements of each of the principles of CBR were present in the Visitor Photo Study, please see Tables 2 through 4, found in the sections of each of the principles.

Table 1.

<table>
<thead>
<tr>
<th>Community-Based Research principles</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
<th>Study extends CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democratization of Knowledge</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Change</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community-Based Research Overall</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Collaboration.** Community-based research is a collaborative enterprise between academic researchers such as faculty and students, and community members. For a CBR project to be fully collaborative, all members of the research project must work on every stage of the research process (Strand et al., 2003b). There must also be mutually respectful relationships among all members, a fundamental sharing of authority throughout the project, and a commitment from all members of the research group to be both a researcher and a learner (Strand et al., 2003b). Table 2 illustrates which elements of collaboration were present in the Visitor Photo Study.
Table 2.

**Collaboration elements**

<table>
<thead>
<tr>
<th>Elements</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
<th>Study extends CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully collaborative, with those in the community working with academics-</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>professors and students- at every stage of the research process</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Identifying the issue or problem (community identified need)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Constructing research questions</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing research instruments</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Collecting and analyzing data</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Interpreting results</td>
<td>X</td>
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<tr>
<td>Writing the final report</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Issuing recommendations</td>
<td>X</td>
<td></td>
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<tr>
<td>Implementing initiatives</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Collaborating on research findings</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutually respectful relationships</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundamental sharing of authority</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Everyone in the group a researcher and learner</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaboration overall</td>
<td>X</td>
<td></td>
<td></td>
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</tbody>
</table>

**Fully Collaborative Research Process.** In terms of a fully collaborative process in all stages of the research, from identifying the issue through implementing initiatives, the Visitor Photo Study was fully collaborative in one stage, partially collaborative in most,
and not collaborative at all in several. The study also extends thinking about collaboration in one area, collaborating on the research findings.

Community-identified need. The first critical component of a fully collaborative research process in CBR is that the study must meet a community-identified need. In this instance, the Visitor Photo Study includes some components of this element. The staff of the Department of Visitor Research and Program Evaluation (hereafter referred to as Museum staff) identified the need for the project – to understand visitors and their experience at the Museum in a new way. I had met the Director of the Department of Visitor Research and Program Evaluation at the American Evaluation Association Conference, and was intrigued with the idea of museum evaluation. I applied for a summer internship at DMNS, and was given the Visitor Photo Study to work on. Without my support as an intern, the Museum staff would not have had the time or resources to design and implement the study. This stage of the study would have been more collaborative if I had worked with the Museum staff at the beginning of the study and helped to clarify what exactly the Museum saw as the need they would like to meet through the Visitor Photo Study.

Constructing the research questions. The Museum had several research questions in mind when planning the study. These included: Is it possible to do the study? What are the common paths through the Museum? Are these common paths correlated to demographic characteristics? Can the study be used to understand how long people stay in exhibits, and understand what people are looking at? The origin of these research questions was the previous work of another Visitor Studies scholar, Rob Jakubowski,
who had experimented with a similar type of photo study in the Buffalo Bill Cody Museum in Cody, Wyoming (K. Tinworth, personal communication, May 17, 2011). However, the DMNS sought to extend the research beyond the scale of the Buffalo Bill Cody Museum, to determine whether it was possible to implement the study in a much larger museum. The development of research questions was not collaborative because I was not part of the process. In order for this stage of the research to be collaborative, developing the research questions collaboratively with the museum would have been one of my first tasks. As a current student immersed in the academic process, I could have worked to help shape clear and articulate research questions that were focused and manageable (Strand, et. al., 2003b). Ideally, we would have decided on the research questions together, and then used them to guide rest of the study. Clarity of research questions from the beginning of the study would also help guide the direction of the research.

*Developing research instruments.* This component was present in the Visitor Photo Study. I took the initial information that the Museum staff had collected in the pilot study, such as the protocol for tracking turndowns and several sets of pictures, and developed the consent form and protocol. I worked with the Museum staff to make sure that all necessary aspects were included and that they met the Museum’s standards for ensuring visitor confidentiality. However, I developed the protocol and other elements such as the camera signs and data spreadsheets on my own. I also made revisions to the protocol throughout the study, though I checked in with the Museum staff to get their insights before I made large changes.
Collecting and analyzing data. I collected all the data for the study. I developed the coding scheme for how the data should be coded, and met with the Museum staff several times in person to discuss the codes I was developing and the process. However, the staff did not make any changes, as they were not as immersed in the process as I was. The development of this coding scheme and the protocol was one of the reasons they assigned me to this study. Since I had worked with data in the past, they thought, correctly, that I would know how the data should be coded. Thus, I coded the data and undertook the initial analyses. Though there was some collaboration in this stage of the research, it was minimal. This element of collaboration would have been present if the Museum staff had worked with me to collect the data, so that they understood the process for themselves. Also, the level of collaboration would have been greater if they had helped with the organization, coding, and analysis of the images and the demographic information. The Museum staff’s involvement in the data analysis process would have also brought a valuable insider’s perspective to these data, and a greater level of validation to the findings (Strand et. al, 2003b).

Interpreting results. Collaboration was not present in this element, as I did all the initial interpretation of results before I presented the report to the Museum staff. This included analyzing the total number of pictures taken in each exhibit, the average numbers of pictures per group and per exhibit, and the average number of pictures taken per minute. It also included determining which exhibits were the most and least popular, in terms of both unique visitor groups and numbers of pictures taken. It also included analyses of basic demographic characteristics. For the interpreting results element to be
collaborative in the Visitor Photo Study, the Museum staff would need to have taken part in the coding and analysis of these data, and then made interpretations of the findings with me, rather than this element being a solo undertaking.

*Writing the final report.* Some aspects of this component were present, but it was not fully collaborative. While I wrote the final report, the Museum staff members checked it for consistency with museum language and practices. For the report to be collaborative, it would have been co-authored by the Museum staff and me. However, given the desire of the Museum to explore whether this was feasible for future iterations, they may have benefited from obtaining my outside perspective on the study itself and its future feasibility.

*Issuing recommendations.* I was sole author of the report’s recommendations. Full collaboration on this aspect would have occurred if the Museum staff had helped me with the analysis and then met with me to discuss potential recommendations. The Museum staff’s interpretations of the data would have likely produced different recommendations from mine, because they possess inside knowledge about Museum policy and direction and what changes would be possible and feasible to recommend.

*Implementing initiatives.* Implementing initiatives has not yet happened at this point in the Visitor Photo Study; in terms of making changes and repeating the study in order to be able to determine whether and how visitor patterns change over time. I include disseminating results in this section, and though the Museum has not yet disseminated results from this study, they will be shared through a joint presentation at the 2012 Visitor Studies Association Annual Conference in Raleigh, North Carolina.
(Schroeder & Tinworth, 2012). The Museum staff and I agreed that future iterations of the study’s participant photos should be displayed on a Museum flickr page, on the DMNS website, or through some other public format. The optimal way to make this collaborative would be for the proposed initiatives to be taking place at this point in time. Ideally, I would work with the museum on the next iteration of the study to implement changes and guide the next phase. Also, it would be worthwhile implementing some of the ways of dissemination that I mentioned, including the flickr page and the Museum website.

Collaborating on research findings. I am collaborating with one member of the Museum staff on a research presentation, titled “Through Their Own Eyes: A Photographic Understanding of Visitor Experience” at the Visitor Studies Association (VSA) Annual Conference. Kathleen Tinworth, the director of the department, suggested that we submit a joint proposal describing the results. This joint presentation extends CBR practices because we are collaborating to share the study’s results beyond the specific community of the DMNS and we will be considering possibilities for how the methodology could be used by other cultural institutions. We are also inviting participants to think of innovative ways to conduct a similar study in their own environment by thinking though similar collaboration efforts within their communities.

Overall collaboration during all stages of the research process: Out of the eight critical components mentioned for full collaboration between partners throughout the research process, four were fully present or had some aspects of full collaboration present, while the other four elements of the study cannot be considered collaborative.
The key areas of collaboration in terms of the CBR process – determining the community need, developing the research questions, and implementing initiatives, were not collaborative in the Visitor Photo Study. However, in the best sense, the research questions came from the Museum staff themselves, indicating that the study sought to develop knowledge that would be useful to the community members rather than to myself as a university student. In terms of implementing initiatives, the Museum has not yet been able to take on this project, and my role as an intern has come to an end. Thus, they may need to develop the capacity to allow this to happen, but it is possible that implementing initiatives will still occur with this project. Also, the component I included as extending this principle is sharing the study beyond the DMNS, bringing new knowledge to the field, and using the study’s results to inform how museums can understand the visitor experience. For this element of collaboration to meet the criteria of being completely collaborative, all of the other elements that were not fully present would need to be undertaken differently, following the recommendations that I made in each section previously. Making these changes would make the entire process collaborative, with all members present and active in each stage of the project.

Mutually respectful relationships. This element of collaboration was definitely present throughout the duration of the Visitor Photo Study and beyond. My insight as a student with some research experience was as valued as that of the Museum staff. Also I valued their insight and expertise in Museum and Visitor Studies and evaluations. Relationships were developed through group lunches and meetings where we got to know each other personally as well as professionally and heard each other’s insights into the
project and what was going well and what could be improved. I valued the fact that the Museum staff treated me as an equal, respecting my knowledge and insight and inviting me to see the work as mine as well as theirs. I was able to design my own schedule, which allowed me to work around the commitments of my full time job while at the same time spending a significant amount of time and energy at the Museum. As a result of my flexible schedule, I was able to be at the Museum at times convenient for me, and was able to be more present and committed to the study during the times that I was there. Also, I was able to both to submit a joint proposal about the Visitor Photo Study at the Visitor Studies Association Conference and to use the study as the basis for my master’s thesis.

**Fundamental sharing of authority.** In this element the Visitor Photo Study demonstrated fully the intent of CBR. While the study was for the Museum, I had the authority to make decisions to the same extent that the Museum staff did, even though I was an intern rather than a staff member. I was also given the authority to develop the final report as I saw fit, and present the results as I desired. I believe that authority was shared throughout the process as we came to mutual decisions about what should be included on the consent form, the major components of the study protocol, and the nature of the coding scheme.

**Everyone in the group a researcher and learner.** All of the Museum staff and myself were interested in the research and the findings, and were engaged in the research project. However, I don’t feel like the study has fundamentally changed views and ideas at this point, so the learning element may be smaller. However, I still learned a great deal
throughout the process, and the Museum staff learned that the study was possible and even feasible, and gained valuable insight into how it could be repeated in the future. I was more actively engaged with the research process and findings, however. More meetings throughout the data collection process to share ideas and updates about how the study was progressing and the initial findings that were emerging would have resulted in everyone in the group feeling like they were both a researcher and a learner at every stage of the process.

**Collaboration overall.** Some elements of the principle of collaboration were clearly apparent in the Visitor Photo Study, while other elements included some of the necessary components, but were not fully realized. A few components were not present at all. Thus, while the Visitor Photo Study was not completely successful in meeting all elements of the principle of collaboration, many were there, enough that it can be considered moderately collaborative.

**Democratization of knowledge.** The second principle of CBR is democratization of knowledge. Community-Based Research validates multiple sources of knowledge and promotes the use of multiple methods of discovery and dissemination of the knowledge produced (Strand et. al., 2003b). This principle is embodied in CBR projects through the knowledge of all members of the research group being valued and validated equally throughout the study, by recognizing and incorporating multiple types of research methods, and by creating innovative, user-friendly approaches to the dissemination of knowledge (Strand et. al., 2003b). Table 3 illustrates how the elements of Democratization of knowledge were present in the Visitor Photo Study.
### Table 3.

*Democratization of knowledge elements*

<table>
<thead>
<tr>
<th>Elements</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
<th>Study extends CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of all parties valued equally</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiential knowledge of community</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Specialized knowledge and skills of university professors and students</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less powerful members of society at the center of the knowledge creation process</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Recognizes and may incorporate multiple research methods</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unconventional criteria for appropriateness of methods</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Potential for drawing out useful or relevant knowledge</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invite the involvement of all parties</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible and adaptable methods</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Innovative, user friendly approaches to the dissemination of knowledge</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democratization of knowledge overall</td>
<td></td>
<td></td>
<td>X</td>
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</table>

**Knowledge of all parties valued equally.** The element of the equal value of knowledge of all parties throughout the research process consists of three components: the experiential knowledge of the community, the specialized knowledge and skills of
university professors and students, and less powerful members of society at the center of the knowledge creation process. In these areas, the Visitor Photo Study included two components completely, while one area could have been more inclusive.

*Experiential knowledge of community.* This component of the equal valuing of the community’s knowledge was fully present in the Visitor Photo Study. As I designed and implemented the study, I sought out the insight and input of the Museum staff about what would and would not work in the Museum setting. I incorporated knowledge gained from the pilot study that took place the previous summer into the development of the protocol and methods. The Museum staff also helped me to set up the logistics of the study, including informing me how they approach visitors and the best place in the lobby to introduce my study to museum visitors. Also, though the Museum staff with whom I was working on the study were not present at the front of the museum, the front desk staff provided me with valuable help and insight into the questions that visitors would ask and where I could find the answers, as well as their insights into the experience of the museum visitors.

*Specialized knowledge and skills of university professors and students.* While my knowledge and insight as a research methods student was valued by the Museum staff, this component was only partially present because knowledge from a university faculty member was not present in the Visitor Photo Study. Even though I was completing this work as a practicum, I did not receive feedback or information about how I could improve the study from my university practicum advisor. I sent some information about my project to my professor; however, I never received any feedback about whether or not
I was on the right track or whether there were other things to consider. Without advice from my professor, I was largely on my own; although in hindsight, I could also have taken more initiative in sharing how my study was going with my professor. My advisor’s guidance might have changed this aspect of democratization of knowledge by helping me feel more competent in my own knowledge and providing additional insights into the study’s design and implementation. If I had known about CBR I might have been able to foresee some of the elements that were missing from the study.

*Less powerful members of society at the center of the knowledge creation process.*

This component was definitely present, as the Museum visitors themselves, who are generally not the ones in control of decision making processes for the Museum, were directly involved in the generation of data. They were allowed to decide what they would take a picture of, thus providing clear insight into what they thought was important or interesting, or at least worth noting, about their visit to the Museum. Even their ideas for future iterations of the study and ways to present the data were taken note of, and will be considered in the future iterations of the study. One shortcoming, however, was the fact that visitors were not included in the study design where they may have been able to provide some interesting insights into the implementation of the study, and how to best generate knowledge by and about the visitors themselves.

*Overall: Knowledge of all parties valued equally.* Overall, with the exception of professor involvement in the sharing of knowledge, knowledge from all partners was valued equally throughout the Visitor Photo Study. Given that the professor was not a direct member of the study, I believe that overall this component of CBR was present in
the study. Though visitors were not included in the design of the study, their voice and opinions are clearly present in the data themselves.

**Recognizes and may incorporate multiple research methods.** The second element of the principle of democratization of knowledge is that a CBR study recognizes and may incorporate multiple research methods. Within this element there are several components: unconventional criteria for appropriateness of methods, potential for drawing out useful or relevant knowledge, inviting the involvement of all parties, and flexible and adaptable methods (Strand et. al., 2003b). Two of these four components were present in the Visitor Photo Study, while two included some, but not all necessary features in the study.

**Unconventional criteria for appropriateness of methods.** This component was present in the study. The Visitor Photo study considered the visitor experience in a way that had never been undertaken in a museum of this size before. It utilized a visual method and invited the participation of the visitors themselves in ways that are not generally present in Visitor Studies.

**Potential for drawing out useful or relevant knowledge.** Some aspects of this component were present in the Visitor Photo Study. The images themselves and the demographic data collected have potential to provide interesting and useful knowledge about the visitor experience. However, the study did not invite the visitors to participate in interviews to share their experience. Given the importance of the participants themselves in the understanding and interpretation of visual data, the inclusion of brief interviews would have made the study’s creation of knowledge even more useful. These
interviews would have focused on the visitors’ experience taking pictures throughout their Museum visit, and their choices of and reflections of the pictures taken.

*Invite the involvement of all parties.* Though the visitors themselves were integral to the creation of data for the Visitor Photo Study, they were not part of the initial design of the study, nor the recruiting process. Involving visitors themselves in these phases of the study would have strengthened this component. Otherwise, both myself as a student intern and all of the Museum staff were involved in the project, and provided valuable knowledge and insight. Establishing a community advisory board and including their insights during all phases of the research process (i.e. study purposes and priorities, participant recruitment, data collection and analysis, etc.), would have been very valuable and would have strengthened this component (Strand et. al., 2003b).

*Flexible and adaptable methods.* Flexible and adaptable methods were definitely present in the Visitor Photo Study. The method itself was an adaptation of a Visitor Studies method known as tracking and timing (Serrell, 1997). The study’s implementation was also flexible so that if something about the setting was not working, it was adjusted for the next day of data collection and analysis (e.g., changing the location of where visitors were intercepted and also where I sat for data analysis). Multiple forms of data were collected, including visual data from the visitors, their demographic information, and contextual information about what was going on at the Museum that day (e.g., special exhibits like the Ice Age Spectacular). The study was also flexible in terms of how much data was collected, (e.g., ending data collection when it was clear that we had reached saturation).
Multiple research methods overall. The Visitor Photo Study was fairly successful in terms of this element of the democratization of knowledge, but given that there were still some components that could have been included and were not, this element is moderately present, but not fully present. Interviews with the visitors and their greater participation throughout the research process would have helped make this aspect of democratization of knowledge fully present in the study.

Innovative, user friendly approaches to the dissemination of knowledge. Though there were many ideas for how the information from this study could be presented creatively, including through 3-D maps that demonstrated visitor paths through the museum, flickr sites to show visitor images, and the Museum website to highlight particularly great shots, at this point the only dissemination of the findings has been through a straightforward, standard evaluation report. This element of the democratization of knowledge could have been present in the Visitor Photo Study had I presented the results of the data in a more interactive way, such as through a slide show of the images, or using the images themselves to make the important points. Also, further dissemination of the results, beyond the Department of Visitor Research and Program Evaluation, to other areas of the Museum would have encouraged great emphasis on the presentation of the data. Presenting the study in an interactive way at the Visitor Studies Association Conference will make this element present in the study, as we plan to recreate the study by distributing cameras to conference participants and asking them to document their experience as a part of our session; thus encouraging them to reflect on the efficacy of our study by participating in something similar themselves.
**Democratization of knowledge overall.** While most of the crucial elements of the democratization of knowledge were present in the Visitor Photo Study, given that the element of innovative ways of presenting and disseminating the knowledge was not present at all, and that some components of the development of useful knowledge and the inclusion of all potential parties could have been stronger, the Visitor Photo Study does not have all elements of democratization of knowledge fully present. However, the study was quite strong in this area, and with the relatively simple inclusion of new ways of presenting the knowledge, and the inclusion of visitors to an even greater degree, democratization of knowledge could be fully present in the Visitor Photo Study.

**Social Change.** Community-Based Research has as its goal social action and social change for the purpose of achieving social justice. Community-Based Research projects should produce information that the community organization needs as part of their effort to make changes. It should involve some modest social action, and may contribute to social change by empowering members of the community and helping to build their capacity (Strand et. al., 2003). Table 4 shows which elements of social change were present in the Visitor Photo Study.
Table 4.

Social change elements

<table>
<thead>
<tr>
<th>Elements</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
<th>Study extends CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce information that community organizations need as part of their efforts to make needed changes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Improve programs</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Promote their interest</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Attract new resources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understand target populations</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In other ways contribute to a social action agenda</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modest social action</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empowering and building capacity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social change overall</td>
<td>X</td>
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</table>

**Produce needed information.** The first element of social change is that a CBR study should produce needed information. This information may be used to improve programs, promote their interest, attract new resources, understand their target populations, or in some other way contribute to a social change agenda (Strand et al., 2003b). Several of these components of need information were present or partially present in the Visitor Photo Study, though two of these components were not present at all.

**Improve programs.** The Visitor Photo Study was not specifically designed to improve existing programs; it was instead developed as its own program. The program was designed to develop new knowledge and understanding of the visitor experience.
Thus, while the study did not specifically seek knowledge to improve current programs, it did seek new understandings. Using the study to more directly improve programs would involve taking the results of the study and specifically looking into how some of the existing programs at the museum could benefit, such as by considering all of the pictures in the Expedition Health area, or all of the pictures in one of the other areas. The images might also be used to consider design, layout, utility, and visitor experience in special exhibits, such as the Ice Age exhibit that was only on display for two days during the summer when the study took place. The Visitor Photo Study coincided with one of these days, so visitor data could have provided insight into improving these types of short term programs.

*Promote their interest.* This element was fully present in the Visitor Photo Study. Greater knowledge of the visitor experience allows the Museum to make needed changes where they are evident. Whether it is clear from a lack of visitor images that visitors are not visiting certain exhibits, or if their images indicate that they are not interacting with exhibits as expected, knowledge from the Visitor Photo Study provides the Museum with necessary information to improve their exhibits and bring more people in to the museum. This knowledge will improve the museum, and in turn generate greater visitor interest, enjoyment, and possibly revenues for the museum.

*Attract new resources.* This component was not present in the Visitor Photo Study, as the study was not specifically designed to bring in more resources for the Museum. However, future uses of the data from the study, such as the placement of images on a website, may generate more interest in the Museum. Presenting the study and
its innovative ideas at a conference may also provide for future opportunities to partner with other agencies for funding to further improve understanding of the visitor experience. Thus, while the Visitor Photo Study was not designed to attract new resources, the potential exists to use the information from the study to promote the Museum and garner resources in the future.

Understand target populations. This component of information production was definitely present in the Visitor Photo Study. A main point of the study was to further understand what visitors experience and how they move through the museum. The study was also able to consider different visitor patterns and interests based on certain demographic characteristics, such as the number and the ages of the children in the group.

In other ways contribute to a social action agenda. The Visitor Photo Study did not have an overt social change agenda beyond improving the visitor experience, thus at this time it has not contributed to a social action agenda. Future iterations of the Visitor Photo Study may focus on specific demographic groups, including families with young children, and under-represented demographic groups (A. Giron, L. Trainer, & K. Tinworth, personal communication, July 2011). Though the greater issues of museum accessibility and appeal to under-represented demographic groups could not be captured through this study, it could be used to address the needs of these groups during their museum experience. While this component is not currently present in the study, potential exists for future renditions of the study to focus on specific demographic groups, and to better meet the needs of groups are that underrepresented or whose experience is more difficult to capture, such as families with young children.
Produce needed information overall. In terms of producing information that the Museum needs in order to make changes, the Visitor Photo Study included half of the necessary components. However, given the Museum’s current focus throughout this study, it is important to consider that not all of these areas may have been ones they were interested in pursuing at this point, or with this specific study. Considering the other ways that the information produced by the Visitor Photo Study could be used would make this element of social change more present.

Modest social action. Typically, CBR projects contain modest social action goals, as the project may be a small item within a larger agenda. This was definitely the case with the Visitor Photo Study. The study had only small social action goals during this first iteration, and focused more on the understanding of visitors rather than how to improve their experiences, which would be a further step in the process. Further, the study was just one of the many research projects that were occurring in the Department of Visitor Research and Program Evaluation at the Museum over the course of the summer. The Department has a large mission that extends beyond the scope of this Visitor Photo Study to include the exploration of elements of learning, development, and growth of visitors, and the evaluation of different programs, products, and Museum services (A. Giron, personal communication, February 13, 2012). Thus, the Visitor Photo Study was a small component within a larger mission of understanding the workings of the DMNS.

Empowering and helping to build capacity among community members. The last element of the social change principle of CBR is that a study should empower and help build capacity among community members (Strand et. al., 2003b). This should also
include the sharing of skills and knowledge among all parties involved in the study. This element was present throughout the Visitor Photo Study. Though the DMNS has a strong Department of Visitor Research and Program Evaluation which is committed to rigorous examination of programs throughout the Museum, their resources are limited. Thus it was necessary to involve me as an intern to design and implement the study that they did not have the resources to implement. Through my involvement the study was able to move beyond the initial idea phase. In addition, I developed the protocol and processes for the study to continue to occur again in the future. I did an audit of the study itself, and worked to determine the resources needed to conduct iterations of the study in the future, including providing the Museum with data about the necessary human and financial resources. My coding scheme will allow for further iterations of the study to be undertaken consistently in the future. However, I could have gone farther in developing the capacity for the Visitor Photo Study to continue in the future. Including Museum staff in more aspects of the data collection and analysis process would have helped to further build their capacity to complete the study again. Also, if I had trained some of their research assistants, the knowledge of the details of the study would have been further disseminated, which might have helped ensure that the study will be conducted again in the future and that it will be done in a high quality way.

Social change overall. Despite the fact that the overall social change agenda for the Visitor Photo Study was small, the study still included many of the elements needed for this principle of CBR to be considered present in the study. While some elements were missing, overall the study produced useful findings, fit within the context of the
larger research agenda for the Museum, and helped build the capacity of the Museum to continue the Visitor Photo Study in the future so that the museum can continue to gain valuable and useful knowledge about its services and visitors.

Community-Based Research overall. The Visitor Photo Study clearly included elements from each of the principles of CBR. However, none of the principles of collaboration, democratization of knowledge, and social change were fully present in the study. Each one included some elements of the principle that were present, while other elements were not present in the study. Thus, overall, the Visitor Photo Study embodied some of each of the principles of the field of CBR, though none of them were completely present. However, considering the Visitor Photo Study as a CBR project has provided valuable insight into how a future study could incorporate elements of CBR in order to improve upon the current study. This retrospective consideration also revealed how those CBR principles that were present in the Visitor Photo Study, though the study was not explicitly designed as a CBR project, enhanced the methods and findings of the project. Overall, considering the Visitor Photo Study as a CBR project provided valuable insights into the manner in which the study incorporated elements of the method and ways that further inclusion of the elements of CBR could enhance the study in the future.

Visual Studies

Unlike CBR, Visual Studies does not have a set of standards and principles to follow. However, the field of Visual Studies tends to include a common set of elements, and while not all of them will be present in all studies it is possible to consider the Visitor Photo Study within the context of all of them. Looking at the Visitor Photo Study through
each of these elements also helps to provide a sense of the depth that the Visitor Photo Study reaches within the field of Visual Studies. The use of images as data in and of itself makes the Visitor Photo Study a visual study. But, the inclusion of many of these elements will indicate that the Visitor Photo Study is a strong visual study.

The elements that I use to consider the Visitor Photo Study as within the field of Visual Studies are: unique data (Rose, 2007), evocative data (Pink, 2007), the complexity of the data (Prosser & Schwartz, 1998), encourages varying interpretations of the data (Banks, 2007), data represent a specific point in time (Ball & Smith, 1992), interpretation depends on the interpreter (Marshall & Rossman, 2011), the types of analysis specific to visual data (Ball & Smith, 1992; Emmison & Smith, 2000; Pink, 2007; Prosser & Schwartz, 1998), the use of images produced by both the researcher and by the participants (Banks, 2007; Marshall & Rossman, 2011; Pink, 2007), and the use of the photovoice method (McIntyre, 2003). These elements emerged as a result of a review of the Visual Studies literature. The following sections describe each of these elements and reveal the extent to which the Visitor Photo Study did or did not include these elements. See also Table 5 below.
<table>
<thead>
<tr>
<th>Visual Studies elements</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
<th>Study extends Visual Studies</th>
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<tr>
<td>Unique data</td>
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<tr>
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<td>More complex data</td>
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<td>Encourages varying interpretations of the data</td>
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<td>Data represents a specific point in time</td>
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<tr>
<td>Timing element of Visitor Photo Study</td>
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<tr>
<td>Interpretation depends on the interpreter</td>
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<td>Images produced by the participants</td>
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<tr>
<td>Number of images produced</td>
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<tr>
<td>Photovoice method</td>
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<tr>
<td>Participant-taken images that allow access where the researcher could otherwise not go</td>
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<td>X</td>
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<tr>
<td>Interviews about the images</td>
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<tr>
<td>Meaning making and analysis done with the participants</td>
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<td>X</td>
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<tr>
<td>Empowering to visitors</td>
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<tr>
<td>Visual Studies Overall</td>
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</table>

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**Unique data.** The first element of Visual Studies is that the type of data that is produced, images, is very different from verbal or written accounts of an experience or event. Images bring a story to life, and allow the viewer to understand the experience in a way that is different from any other recounting (Rose, 2007). The Visitor Photo Study data is definitely unique. Using photos to document a museum visit, especially while using the images to reveal the timing of the visit, presents unique data that reveals where visitors go in the museum, how long they spend there, and the paths that they take. It also reveals the types of objects that visitors deem important and interesting enough to photograph and make note of for the museum.

**Evocative data.** A second important element of Visual Studies is that the images are evocative, and used to experience the worldview of the participants. As visual ethnographer Sarah Pink (2007) notes, images can reveal a deeper understanding of an individual reality that is only experienced by the individuals themselves. Though the images in the Visitor Photo Study are interesting, only some aspects of the element of evocative data were present in the study. The visitors were asked to take pictures every three to five minutes, which probably resulted in more pictures than if they were simply asked to reveal their perspective of the Museum through images. The Visitor Photo Study asked for more pictures in order to be able to track where visitors went and how long they spent there, rather than asking for only meaningful pictures. Thus, while some images may reflect the worldviews of the participants, and understanding where visitors do and do not visit within the Museum may reflect the worldview of the participants to a certain extent, this study does not use images to reflect a worldview. Additionally, the
worldview of any one person or group is complex and multi-faceted. While visitor images may reflect their interests and motivations on the specific date of their visit, within the specific context of the Museum these images are limited and not necessarily indicative of their worldview. Though this was not the focus of the Visitor Photo Study, if the Museum were interested in understanding the worldviews of their visitors more specifically, they would have needed to ask visitors to take pictures of exhibits and interactions that were meaningful to them.

**Complex data.** Image data contain a layer of complexity not always present in other types of qualitative data (Prosser & Schwartz, 1998). Images resist single interpretations and may provide insight into subtle relationships and characteristics that are present in the study (Prosser & Schwartz, 1998). The Visitor Photo Study was definitely more complex than a purely written or verbal qualitative study. The very nature of collecting images (over 3400 images were collected for 69 visitor groups), makes the study more complex. Indeed, the sheer amount of data could have been overwhelming. However, given that the visitors were not asked to share their experience taking the images, nor to explain why they took them, the study was not as complex as it could have been. Adding the visitor voice in addition to their images would have resulted in another layer of interpretation that would have made the data collected for the Visitor Photo Study both richer and more complicated. Additionally, the Visitor Photo Study would have been more complex if additional qualitative analysis had been done. Up to this point, most of the analyses of the images have been quantitative, and little qualitative analysis has been undertaken of the more complex aspects of understanding the
underlying intentions and meanings of the images. This element would be fully realized in the Visitor Photo Study if visitors were asked to share their experience taking pictures and to explain their choices. Adding this layer of the visitor voice would have made the study more complex and meaningful. Also, doing a content analysis of the images, including people’s expressions and actions, would have added another layer of complexity to the understanding of the images and how they relate to the whole story of the Visitor Photo Study.

**Encourages varying interpretations of the data.** The nature of working with images in Visual Studies encourages varying interpretations of the data, whether that means understanding different perspectives, or considering different understandings (Banks, 2007). At this point, some aspects of this element are present in the Visitor Photo Study, but some are not. While there is potential for varying interpretations of the data, given that the visitors themselves were not included in the interpretation of the data and that the Museum staff were not involved in the interpretation or analysis of the data, varying interpretations have not yet been sought. Even the level of analysis that has been done so far has not allowed for many different interpretations, as most analysis has been quantitative in nature. On the other hand, the way that the images are being used in different ways to tell the story of the museum visit does encourage multiple interpretations. The images were looked at holistically for each visitor group, the times of each image were used to determine how long visitors stayed in certain sections of the museum, demographic data were used to identify trends among different types of visitors, and all of the images were considered together in order to understand how many unique
groups visited different exhibits, and which exhibits prompted the most and least photos. Several other approaches were used to consider these same images and understand the stories that they could tell. To make this element fully present in the study, the visitors would have interpreted their own images, and the Museum staff, who have a better sense of the museum than I do, would also have interpreted the images and what they revealed, both about the visitors’ museum experience and about the meanings that could be ascertained about the way that visitors move through the space.

**Data represents a specific point in time.** Another element of the field of Visual Studies is that image data represent a specific point in time, reflecting the experience or event taking place at that time (Ball & Smith, 1992). The Visitor Photo Study definitely sought to use images to represent a specific point in time. In fact, given the nature of these museum visits, the images represented the number of hours that visitors spent doing a specific activity: visiting the Museum. Time stamps were also used on the images, to be able to specifically track what time visitors were at different exhibits throughout the Museum and how long they spent there. Visitors were also instructed to take pictures every three to five minute throughout their experience. These specific instructions underlie the importance of time in understanding experience in the Visitor Photo Study.

**Timing element.** While Visual Studies posits the importance of images for understanding the experiences of an individual at a specific point in time, the Visitor Photo Study also extends this element. Using the time stamp as a way to understand exactly what time visitors were in a certain location and how long they spent there, moves beyond the general use of images in Visual Studies to represent a point in time.
The Visitor Photo Study uses the time stamps on the images to directly correlate time as a component of the experience. Also, the Visitor Photo Study extends the field of Visual Studies by using the element of time as a critical component of the visual image. By providing participants with instructions to take pictures at regular intervals, the study allows the museum experience to be understood on a minutely chronological level. This direction creates a new element of understanding of the image data, and provided a greater amount of data as well.

**Interpretation depends on the interpreter.** Another critical component of Visual Studies is that the interpretation depends on who is doing the interpreting. Different interpretations will result depending on whether the researcher or the participants interpret the data, and the differences among these interpretations lead to varying understandings of experience (Marshall & Rossman, 2011). This element has not been fully attained in the Visitor Photo Study, as I have done all the coding and interpretation of the images so far. More inter-coder reliability during the coding phase would potentially result in different findings. Also, it is crucial to Visual Studies that the participants are involved in the interpretation of the findings. Though the visitors interpreted the instructions that I gave them and created the images that represented their visit in their own way, such as by including funny messages, expressions, or body language in their images, they did not participate in the process of making meaning from the images. The addition of further coders to provide new and different interpretations of meaning and analysis would strengthen this element in the Visitor Photo Study. These coders would need to be both the participants and the Museum staff from the Department.
of Visitor Research and Program Evaluation. The Visitor Photo Study might also benefit from the perspective of an outside coder who is not as familiar with the Museum and thus may reach different conclusions about the meaning of an experience from those with a more intimate knowledge and understanding of the setting.

Additionally, the meaning-making component of the interpretation process could be strengthened in the Visitor Photo Study. Up to now, only a basic analysis of the content of the images, the time, and the location has been undertaken. Further interpretations of body language, camera angles, and other elements within the images are possible but not present in the study at this time. Strengthening this aspect in the Visitor Photo Study would require additional coding on all of the images, including coding for interactions, body language, and camera angles in order to delve deeper into the experience that the images can reveal.

**Analysis.** Analysis of the images in the field of Visual Studies can be complex and includes varying components of analysis. The components that are most often considered are whether the visual study meets the criteria of qualitative analysis and whether three specific types of visual analysis (content, context, and chronology analysis) are part of the analysis process. Understanding whether and how the Visitor Photo Study included each of these components in its analysis provides insight into how well the study embodies the analysis element of Visual Studies.

**Qualitative analysis principles.** The qualitative analysis principles of explicit research design, standards of evidence, and connections to the research questions are important components of visual data analysis (Emmison & Smith, 2000; Prosser &
Schwartz, 1998). In terms of explicit research design, the Visitor Photo Study began with a concrete plan for how the data would be collected and used, but there was not a clear plan for analysis, nor were there clear research questions to address. For standards of evidence, the Visitor Photo Study planned to use the visitors’ images to show where visitors went and how they moved through the museum. However, the study did not have a clear and explicit understanding of how these images would link to understandings of experience and evidence of engagement. The connection of the analysis to the research questions in the Visitor Photo Study was also not clear, since the research questions where not explicitly defined at the beginning of the study. However, the use of images as data was clear, as it was desired to use visual means as an understanding of the museum experience. In order for the Visitor Photo Study to more fully incorporate qualitative data analysis principles, the study would need clear research questions and a plan for how the data would answer these questions. The study would also need to provide specific standards of evidence, including examples of what would be considered as engagement and active participation in the study, and what would constitute a museum object, sign, or image. Doing all of this initial work at the beginning of the Visitor Photo Study would have provided clear evidence for the use of qualitative analysis principles throughout the study.

*Content analysis.* Content analysis in Visual Studies is considered to be one way to understand visual data, and includes analysis of the activities, people, and objects present in the images (Ball & Smith, 1992). Some content analysis was present in the Visitor Photo Study, though there is potential for more to be undertaken. General content
analysis of the images documented the location of each photo; the content of the image itself; and whether the image included people, objects from the museum’s collection, or other signs or images from the museum. However, the Visitor Photo Study could have involved a more thorough content analysis involving the visitors themselves in interpreting their images and explaining their interpretations. Further, content analysis could have considered the action within the photos rather than just indicating whether the image included people and objects. Clearly, further content analysis of each image is needed for the component of content analysis to be fully present in the Visitor Photo Study.

**Context analysis.** Context analysis in Visual Studies seeks understanding both of the context in which an image is produced and the context in which the same image is analyzed (Pink, 2007). In the Visitor Photo Study the context within which the images were produced is at the forefront of the study, as all images are understood within the context of a visit to the museum on a specific day and during a specific time. However, the images have not been considered in terms of the demographic characteristics of the individual and their visitor group, and how these contextual elements related to their images. Other contextual elements also should be considered in the study. Are visitors taking pictures of people in their group? Are they taking pictures of others, such as docents? How do these instructions influence the images that are taken? Also, the context in which the images were analyzed was not specifically noted. It would be important to consider how my environment influenced my understanding of the pictures, whether I was coding from home or from the museum, whether I was coding only a few pictures at
a time, or many, and how my knowledge of the museum impacted my coding, and conversely, how the coding might have changed if Museum staff who are more familiar with the Museum took part in the coding process. For context analysis to be fully present in the Visitor Photo Study, additional analysis of the images in conjunction with demographic characteristics such as total time spent at the museum and the effect of the photo rules (such as considering whether they were followed or not) is needed. Also, greater documentation of the way that participation in the Visitor Photo Study impacted the visitor experience would be important for understanding the context in which the images were created. Lastly, further documentation of my analysis process is needed.

**Chronology analysis.** Analysis of chronology in Visual Studies seeks to understand the order and narrative created by the images, and centers the images in the research process by providing a sense of order of interpretation (Emmison & Smith, 2000; Pink, 2007). This is the method of visual analysis that was most present in the Visitor Photo Study. The images were time stamped and analyzed in the order that they were taken. They were also considered in terms of how much time the visitors spent in a certain exhibit and the chronological path that they took as they moved through the Museum. Most of the analysis that has been done for the Visitor Photo Study considered the images this way, with this chronological aspect the most important characteristic in the process. The Visitor Photo Study could go farther, however, and consider chronology of experience within individual exhibits and seek to understand whether visitor groups experience exhibits in similar ways.
**Analysis overall.** Overall, the analysis of the Visitor Photo Study included some components necessary for analysis within the field of Visual Studies. While the chronology analysis is quite strong, strengthening the content and context analysis and further defining the research questions and analysis plan at the beginning of the study would improve the analysis element of the Visitor Photo Study.

**Images produced by the researcher.** Historically, images produced by the researcher have been used in ethnographic studies as a way of creating a systematic recording of cultural events and groups (Marshall & Rossman, 2011; Pink, 2007). However, this traditional element of Visual Studies is not present in the Visitor Photo Study. None of the images were taken by me as the researcher but by the participants themselves. This is a strength of the study because the goal was to understand the visitor experience through the eyes of the visitors themselves. It would have been useful however, if I had documented at least one image of each group by taking their picture as they began their visit, so that we would have a visual record of all of the members of each group for confidentiality purposes. I made this recommendation in the report for future iterations of the study. Another important component of researcher-produced images that would have been beneficial to the Visitor Photo Study would be the development of a code book for the study that documented the setting. This codebook would document each location, which could then be compared to unclear images. This codebook would have given me a better sense of the context of the museum overall when I analyzed the images. I do not think that the researcher-generated images should have been the majority of this study; however, as the current format clearly allowed the museum to see itself as
the visitors see it. Also, there is some criticism of researcher-generated images in Visual Studies as biased and not true to the life of the participants, so the continued use of images created by the visitors circumvents this criticism (Marshall & Rossman, 2011).

**Images produced by the participants.** Images produced by the research participants themselves add a new element to Visual Studies, as they allow the researcher to see parts of the participants’ lives that may not be easily available to them (Banks, 2007). This element of Visual Studies was clearly present in the Visitor Photo Study, and formed the basis of all data for the study. The study sought to understand the experience of visitors by analyzing their own recording of their visit, considering where they went throughout their visit, what they did within exhibits, and anything else they desired to share about their experience. Because the images were produced by the visitors rather than by the researcher, they provide greater insight into how visitors experience the museum, what interests them, and what they engaged with.

**Number of images produced.** The Visitor Photo Study also extends the element of “images produced by the participants” because of the sheer number of images that the participants produced in a relatively limited amount of time. The creation of this large number of images produced a chronology of data that would not always be present on such a scale in other types of Visual Studies with participants taking the images.

**Photovoice method.** Photovoice is a method that allows research participants to record aspects of their lives from their own perspective and uses photography to document social and community issues in order to influence social policy (McIntyre, 2003). One of the strengths of photovoice is that participants are able to take images that
allow the researcher access to places and situations where they would otherwise not be able to go. Other benefits of the method are that interviews are conducted with the participants about their experiences taking the pictures, and interpretation can also be undertaken with the participants as a part of the analysis process. Participating in the research process can also be empowering to participants, and may facilitate them making sense of their own world (Marshall & Rossman, 2011; Photovoice, 2012). Some of these components were present in the Visitor Photo Study, while others were not present at all.

*Participant-taken images that allow access where the researcher could otherwise not go.* This component was definitely present in the Visitor Photo Study. As the researcher, I did not have the time or resources to experience the museum alongside each of the visitor groups, and sending a camera with them gave me access to the experiences of many different groups on the same day.

*Interviews about the images.* Interviews with the visitors were not undertaken in the Visitor Photo Study beyond informal questions such as “How did it go?” and “Did you enjoy the experience?” These interviews were not part of the original design but this element could have been fully realized in the Visitor Photo Study if visitors were interviewed following their museum experience, and asked why they took the images that they did, what their favorite images were, and other relevant questions about their experience. Visitors might also be asked about their choices and where they chose to go and what they chose to do throughout their visit, in order to have a greater understanding of the intentions behind their actions. This inclusion of the visitor storying of the images would greatly enhance the overall understanding of the visitor experience. However,
given the visitors’ time investment by participating in the study, adding an additional interview might have been seen as an undue burden and lead to decreased participation in the study. It would be crucial to make sure that the addition of these interviews was not an added burden on the participants, perhaps by asking them only a few questions, allowing them to share only as much as they would like to share, and by providing them with an additional incentive to do so.

Meaning making and analysis done with the participants. This component of meaning making and analysis done with the participants was also not present in the Visitor Photo Study. All analysis of the images was undertaken after participants returned their cameras and left the museum. Interviewing participants would be one way to include participants in the meaning making process, but in order for the principles of photovoice to be completely present, the visitors would also need to be asked to return to the museum later, after they had time to reflect on their experience, and help with the analysis of the images. Inviting some visitors to help in the overall analysis of the project would be a valuable way for them to help the museum to understand what can be learned from the complete set of visitor images and experiences. However, this would have been a more extensive process than the museum was prepared to engage in at the time of the study.

Another way to incorporate this component into the Visitor Photo Study would be to invite visitors to write captions or narration for their images after they are placed on a flickr site or other photo sharing site. This would allow their input into the process of making sense of the images. Alternatively, visitors could be given a video camera rather
than a digital camera and asked to narrate their museum experience. This would provide greater insight into the intentions of visitors throughout their museum visit. However, both of these options would require additional time and work from the visitors, and this may prove to be prohibitive to participation in the study. While these suggestions are not explicit components of the photovoice method, they are similar in their intent to include visitors’ meaning with the images.

**Empowering to participants.** The component of visitor empowerment was present in the Visitor Photo Study because visitors had the power to choose the story of their experience that they presented to the museum. They were invited to participate in the research, and knew that their insights, understandings, and experience of the museum were important and meaningful, and something worth documenting and understanding. Also, they were able to choose whether to fully or partially engage in the study by completely following instructions or not.

**Museum setting.** The photovoice method was also extended in the Visitor Photo Study through the use of the museum setting. A study of this type and on this scale using images created by the visitors themselves has never been undertaken before. Including participants of all ages in the Visitor Photo Study also increased the understanding of many different types of experiences within the same study. Moving the photovoice method to the museum setting has potential for future work, and the Visitor Photo Study has laid the groundwork for future studies in this area. The Visitor Photo Study could potentially be used for understanding the experiences of children on field trips to museums and to other cultural attractions, or to better understand how visitors experience
specific exhibits within museums. The method might also be used to focus on difficult aspects of museums, either by having visitors document aspects that they find challenging, or by documenting aspects that overwhelm them and that they will need time to process.

**Photovoice overall.** Interestingly, the components of photovoice within the Visitor Photo Study were very polarized, with some components completely present and others not present at all. This is an interesting dichotomy between the data collection process and the data analysis process, with full participatory components present in the data collection process, but no participatory elements present in the data analysis process. Improving the interview and analysis components, as mentioned previously, would help to improve the photovoice components within the Visitor Photo Study and strengthen the study’s participatory elements.

**Visual Studies overall.** Overall, the Visitor Photo Study included many of the elements of the field of Visual Studies. Out of the ten elements of Visual Studies that were considered, three elements included most or all of the components in the Visitor Photo Study, six elements included some of the necessary components, and one element was not included in the Visitor Photo Study. The three elements that were fully present in the Visitor Photo Study were unique data, data representing a specific point in time, and images produced by the participants. Most components of these elements were present in the study. The six elements that were partially present in the Visitor Photo Study were evocative data, more complex data, encourages varying interpretations of the data, interpretation depends on the interpreter, analysis, and the photovoice method. For each
of these elements, some components were present in the study, while some needed to be added in order for the element to be fully present in the Visitor Photo Study. One element, images produced by the researcher, was not present in the Visitor Photo Study. Considering the Visitor Photo Study as a type of Visual Study helped to reveal the potential uses of visual data in museum settings, and also helped to reveal the rigor of the methods that the Visitor Photo Study used to collect this data. Overall, Visual Studies provided interesting insights into many different elements of the Visitor Photo Study, and revealed important qualities of and insights into the study in terms of rigor and data collection and interpretation.

Visitor Studies

The field of Visitor Studies research includes any study that involves visitors at a cultural institution such as a museum or a zoo (Visitor Studies Association, 2012). Like Visual Studies and unlike CBR, Visitor Studies does not have a set of consistent principles. Therefore, there are no clearly defined principles of Visitor Studies to compare to the Visitor Photo Study. However, there are several different areas of focus and interest that Visitor Studies generally considers, and I have compared the Visitor Photo Study against these elements. The elements that I have used to consider the Visitor Photo Study as a type of Visitor Study are: understanding the visit (Falk, 2009), visitor engagement (Bitgood, 2006; Serrell, 1997; Wolf & Wood, 2008), visitor learning (Doering, 1999; Mastai, 2007, Rennie & Johnston, 2004; Wolf & Wood, 2008), understanding visitor groups (Sandifer, 1997; Streery, 1996), and visitor involvement in the research process (Rennie & Johnston, 2004). Each of these areas and their sub-
elements are explained in more detail below. As with Visual Studies, not all of these elements will be present in all Visitor Studies projects, but inclusion of many of the components indicates a strong visitor focus in a study. Table 6 illustrates the extent to which the Visitor Photo Study included each of these elements of Visitor Studies.
Table 6.

Visitor Studies elements

<table>
<thead>
<tr>
<th>Elements</th>
<th>Not present in the study</th>
<th>Some elements present in the study</th>
<th>Most or all elements present in the study</th>
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**Understanding the visit.** The first element of Visitor Studies is a desire to understand the visit to a museum or other cultural institution. Most commonly Visitor
Studies researchers seek to understand why visitors come to the museum in the first place (Falk, 2009), whether and how the museum is meeting the needs of visitors (Packer, 2008), and how visitors experience the museum throughout their visit (Doering, 1999). Each of these components were present in the Visitor Photo Study, though some were more explicitly part of the study than others.

**Why do they come?** The question of why visitors come to a cultural attraction is important to Visitor Studies, as cultural institutions are always seeking to attract new visitors and to understand what draws visitors to museums so they can improve their institutions and continue to attract new visitors (Falk, 2009). While visitor attraction was not an explicit objective of the Visitor Photo Study, understanding why visitors came to the museum was a small part of the study. Visitors were asked on the consent form why they came to the museum. This was the only part of the study that focused on this question, and so far the results have only been aggregated. In order for this component to be present in the Visitor Photo Study, I would have needed to consider the data in respect to why visitors indicated that they came to the museum and sought to understand if there were different patterns of where visitors went and what they did based on the reasons that they gave for coming to the museum. Also, I would have needed to look more closely at whether visitors with different reasons for visiting (such as to learn, to have fun, or to visit a specific exhibit) take pictures of different things or if there were other qualitative differences in the types of pictures that these visitors took. It would also have been interesting to explore whether demographic factors were correlated to why people come to the museum.
**Meeting visitor needs.** Another component of understanding experience in Visitor Studies is seeking to understand whether and how the museum is meeting the needs of visitors for a comfortable and enjoyable experience while at the museum. While the Visitor Photo Study does not focus on the enjoyment of visitors beyond asking visitors to take pictures of things that they like and enjoy, there are still some aspects of this component present in the study. The study allows the museum to learn about the way that visitors experience the museum and whether they are enjoying themselves based on the types of pictures that visitors take, the types of interactions they portray, and on the length of time that they spend in exhibits. In order for this component to be more present in the Visitor Photo Study, I would have needed to more explicitly ask visitors about their experience at the Museum and whether they enjoyed it. Inferring levels of enjoyment from the images alone has potential for misinterpretation, since negative experiences may not have been captured as a part of the visitors’ images. However, as this was not the main focus of the Visitor Photo Study, it may not be relevant to include this component in the study.

**Understanding visitor experience.** The main component of understanding the visit is to understand the visitor experience itself, including what visitors think of the museum, how they move through the museum, and why they make the decisions that they do while at the museum (Doering, 1999). This component is definitely present in the Visitor Photo Study. Understanding the experiences of the visitors in a new and innovative way is the focus of the study. Asking visitors to take pictures throughout their visit allows the researcher to experience the visitors’ journey as they move through the
museum. Through their images, I could see where visitors went in the museum, how long they spent there, and the aspects that they found exciting or interesting. I also got a sense of the flow of the overall visit, from the time that they arrived at the museum until the time that they left. This understanding of the experience is an interesting component of understanding the visit that is definitely present in the Visitor Photo Study.

**Understanding the visit overall.** Clearly, some components of the understanding the visit element of Visitor Studies were more present in the Visitor Photo Study than others. Though the study did not fully include the components of why visitors come to the museum and whether the museum was meeting their comfort and enjoyment needs, the Visitor Photo Study’s focus on understanding the experience of visitors throughout their visit was a large aspect of the study, making the understanding the visit element present in the Visitor Photo Study overall.

**Visitor engagement.** Another important element of Visitor Studies is understanding how visitors engage with the setting, including with museum exhibits and with others in their group. Visitors must be quickly drawn into their setting in order to effectively engage in it, and they also must connect to what they see throughout their visit (Serrell, 1997). Understanding how visitors move through the museum and a method known as tracking and timing are also key elements of understanding visitor engagement (Bitgood, 2006; Wolf & Wood, 2008). The Visitor Photo Study includes some components of this element, but the element is not fully present in the study.

**Quickly drawn in.** An important component of visitor engagement is how quickly visitors are able to engage with the experience around them. The more quickly a visitor is
drawn into the experience of the exhibit, the more likely they are to continue to engage with the exhibit than turning their attention elsewhere (Serrell 1997). It is difficult to tell how quickly visitors are drawn in to the experience of the Museum through the Visitor Photo Study. One might argue that the number of pictures taken by a visitor group indicates a level of engagement with the museum and the study, or that knowing how quickly visitors begin taking pictures after they enter an exhibit might be another indicator of quick engagement. However, the data do not clearly indicate how long a visitor was in an exhibit before they took a picture, as the only analyzable time indicators are the times between pictures, which may not always reflect the time of entry into an exhibit. Anecdotally, some visitors also mentioned the opposite; that when they became quickly engaged in the experience of the exhibit, they forgot to take pictures. Thus, understanding how quickly engagement occurred would be very difficult to obtain from the Visitor Photo Study. One way to increase this component in the Visitor Photo Study would be to ask visitors to take a picture as soon as they enter a new exhibit, in order to determine how quickly they engage after their initial entrance. However, this might also impact the natural flow of image taking that visitors engaged in throughout their visit.

**Connecting to what they see.** Visitor connection to what they see is an important component of visitor engagement, as it reveals whether the visitors related to what they saw in the museum, and whether they had a meaningful experience while they were there (Serrell, 1997). The Visitor Photo Study definitely included this component, as the study allows the researcher a glimpse into how the visitors are interacting with the museum and with each other. It shows what visitors looked at, what they thought was interesting
enough to take a picture of, and the areas of the museum that they decided to go to during their visit. It also shows whether a visitor engaged with a docent or other member of the museum staff, and the ways in which they interacted with their surroundings while experiencing the exhibits.

**Understanding how they move through the museum.** Understanding where visitors go while they are at the Museum and how long they spend there is another important component of visitor engagement (Bitgood, 2006), and is an important aspect of the Visitor Photo Study. One of the purposes of the photos and the time stamps on the photos was to be able to see where visitors went while at the museum, the order in which they experienced the exhibits, and how long they stayed there. The photographs provide clear evidence of how visitors moved through the museum and also provide time estimates for how long visitors stayed in each area.

**Tracking and timing.** Tracking and timing is an important method in Visitor Studies, in which researchers track visitors as they move through an exhibit, keeping track of length of time spent, specific interactions with exhibits and people, and other engagement behaviors (Serrell, 1997; Wolf & Wood, 2008). The traditional method of tracking and timing is expanded in the Visitor Photo Study. Rather than researchers following visitors throughout their experience in an exhibit, visitors track their own experience, in terms of both the order and the duration of the experience, as well as through their own selection of what aspects of the visit to share with the Museum. This increases the length of the museum experience that is understood by the researcher from the tracking of a specific exhibit to a visitor group’s entire museum experience. It
includes a participatory element by drawing the visitors into the data collection experience and asking them to reflect on what they are seeing and doing throughout their visit by taking pictures, and also increases the number of visitors that can be tracked at the same time, as one researcher can send out multiple cameras on the same day. In fact, with four cameras, I could collect as many as nine different visitor group experiences on the same day. The visitor voice is also more present in the Visitor Photo Study as the visitors themselves are able to decide what they would like to share about their experience. One limitation, however, is that visitors are not trained to keep track of their own levels of engagement. Visitors may not note every specific interaction the way a traditional tracking and timing study would. Also, images do not capture gestures and some indicators of engagement in the same way that observation can. However, the benefits of understanding the visitors’ movement throughout their entire museum visit outweigh the limitations of this extension of the tracking and timing method.

**Visitor engagement overall.** Given the level of visitor engagement with the museum and with the Visitor Photo Study throughout the visit, I feel that most of the elements of visitor engagement are included in the Visitor Photo Study. Though there is not one good measure of how quickly visitors engage, the images provide a consistent measure of engagement throughout the museum visit.

**Visitor learning.** Whether and how visitors are learning from their visits to museums and other cultural institutions is another facet of Visitor Studies. Learning in informal learning environments such as museums is different from learning in formal learning environments such as classrooms and thus must be studied and understood
differently. Visitor Studies considers learning in terms of connections made to previous knowledge (Mastai, 2007), active participation in the learning process (Wolf & Wood, 2008), and personal learning characteristics and desire to learn (Doering, 1999; Rennie & Johnston, 2004).

**Connections to prior knowledge.** What visitors learn and see throughout their visit is influenced by their prior knowledge and experience with the subject. Understanding learning through connections to their own knowledge and experiences allows visitors to contextualize their museum experience within their greater understanding of the world (Doering & Pekarik, 1996). Visitor Studies seeks to understand this type of learning process so that museums better engage visitors and help them bridge their current knowledge and understanding to new ideas (Mastai, 2007). This focus on understanding how previous knowledge connects to learning in an informal environment was not a part of the Visitor Photo Study. I did not speak to visitors about their learning or their previous knowledge before the study, and the images cannot reveal previous knowledge. Therefore, the learning process is not evident from the Visitor Photo Study. Visitors were not asked to take pictures of things that they learned from; rather they took pictures of things that interested them and things that they were looking at. Though learning was surely occurring during these visits, it is impossible to distinguish if or how visitors were making connections to their previous knowledge. In order for this component of understanding learning to be incorporated into the Visitor Photo Study, it would be necessary to change the study to ask visitors to take pictures of the areas where they learned something new about a topic they were familiar with. However, the addition
of these more complicated instructions would change the dynamics of the study. Also, the addition of this component would require asking visitors about their experiences and how they related to their previous knowledge after they had finished their museum visit.

**Active participation in the learning process.** Understanding how visitors actively engage in their own learning process while experiencing an informal learning environment is another component of the learning element of Visitor Studies. Museums desire to develop engaging learning environments, and thus must learn what types of environments lead to active participation in the learning process (Wolf & Wood, 2008). Though this was not one of the specific goals of the Visitor Photo Study aspects of it are present. It is possible to see when visitors are engaging in the learning process through the images that they created. The images reveal when visitors are engaging with the museum’s collection, whether it is through comparing the size of a fossil to the size of their hand, or by doing a science experiment in the lab. Even the act of participating in the research process through the Visitor Photo Study is a method of learning for many of the participants, as it caused them to consider again what they are looking at and how it relates to their overall museum experience, and also understand a way that the Museum does research about itself. However, like the connections to knowledge component, this component could have been more explicit in the Visitor Photo Study, by asking participants to take pictures when they were engaging with something from the museum collection.

**Personal learning.** Learning in a museum is deeply personal, as visitors choose what they would like to learn based on their own interests and experiences and there are
no predefined learning goals to be met (Doering, 1999; Rennie & Johnson, 2004). Learning was not measured in the Visitor Photo Study, but the study does show where people chose to go within the museum, which may be related to the topics they are interested in learning about, though other factors also influence the choices visitors make about their where to go within the museum. In order for the component of personal learning to be more explicit in the Visitor Photo Study, it would be necessary to interview visitors following their museum experience to understand why they made the choices that they did and understand what they are interested in learning about in an informal way.

**Visitor learning overall.** Overall visitor learning was not a major focus of the Visitor Photo Study. However, as noted, there were several ways in which the study could be used to understand the visitor’s learning experience better, and many ways that changing the study’s design could lead to improved understanding of learning. However, it would be necessary to be cautious about changing the Visitor Photo Study too much to incorporate these learning components, as doing so may change the focus of the study significantly. At this point, I would not alter the study to include more learning components, but simply note that understanding how visitors learn is complex, and while there are some ways to understand this through the study, it was not a main goal.

**Understanding visitor groups.** A fourth element of Visitor Studies is understanding the nature of visitor groups and how the dynamics of these groups impact the museum visit. Studies seek to understand the relationships within visitor groups and their impact on the decisions that the groups make (Sandifer, 1997; Strerry, 1996). Often, studies consider the differences between family groups and non-family groups, and how
the presence of children (and their ages) impacts the group’s visit. Another component of understanding visitor groups is understanding the museum visit as a social experience, during which interacting with others throughout the visit is a key aspect of the experience (Silverman, 2010). While understanding the impact of visitor group dynamics was not the focus of the Visitor Photo Study, there are some ways that the data could be used to understand these aspects of Visitor Studies. These are described below.

**Relationships in visitor groups.** Visitor Studies is interested in whether there are differences between what visitor groups do if the group consists of family members or non-family members, as well as the differences between different types of family groups, such as parents and children or grandparents (Sandifer, 1997; Strerry, 1996). Though not the explicit focus of the study, the Visitor Photo Study would be a potential outlet for exploring whether there are differences among these groups in terms of length of visits, types of exhibits visited, and paths though the museum. Though these analyses have not been done, it is possible to do so with the data from the current Visitor Photo Study and with future iterations of the study.

**Museum as social experience.** How visiting the museum is a social experience is clearly apparent in the Visitor Photo Study. Visitor images show group members interacting with each other and with museum staff. Also, in selecting participants for the study, it was rare to see a person who came to the museum alone; in fact, there was not a single study participant who was at the museum alone. The Visitor Photo Study specifically noted which groups contained children and collected demographic information including age and the number of people in the visitor group in order to be
able to understand whether there were differences in visits between groups with certain numbers of children, numbers of people in the group, or ages of group members, along with other demographic differences. Though it has not yet done so, the study could analyze whether these social differences influenced the types of exhibits visited or the length of visits. To obtain a greater sense of how these social aspects impacted the museum visit, it would be necessary to ask visitors how the people that they came with influenced the decisions their group made about where they went and what they saw at the museum. The data that has been collected could be used to determine if there were differences among these groups, but would not reveal the reasons why the visitors believe this occurs.

**Understanding visitor groups overall.** Though there are some interesting insights about visitor groups at the Museum that could be ascertained from the Visitor Photo Study, this was not the focus of the study. Thus, at this point this element of Visitor Studies has only some components present in the Visitor Photo Study. It would take some additional focus on the significance of the visitor group for this element to be fully present in the Visitor Photo Study. This additional focus could be included by asking visitors specifically about their group and how it influenced their museum visit.

**Visitor involvement in the research process.** The last element of Visitor Studies is the focus on including visitors in the research process, whether it is through interviews, surveys, advisory boards, or other forms of research participation. Two key components of this element are the direct use of the visitor voice to inform practice and make changes, and the development of participatory research projects which involve visitors in
many different stages of the research project (Rennie & Johnston, 2004). These components are evident in the Visitor Photo Study, which involves visitors directly in the research process.

**Direct visitor voice.** The component of direct visitor voice encourages Visitor Studies practitioners to learn about the visitor experience directly from the visitors themselves, through both self-report data and by observing and recording what visitors say and do (Rennie & Johnston, 2004). This component is definitely present in the Visitor Photo Study. The data came straight from the visitors themselves, and they decided what they were interested in reporting back to the museum about their experience. However, their voice in the research process is also limited to the images. The Visitor Photo Study did not include visitor explanations of their experiences, of why they took the paths that they did, or why they decided to take the pictures that they took. Thus, for this component to be fully present in the Visitor Photo Study, it would be important to add a visitor interview to the study that would allow the researcher to ask the participants about their experience during the study, how they moved through the museum, and why they made the choices that they did. This additional interview would need to be handled carefully, however, as most visitors were ready to leave by the time they returned the camera, and thus may have needed an extra incentive to spend the additional time talking about their experience after they have already participated in the study by taking pictures throughout their visit.

**Participatory research.** Direct participatory research is another important component of including visitors in the research process. Participatory research invites the
inclusion of visitors into the Visitor Studies research process (Rennie & Johnston, 2004). In the Visitor Photo Study this component extends beyond the traditional aspects of this element in Visitor Studies. The inclusion of the visitor as the primary source of data, with visitors given such autonomy in the types of data that they created, extends beyond the traditional involvement of visitors in Visitor Studies. Generally, visitor participation may involve filling out a survey about their experience or participating in a focus group. In tracking and timing, visitors may not even know that they are part of the research process. However, with the Visitor Photo Study, the visitor, their experience, and how they chose to portray this experience through images, is the center of the research. Though there were some study qualifications, such as the request to take pictures every three to five minutes throughout their visit, most visitors did not find this to be a problem. Some even used their images to tell a story, as one couple told me when they returned their cameras. They took funny or silly pictures throughout their visit as a reference to the role that their study participation played in their overall museum visit. This experience of such direct involvement in research may have shaped and changed the visitor experience, but it also allowed them to actively participate in the research process.

Visitor involvement in the research process overall. Given the participatory nature of the Visitor Photo Study, overall the study included most necessary components of the element of visitor involvement in the research process. This is because of the unique use of images and the visitors themselves in telling the story of their museum visit. Though the visitors may not have verbally shared their experience with the project team, they definitely shared it through their images. This new kind of data, directly from
the visitors themselves, provides new ways to understand the visitor and their experience within the museum.

Visitor Studies overall. The Visitor Photo Study clearly included each of the five elements of the field of Visitor Studies: understanding the visit, visitor engagement, visitor learning, visitor groups, and visitor participation in research. Three of these elements were very strong in the Visitor Photo Study, while two were less strong, but included some components of the element. The three elements that were strong in the Visitor Photo Study were understanding the visit, visitor engagement, and visitor participation in the research. In terms of understanding the visit, the Visitor Photo Study clearly seeks to understand the experience of visitors during their visit to the DMNS in a new and innovative way. For visitor engagement, the Visitor Photo Study clearly shows how visitors are connecting to what they see, and how they are moving through the museum. Visitor involvement in the research process was also clearly present, as the Visitor Photo Study was an opportunity for visitors to participate in research and share their insights about the museum. The two elements of Visitor Studies that were not as clearly present in the Visitor Photo Study were visitor learning and visitor groups. Though aspects of each of these elements were present in the study, they were not the focus of the study, and thus were not as explicit in the findings of the study. Overall, the Visitor Photo Study includes components of each of the five elements of Visitor Studies, and is an example of a unique type of Visitor Study. Considering the Visitor Photo Study within the context of the primary elements of Visitor Studies allowed me to see not only where the Visitor Photo Study was a strong representation of the field, but also to
consider new ways to modify the study or use data from the study to address different elements of Visitor Studies. This greater understanding of the context of the study within the field of Visitor Studies also helped to reveal where the value of the findings lay.

**Value of this Analysis**

Considering the Visitor Photo Study through the lenses of the fields of CBR, Visual Studies, and Visitor Studies provided interesting insights into the study itself and into the research process in general. The following section will consider several different areas of value that resulted from this study. These areas are the value of the retrospective approach, the value of understanding how the fields of CBR, Visual Studies, and Visitor Studies complement one another in this specific study, the value of determining whether a hybrid study which incorporates all of these three fields is possible, and the value of the findings of this study in terms of future research design.

**Value of the retrospective approach.** Considering the Visitor Photo Study retrospectively provided interesting insights about the study’s research design and findings. Because the Visitor Photo Study did not begin with one of these specific fields as its framework, the study emerged organically as a product of many different elements of the three fields rather than being tied to the specific method and framework of one of the fields. While there was general knowledge of each of these fields, the requirements of the specific fields were not necessary. This allowed for an innovative approach to understanding the visitor experience, which might not have been possible if the study had been framed by one specific methodology from the beginning. Looking at the Visitor Photo Study retrospectively also allowed me to understand what worked well and did not
work well about this approach, and to see the organic process of development. By comparing the study to the fields in retrospect, I was able to identify which elements of the three fields benefited the study, and which elements could have been included in order to strengthen the study’s methods and findings. This analysis also allowed me to appreciate what was innovative and worth noting about this study through the lenses of three very different fields.

**Value of understanding how the fields of Community-Based Research, Visual Studies, and Visitor Studies complement each other.** Another important aspect of this case study of the Visitor Photo Study was that it allowed me to understand not only how the Visitor Photo Study met some of the criteria for the fields of CBR, Visual Studies, and Visitor Studies, but it also allowed me to consider how the three different fields complemented each other within one study. The Visitor Photo Study was enhanced by elements from each of these three different fields, and the combination of the three different fields brings a depth of insight that would not otherwise have been possible.

When I compared the three different fields within the same study, I was able to see how aspects of each method would improve upon components of the other methods. Considering the fields of CBR and Visitor Studies together enhanced my thinking in unique ways. The overtly participatory aspects of CBR have the potential to greatly enhance the work of Visitor Studies, through the continued inclusion of the visitor voice in understanding the museum. Viewing the study through lenses of both CBR and Visitor Studies also allowed me to consider future potential for Visitor Studies, such as the inclusion of an advisory board who could inform the work of the Museum’s research and
evaluation projects. Also, the inclusion of the community at all stages of the research process, from the development of the research questions to the dissemination of the findings, has great potential to provide new insight into the field of Visitor Studies. The use of CBR in the field of Visitor Studies also has the potential to include community members in research in new ways, and expand visitors’ understandings and insights into the experience of science research and education.

In terms of Visual Studies and Visitor Studies, the Visitor Photo Study revealed how the use of visual images can improve and change traditional tracking and timing methods to decrease cost and improve visitor participation. Expanding the field of Visual Studies into the museum setting provides many new and exciting possibilities for understanding the museum in terms of how visitors see and experience it, and also as a way for museums to understand areas that need improvement. Visual Studies can also be improved through further incorporation of the work of Visitor Studies by considering how images can be used to understand group dynamics and methods of learning.

Considering the fields of CBR and Visual Studies alongside each other in the Visitor Photo Study revealed how the photovoice method has the potential to continue to improve CBR by providing further insight into the participants’ lives and bringing the researcher into areas of the community where they might not otherwise be able to go. The inclusion of the community in the analysis process of images also shows how the participatory elements of CBR fit within the context of Visual Studies. Clearly, analyzing the intersection of the fields of CBR, Visual Studies, and Visitor Studies within the
Visitor Photo Study opens up potential avenues for improving the methods of each of the fields.

**Value of understanding whether a hybrid study is possible.** Another valuable insight that emerged from this examination of the Visitor Photo Study was a greater understanding of whether it is possible to incorporate all aspects of several fields into a single study or whether one field must by nature be dominant in terms of design. By considering the Visitor Photo Study in this way, I came to the conclusion that a hybrid of this sort is only possible to a certain extent. It would not be possible to include all aspects of the fields of CBR, Visual Studies, and Visitor Studies in one study. Some elements of each naturally conflict, making it difficult to combine them in the same study. For example, the nature of research in museums makes the intensive interview and meaning making process of the photovoice method within Visual Studies difficult, as the nature of the research participation comes as a component of their museum visit, and adding an additional burden such as these interviews would make recruitment a challenge for this type of study. This research setting of the museum also limited the participatory nature of CBR, as the nature of the visitor population (visiting the museum for a short period of time during their leisure hours) makes the inclusion of the community in all aspects of the research difficult.

However, the Visitor Photo Study embodied many of the best characteristics of each of these fields, and combined them in new and innovative ways. The Visitor Photo Study embodied the principles of CBR by including participants in the research process, and developing a working relationship between a university student and a community
organization. It also embodied valuable aspects of Visual Studies by creating images that reflect the experience of the participants, allowing the participants themselves to generate their own images which reflect their own experience and also bring the researcher to where it was not logistically possible to go, and by understanding analysis of the chronology of images in a new and innovative way. The study also provided valuable insights for the field of Visitor Studies in terms of understanding visitor engagement throughout a museum visit and the overall experience of the visit.

**Value in terms of future research design.** Considering the Visitor Photo Study through the lenses of CBR, Visual Studies, and Visitor Studies was also valuable in terms of considering future research design. Understanding how each of these three fields would approach the study differently provides insight into how elements of each of these fields would work in the study, and also into the ways that a future research design could be modified to incorporate additional elements which would improve the quality of the study or to remove elements that did provide the information or insight that was expected. These removed elements could then be replaced with other elements from the three fields. Considering the study this way allowed me to step back from the immediate process of the study and understand the contextual aspects of the different research methods and how they impacted this study. Doing so allows for greater insight into changes needed for future iterations of the study.

**Overall value.** Overall, considering the Visitor Photo Study through the lenses of the fields of CBR, Visual Studies, and Visitor Studies provided interesting insights into the Visitor Photo Study itself and also into future versions of the study. The retrospective
approach allowed for insight into adjustments to be made and provided insight into why the study worked the way that it did. Considering the study through the lenses of these three fields also provided insight into how these fields are able to complement each other within a unique study that embodies elements of all three. The analysis also revealed whether a complete hybrid study was possible, and provided insight into beneficial changes for future research designs.
Chapter 5 Summary, Conclusions, and Implications

This chapter consists of summary, conclusions, implications, and limitations of this analysis of the Visitor Photo Study. It also provides final thoughts on this analysis of the Visitor Photo Study through the lenses of the fields of Community-Based Research (CBR) (Strand et al., 2003b), Visual Studies (Marshall & Rossman, 2011; Pink, 2007), and Visitor Studies (Visitor Studies Association, 2012). The first section summarizes each of the research questions, including why the research question was selected, how it was analyzed, and a brief summary of the findings. The second section provides conclusions that can be drawn about the Visitor Photo Study from considering it through the lenses of CBR, Visual Studies, and Visitor Studies. It also provides conclusions about the value of conducting a retrospective analysis of the Visitor Photo Study. The third section details implications for museums, faculty, and students that emerged from this analysis. The fourth section details the study’s limitations, while the final section, Final Thoughts, provides concluding thoughts about the Visitor Photo Study and the process of considering its origins, implementation, and findings alongside the principles and elements of CBR, Visual Studies, and Visitor Studies.

Summary

This section details the origin of the research questions and describes why each research question was chosen, how they were analyzed, and a brief summary of the findings. The following research questions guided this study:
1. What were the origins, implementation, and findings of the Visitor Photo Study?

2. What principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies were present in the Visitor Photo Study?

3. What principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies were not fully realized or missing in the Visitor Photo Study?

4. How does the Visitor Photo Study extend the principles and practices from the fields of Community-Based Research, Visual Studies, and Visitor Studies?

**Origin of the research questions.** This study’s research questions emerged as the result of a desire to more deeply understand the findings and contexts of the Visitor Photo Study. Though I had worked on the Visitor Photo Study for my practicum course, I felt that there was still much to explore in terms of the data that resulted and also in terms of how the study contributes to a greater understanding of research methods. I was interested in the three fields of CBR, Visual Studies, and Visitor Studies, and wanted to understand how the principles and elements of each of these fields had impacted the Visitor Photo Study and the way that it was implemented. Because the Visitor Photo Study will be repeated at the Denver Museum of Nature & Science in the future, I also wanted to understand what worked well with the study in terms of these three fields, what did not work as well and should be improved for future iterations of the study, and what features of the Visitor Photo Study extended the principles and elements of each of these three fields, improving upon the method through this innovative implementation. Based
on my desire to understand the Visitor Photo Study in new ways, I pursued writing a thesis that explored the origins, implementation, and findings of the study, along with considering the study through the lenses of CBR, Visual Studies, and Visitor Studies.

**Origin, implementation, and findings of the Visitor Photo Study.** The first research question sought to understand the origins, implementation, and findings of the Visitor Photo Study. This research question enabled me to understand and clarify how the Visitor Photo Study came about, how it was implemented, and the initial findings that resulted. These details were crucial for placing the Visitor Photo Study in context and for my later understanding of whether and how the Visitor Photo Study included or did not include the principles and elements of CBR, Visual Studies, and Visitor Studies. I also wanted to make clear my involvement in the process of the study from start to finish and to present the initial findings of the data, in order to provide a clear picture of the study that I was exploring through the fields of CBR, Visual Studies, and Visitor Studies.

The Visitor Photo Study emerged as the result of my internship with the DMNS over the summer of 2011. The Museum’s Department of Visitor Research and Program Evaluation envisioned a new type of study in which visitors would document their museum experience by taking pictures throughout their visit. The pictures would be used to understand what visitors are seeing and experiencing, to determine their paths through the museum, and to understand what interests and engages them. The study also sought to determine whether a study like this was feasible in terms of logistics, resources, and analysis.
I worked closely with the Museum staff to develop tools and protocols for the study and then collected data on ten days throughout the summer. Data coding and analysis followed, and an initial report of the findings was presented to the Museum in November 2011. This report is included as Appendix A. Through this process of shaping the Visitor Photo Study, collecting and analyzing the data, and reporting the findings, I began to realize the potential for further analysis of this study by considering it through the lenses of CBR, Visual Studies, and Visitor Studies, which were not explicitly part of the initial implementation, but principles and elements of each of these fields are present in the Visitor Photo Study to varying degrees.

Detailing the origins, implementation, and findings of the Visitor Photo Study establishes the context for the next three research questions, which each consider the ways in which the Visitor Photo Study can be explored and understood through the fields of CBR, Visual Studies, and Visitor Studies.

Principles and practices of CBR, Visual Studies, and Visitor Studies present in the Visitor Photo Study. The second research question considered what principles and elements from the fields of CBR, Visual Studies, and Visitor Studies were present in the Visitor Photo Study. This question sought to understand which aspects from each of these three fields were present in the study and the extent to which they were present. I sought to understand which elements were present in the Visitor Photo Study by developing a matrix for each of the three fields, through which I indicated whether the Visitor Photo Study did not include the element, whether the some parts of the element were present in the study, whether most or all elements were present in the study, and
whether or not the study extends thinking about the field. These matrix tables then served as the basis of my findings, as they revealed which elements from CBR, Visual Studies, and Visitor Studies were present in the study and to what degree.

*Community-Based Research.* Elements of CBR that were found to be present in the Visitor Photo Study included several elements from each of the principles of collaboration, democratization of knowledge, and social change (Strand et al., 2003b). Several features of collaboration, specifically mutually respectful relationships, sharing of authority, and everyone in the research group acting as a researcher and a learner, were found to be present in the Visitor Photo Study. Components of the element of full collaboration on the research process were also present, including collaborative development of the research instruments. For democratization of knowledge, the element of the knowledge of all parties is valued equally was present in the Visitor Photo Study, along with the components of unconventional criteria for the appropriateness of research methods and flexible and adaptable research methods, which both fit under the element of incorporating multiple research methods. In terms of social change, the elements of a modest social agenda, and empowering and building the capacity of the community organization were both present, along with two components of the element of producing useful information. The components that were present were information produced promotes the interest of the organization, and the information produced helps the organization to understand their target populations. See Tables 1, 2, 3, and 4 in Chapter 4 for the complete listing of all CBR elements present in the Visitor Photo Study.
**Visual Studies.** Elements of the field of Visual Studies that were present in the Visitor Photo Study included creation of unique data, the data represents a specific point in time, and images used for the study are produced by the participants. One component of the analysis element was also present: the chronology analysis component. In regard to the element of the photovoice method, two components were present: participant-taken images allow the researcher access to areas they would not otherwise be able to access, and participation in the research process is empowering to participants. See Table 5 for a complete listing of all Visual Studies elements present in the Visitor Photo Study.

**Visitor Studies.** Three out of the five key elements of Visitor Studies were present in the Visitor Photo Study. These elements were: understanding the visit, visitor engagement, and visitor involvement in the research process. Also present was one component of visitor groups. This component was understanding the museum visit as a social experience. See Table 6 in Chapter 4 for a complete listing of all Visitor Studies elements present in the Visitor Photo Study.

Clearly, many elements from each of the fields of CBR, Visual Studies, and Visitor Studies were present in the Visitor Photo Study. Considering the Visitor Photo Study through the lenses of each of these three fields allowed these elements to emerge in the findings, revealing the ways in which the Visitor Photo Study embodies some principles and elements of each of these fields.

**Principles and practices of CBR, Visual Studies, and Visitor Studies missing or not fully realized in the Visitor Photo Study.** The third research question sought to understand what elements of the fields of CBR, Visual Studies, and Visitor Studies were
missing from or not fully realized in the Visitor Photo Study. This question sought to complement the findings of the second research question, which detailed which elements of the three fields were present in the Visitor Photo Study. The purpose of this research question was also to understand which elements of these three fields could be added to future iterations of the Visitor Photo Study. Two columns of my matrix tables addressed this research question. Elements that were found to be completely missing from the study, and elements which contained some but not all components necessary to be considered present in the study, were used to understand which aspects of the fields were lacking in the Visitor Photo Study.

**Community-Based Research.** There were some elements of CBR which were lacking in the Visitor Photo Study. In terms of the principle of collaboration, several components of the element of full collaboration in the research process were missing from the Visitor Photo Study. These missing components were: constructing research questions collaboratively, interpreting results collaboratively, issuing recommendations collaboratively, and implementing initiatives collaboratively. Three components were partially present: collaboration on identifying the research issue, collecting and analyzing data collaboratively, and collaboration on writing the final report. For democratization of knowledge, one element was completely missing from the Visitor Photo Study: innovative, user-friendly approaches to the dissemination of knowledge. Several components of the element of incorporating multiple research methods were only partially present in the study. These included the potential for the data to draw out relevant knowledge, and inviting the involvement of all parties in the research process.
Regarding the principle of social change, some components of the element of producing needed information were missing completely while others were only partially present. Missing from the study was the potential for the information produced to attract new resources, and the potential for the information produced to contribute to the social agenda. The component of using information to improve programs was partially present in the Visitor Photo Study. See Tables 2, 3, and 4 in Chapter 4 for a complete understanding of which aspects of CBR were missing or not fully present in the Visitor Photo Study. Overall, each of the three principles of CBR (collaboration, democratization of knowledge, and social change) were categorized as “Some elements present,” because each contained only some of the elements necessary for the principle to be fully present in the Visitor Photo Study. Table 1 in Chapter 4 details where each of these principles fit within the CBR matrix.

**Visual Studies.** One element of Visual Studies was missing from the study: the inclusion of images produced by the researcher. The elements of evocative data, more complex data, interpretation of data depends on the interpreter, and analysis of visual data were partially present in the Visitor Photo Study. The photovoice method was also partially present in the study, with two components present and the two components of interviews about the images and meaning making done with the participants missing. Overall, the field of Visual Studies was classified as “some elements present” in the Visitor Photo Study, due to these elements that were not fully present. See Table 5 in Chapter 4 for a complete list of which elements of Visual Studies were missing or not fully present in the Visitor Photo Study.
**Visitor Studies.** Two elements of Visitor Studies, visitor learning and understanding visitor groups, were categorized as having some elements present in the Visitor Photo Study. Visitor learning was present because the components of active participation in the learning process and personal learning had only some aspects present in the study. One component of visitor learning, learning connecting to previous knowledge, was absent from the study. For understanding visitor groups, one of the components, relationships within visitor groups was partially present in the Visitor Photo Study. All elements of Visitor Studies included at least some aspects in the Visitor Photo Study. However, because not all of the elements were fully present in the study, overall Visitor Studies was classified as “Some elements present” in the Visitor Photo Study. See Table 6 in Chapter 4.

**Principles and practices of CBR, Visual Studies, and Visitor Studies extended in the Visitor Photo Study.** The fourth research question enabled me to consider the extent to which the Visitor Photo Study extended some elements from each of the fields of CBR, Visual Studies, and Visitor Studies. I wanted to explore how the Visitor Photo Study improved practices for elements of these fields, and the ways in which this impacted both the Visitor Photo Study itself and the fields as a whole. I considered this within the same matrix tables that I used to consider whether elements of each of the fields were missing, somewhat present, or present in the Visitor Photo Study. I noted specifically when aspects of the Visitor Photo Study went beyond the requirements necessary for an element to be present in the study. I hoped that these extensions could be used to highlight the ways in which the unique aspects of the Visitor
Photo Study should be considered important elements to retain in future iterations of the Visitor Photo Study.

**Community-Based Research.** One element of CBR was extended in the Visitor Photo Study. This element, collaborating on the research findings, fits within the principle of collaboration. This element is extended in the Visitor Photo Study because of the level of collaboration between myself and the director of the Department of Visitor Research and Program Evaluation. Our presentation of the results of the study at a national conference, which disseminates the findings of the Visitor Photo Study beyond the community of DMNS itself, and during which we will consider implications for the method beyond the DMNS and into other types of cultural institutions, reveals a new level of collaboration possible between partners in a CBR project. See Table 2 in Chapter 4.

**Visual Studies.** Three elements of Visual Studies included components which extended the elements and practices of the field. The element of data represents a specific point in time was extended by the timing element of the Visitor Photo Study. By asking visitors to take time-stamped pictures every three to five minutes, the Visitor Photo Study not only captured the time that the images were taken, but also the location and sequence of the visitor group’s movements throughout the museum. This extends thinking about how images can represent a specific moment.

The element of images produced by the researcher was extended by the number of images that participants produced. Between 69 visitor groups, 3742 images were created, with each group taking an average of 58 pictures, though some groups produced more
than 200 images. The sheer number of images produced represents an extension of Visual Studies, as the number of images provided insight into the visitor experience on a minute level.

The last extension of Visual Studies concerns the photovoice method. This extension represents the fact that the Visitor Photo Study brought elements of the photovoice method into a new setting, the museum. A study of this type and scale using images created by the visitors themselves in a museum setting has never been undertaken before. Deploying the photovoice method in the museum setting presents new opportunities for future work, and the Visitor Photo Study has laid the groundwork for future studies in this area. See Table 5 in Chapter 4.

**Visitor Studies.** Within the Visitor Photo Study, the elements of visitor engagement and visitor participation in the research process included components that extended the field. Within visitor engagement, the component of the tracking and timing method was extended, as visitors themselves tracked their experience throughout their visit rather than a researcher tracking the experience for them. The Visitor Photo Study also expands the method from tracking visitors through one exhibit within a museum to tracking visitors throughout their entire museum visit.

In terms of visitor participation in the research, the participatory element of the Visitor Photo Study extends this element within the field of Visitor Studies. The visitors themselves are the primary source of data about their museum visit, and have a level of autonomy about what they would like to share about their experience which is not often
present in Visitor Studies. See Table 6 in Chapter 4 for the complete list of extensions of Visitor Studies in the Visitor Photo Study.

Overall, each of the four research questions revealed interesting insights into the Visitor Photo Study itself, and into the way that it fits into the contexts of the fields of CBR, Visual Studies, and Visitor Studies.

**Conclusions**

The following section considers the findings of the Visitor Photo Study through the three fields of CBR, Visual Studies, and Visitor Studies overall, providing insight into the understanding of the Visitor Photo Study through these lenses and also about the importance of each of these three fields to the implementation and understanding of the Visitor Photo Study. When the Visitor Photo Study was considered in the context of the three fields of CBR, Visual Studies, and Visitor Studies, each time the study was found to have some elements of the field present. Each of the fields included elements that were missing, elements that were present, and elements that were partially present, and as a result revealed that none of the fields were completely present in the Visitor Photo Study. This overall categorization provides greater insight into the Visitor Photo Study as a whole, especially when considered in light of the multiple elements and components that make up each of these three fields. See Tables 1, 5, & 6 in Chapter 4. While the study included elements from each of the three fields, none were the dominant field of thought during the implementation and analysis of the Visitor Photo Study. Thus, the study can be
considered a hybrid of each of the three fields, including some elements of each, but with no field completely present in the Visitor Photo Study.

**Community-Based Research.** Considering the Visitor Photo Study through the lens of CBR provided valuable insight into the ways and extent to which the principles and elements of CBR were present in the study. Understanding how collaboration, democratization of knowledge, and social change fit into the origins, implementation, and findings of the Visitor Photo Study revealed that the Visitor Photo Study embodied many of the elements of these principles even though it wasn’t designed to be a CBR project. It also revealed how the inclusion of some principles of CBR which were not included in this iteration of the Visitor Photo Study could improve future versions of the study. More collaborative work on each of the stages of the research process, especially during the creation of research questions and the analysis process, would have potentially reaped new insight into the data that were collected and the resulting findings. Innovative ways of disseminating the data would have capitalized on the unique data that the Visitor Photo Study collected. The analysis also revealed that some elements of CBR that were missing would not have benefited the Visitor Photo Study. For instance, the inclusion of additional interviews with the visitors would hinder participation because of the greater time commitment. Overall, considering the Visitor Photo Study through the lens of CBR illustrated both the elements that currently enhanced the study, those elements which inclusion in future versions of the study would enhance findings, and those elements of CBR that were simply not compatible with the Visitor Photo Study.
**Visual Studies.** Like the comparisons to CBR, considering the Visitor Photo Study through the lens of Visual Studies provided interesting insights into both the study itself and the field in general. In order to compare the Visitor Photo Study to the elements of Visual Studies, I first had to determine which elements were common across Visual Studies. Working through the Visual Studies literature in this way helped to reveal to me the important aspects of Visual Studies which should be present in a visual study. It also revealed elements which may not work for every type of visual study. After I completed this process, the extent to which these elements of Visual Studies were present in the Visitor Photo Study, and the way that the inclusion or exclusion of these elements impacted the Visitor Photo Study, became clear. Like with CBR, this analysis revealed which elements that were absent in the Visitor Photo Study would have enhanced the study, and which elements would have hindered the study. The inclusion of more analysis of the images in terms of content and context would have enriched the overall understanding of the museum visit. And, the inclusion of more components of the photovoice method, such as interviews with the participants about the images that they created, and their inclusion in the coding process, would have been ideal, but not realistic given the constraints of the Museum setting. The analysis also revealed unique extensions of the field of Visual Studies in terms of understanding the images as representing a specific point in time, and the value of larger numbers of images in producing a broader picture of an experience overall. Thus, examining the Visitor Photo Study through the lens of Visual Studies revealed the extent to which the study incorporated key elements of the field, ways it extends thinking, elements which would enhance the study if they had been included, and elements whose inclusion would not have benefited the study
Visitor Studies. Like Visual Studies, in order to compare the Visitor Photo Study to the field of Visitor Studies I first had to determine the elements and components of Visitor Studies that were present across most Visitor Studies research. Developing the elements of understanding the visit, visitor engagement, visitor learning, understanding visitor groups, and visitor participation in the research process provided me with a greater knowledge and understanding of the field of Visitor Studies and the role that its elements and history played in the Visitor Photo Study. Understanding the Visitor Photo Study as a product of Visitor Studies revealed the extent to which the study included these elements. Though overall I classified the Visitor Photo Study as containing some elements of Visitor Studies, the elements of Visitor Studies were more consistently present in the study than either those of CBR or Visual Studies. The only elements which were not fully present in the Visitor Photo Study were visitor learning and understanding visitor groups. In terms of visitor learning, the elements that were missing or not fully realized in the study, connecting to previous knowledge, active participation in the learning process, and personal learning, were not the focus of the Visitor Study, which instead sought to understand the visitor experience holistically rather than focus on the difficult to measure details of how learning is taking place. Thus, the further inclusion of these elements in the Visitor Photo Study would not have enhanced the study, but rather moved it in a direction away from its focus. Clearly, understanding the Visitor Photo Study through the lens of Visitor Studies not only revealed the extent to which it embodied the important
elements of the field, but also which elements would not be appropriate to include in future iterations of the study.

**Value of this analysis.** Overall, understanding the Visitor Photo Study through the lenses of CBR, Visual Studies, and Visitor Studies provided interesting insights into the study as a whole. Considering the study as a product of these three fields after the study has been completed reveals the value of considering a study retrospectively, both in order to be able to make changes for future iterations of the study and to be able to more clearly understand how the decisions made and methods chosen impacted the study at all stages, from origins to the final reporting of the results (Puma et al., 2009).

Comparing the Visitor Photo Study to the fields of CBR, Visual Studies, and Visitor Studies simultaneously also provided insight into how these three fields can complement each other, both within the Visitor Photo Study and also within the larger contexts of research methods in general. It revealed the extent to which the principles and elements of each of these fields complement and contradict one another. Along this same vein, understanding the Visitor Photo Study through each of these lenses simultaneously revealed the extent to which a hybrid of all three of these fields was possible. In the case of the Visitor Photo Study, it became clear that including all principles and elements of each of the fields in a single study was not possible or desirable, as there were elements of each that contradicted one another. However, the study also revealed that it was possible to include many, if not all, of the components of each of these three fields within a single study and produce findings which are valuable and useful for each of the three fields.
Lastly, considering the Visitor Photo Study through the lenses of each of these three fields provided insights that could inform future research design, specifically by illuminating which elements of the study worked well, which could have been improved, and which should be removed entirely. It also presented the possible alternatives for inclusion, based on the principles and practices common to CBR, Visual Studies, and Visitor Studies. Overall, understanding the Visitor Photo Study in this way provided insights which would not have been possible if the study had not been analyzed retrospectively and through the lenses of CBR, Visual Studies, and Visitor Studies.

**Implications**

The analysis of the Visitor Photo Study through the lenses of CBR, Visual Studies, and Visitor Studies also provided important implications for museums, for faculty, and for students.

**Implications for museums.** This analysis of the Visitor Photo Study has several implications for museums and other cultural settings. The first implication is the resulting enhancement in understanding of the value of this type of project. A photo study like the Visitor Photo Study allows museums to understand the experience of visitors in an innovative way, with accurate time data, the participatory involvement of the visitors themselves, and the unique images that the visitors create. This study has potential to contribute to museums’ understanding of many of the different elements which are the concern of Visitor Studies.

A second implication is an understanding of the value of the methods and elements from the fields of CBR, Visual Studies, and Visitor Studies. This analysis
revealed the strengths and limitations of each of these fields, and provides insight into how they can be used effectively in a museum setting, specifically with a photo study. Though Visitor Studies has been a main focus of museum evaluation for a long time, the inclusion of the elements of CBR and Visual Studies provide new depth of insight into type of data and conclusions that can be drawn from research within museums.

A third implication is the understanding that this study brings to the value of using a hybrid of methods to address your research interests. The Visitor Photo Study clearly shows how elements of each of the three fields were used in the study, and how the combination of these elements provided insight that would not have been obtained through only one method. The study also reveals, however, that a complete hybrid is not always possible, as elements of the fields may be contradictory, so the desired outcomes of the study should dictate which elements are included in the study.

A final implication of this study for museums is the value of partnering with graduate students. Though museums often acquire interns to do research and evaluation within the museum, these interns often come from Museum Studies programs. As a student in a Research Methods and Statistics program, I entered my internship at DMNS with a different set of skills and understandings of the museum setting. My skills and my fresh perspective were a valuable asset to the museum as I worked on the Visitor Photo Study. Clearly, there are many important implications for museum settings which can be drawn from this analysis of the Visitor Photo Study.

**Implications for faculty.** Several important implications for faculty can be gleaned from this analysis of the Visitor Photo Study. The first is the potential for
museum settings as a place for students to gain valuable research experience. Each student in the Research Methods and Statistics Program at the University of Denver must complete a practicum in which they gain hands-on experience and insight into a research project. My internship at the DMNS served as my practicum, and I was the first student in the program to work in this type of setting. The Department of Visitor Research and Program Evaluation at DMNS is doing valuable and interesting work in the museum setting, and would be an excellent experience for students wishing to complete their practicum project in a unique setting.

There are several other implications for faculty in terms of the student practicum. The first concerns the supervision of the student. It would be valuable for a student entering a new setting such as a museum to have a faculty advisor who they can discuss the site, any issues or complications, and challenges or successes that may arise. A faculty advisor may help to identify problems or opportunities in design or method from the outset. Though I had a faculty advisor, the practicum experience does not include close contact with this advisor throughout the experience. If I had received more support from my faculty advisor throughout my time at the museum I also might have been introduced to the three fields of CBR, Visual Studies, and Visitor Studies, and considered earlier how elements from each of them might have benefitted the Visitor Photo Study.

Clearer requirements for a practicum project would also benefit both students and site supervisors. My museum supervisor and I would have benefitted from having a clear understanding of expectations and requirements involved in the research practicum. Lastly, if my faculty advisor had met with my practicum site supervisor this would have
provided an opportunity to build relationships between the museum and the university, fostering future partnerships for both students and faculty.

The last implication for faculty is the value of this unique type of thesis project. Considering a study retrospectively through the lenses of three different fields provided insight into each of the three fields and also into the study itself. This type of study is a valuable opportunity for others seeking to pursue research methods as the focus of their thesis. Overall, there were several key implications for faculty that resulted from this analysis of the Visitor Photo Study.

**Implications for students.** The analysis of the Visitor Photo Study also revealed several implications for students. For me, the most important implication was the availability of the museum setting as a place for research. As someone who had always enjoyed museums and even considered working in one, conducting research in the museum setting provided me with the opportunity to combine two fields that I love: museum studies and research. Before I met the director of the Department of Visitor Research and Program Evaluation at the DMNS, I had no idea that this type of research was possible. I hope that this study also enhances the visibility of museums and other cultural settings as interesting places of research for other students.

Another implication for students is the value of considering different research fields within the same study. Understanding how the fields of CBR, Visual Studies, and Visitor Studies connected and contradicted each other improved my own knowledge of research methods in general and helped clarify how the components of each can work together to produce a strong study. Understanding the components of each also allowed
me to be critical of their use in studies. It also revealed the value of combining the principles and methods of different fields in developing the best research approach to answer pertinent research questions. Considering the Visitor Photo Study retrospectively was also enlightening for me as it allowed me to understand the value of considering studies in retrospect in order to understand what worked well and what did not work well. Though in this case the study I analyzed was my own study, the value of considering studies retrospectively in order to improve future work goes beyond critiquing your own work, and could be applied to many different types of studies that students might be interested in.

The final implication for students that emerged was the value of CBR projects for promoting student learning. I was lucky to be able to work with a team at the DMNS who considered me as an equal, and allowed me to grow significantly in my understanding of research methods and research in general through my experience with the Visitor Photo Study. Considering the study within the context of CBR revealed to me that this is not the norm, and that student projects are not always so collaborative. Not only did I benefit in my learning, but I was also able to develop relationships which will also be valuable in the future. When I considered CBR, I also realized that a key component that was missing from the Visitor Photo Study was active faculty guidance in the research. As I understood the study more, I came to recognize how this impacted my own understanding of the study, and as a result, I would encourage students to actively seek faculty guidance as they pursue research projects. Overall, there were valuable implications for students
that resulted from this analysis in terms of research methods, value of CBR, and the value of the museum setting as an avenue for research.

Limitations

There are several limitations to this study. The first is that it is a retrospective analysis of a study that has already taken place, rather than a prospective analysis of a potential study. Thus, though changes could be made to future iterations of the study, this version of the Visitor Photo Study is already complete, and cannot benefit from the findings of this analysis as it would have if the study was done prospectively. A second limitation was that I worked on this project alone. Though I was immersed in the literature and the findings of the Visitor Photo Study, collaboration with others involved in the study or interested in this type of analysis would have resulted in different insights into the same fields. Though these limitations are relatively minor, it is important to consider them when understanding the overall findings of this thesis.

Final Thoughts

Analyzing the Visitor Photo Study through the lenses of the fields of CBR, Visual Studies, and Visitor Studies revealed that this photo study method is a viable methodology to use with each of these three fields. The analysis revealed that while some elements of each of these fields were missing from the Visitor Photo Study, many elements were present, and there were even some extensions of each of the fields to be found in the Visitor Photo Study.

While there are ways that the study could have been augmented through the inclusion of additional elements from each of the fields, it is clear that the Visitor Photo
Study was a hybrid of these three fields, in which many elements of each field were represented in the study. However, it is also clear that for all elements of any of these fields to be included, the other fields must necessarily be less prominent, as some elements among the fields are contradictory. Ultimately, this study would have different foci depending on the prominent field of research, and different research questions should be used to tailor the study to the specific needs of the field of interest.

Coming to understand and appreciate the Visitor Photo Study in new ways through the lenses of CBR, Visual Studies, and Visitor Studies enriched my understanding of the research that I had been a part of, and also about the three fields themselves and the ways that I can apply them to future research and understanding of research methodology. This analysis of the Visitor Photo Study also provides new insights and understandings to museum researchers, faculty, students, and other researchers with an interest in the fields of CBR, Visual Studies, and Visitor Studies. Ultimately, I hope the study continues to provide insight into the ways that the visitor experience can be understood through the Visitor Photo Study.
References


Appendix A: Report of the Visitor Photo Study presented to Denver Museum of Nature & Science

*Note:* Original formatting and page numbers have been retained for consistency with the original report.
Photo Study Process Evaluation Report
Katie Schroeder
Fall 2011
# Department of Visitor Research and Program Evaluation

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Introduction

The Department of Visitor Research and Program Evaluation at the Denver Museum of Nature & Science (DMNS) is an innovative department which seeks to understand the visitor experience at DMNS. They do this through value studies, which seek to determine what visitors and non-visiters see as the worth and merit of the Museum, through their semi-annual visitor baseline survey, which collects demographic and psychographic data about Museum visitors, through evaluations of individual exhibits and grant-funded studies, and through various other types of studies (such as one simple question, visitor tracking and timing, etc.).

In the summer of 2011, the Department of Visitor Research and Program Evaluation embarked on a new type of visitor research, a visitor photo study. The purpose of the photo study was to see the Museum through the eyes of its visitors. The study sought to see what the visitors see while they are at the Museum, to determine their paths through the Museum, and to understand what interests and engages them. The Department of Visitor Research and Program Evaluation is interested in improving learning and entertainment experiences for children and adults. Visitors were invited to document their experience at the Museum by taking photographs throughout their visit using digital cameras provided by the museum.

Purpose of the study

The purpose of the 2011 study was to determine whether a photo study could be implemented in a Museum the size of DMNS. To the best of the department’s knowledge, a photo study had only been done in a museum setting once before, in the Buffalo Bill Cody Museum in Cody, Wyoming (K. Tinworth, personal communication, May 17, 2011). Undertaking this project at the Denver Museum of Nature & Science brought the study to a new scale and magnitude, as undertaking a photo study in a one room Museum is very different than implementing it in a large multi-level Museum housing more than twenty permanent exhibits and multiple traveling exhibitions each year. A small test of the study was conducted in the summer of 2010, but the test did not move beyond the collection of data, as a coding scheme and protocol had not yet been developed.

Another purpose of the study was to determine whether and how photos could be used to track the level of visitor traffic in exhibits, the length of time visitors spend in different exhibits, and to map typical routes through the Museum. The study also sought to determine whether levels of visitor engagement in different areas and exhibits could be measured by considering length of time and number of pictures taken within different areas of the Museum, and through examination of the types of pictures that visitors take during their visit. Developing a greater understanding of what is significant and important to visitors about their visit to the Museum was another goal. This information could be used to help improve the quality of visitor experience at the Museum, and to improve learning experiences.
Audience

This report has been prepared for the use of Kathleen Tinworth, Andréa Giron, and Laureen Trainer, evaluators in the Department of Visitor Research and Program Evaluation at the Denver Museum of Nature & Science. This initial pilot study and report is meant to explore the feasibility of implementing the visitor photo study on a larger scale at DMNS in the future. It documents the strengths and weaknesses of the study and indicates successes and possible challenges for the future. It also provides the foundation of a protocol and a coding scheme, which can continue to be refined through future iterations of the study. Future stakeholders will include curators, marketers, and other staff from the Denver Museum of Nature & Science, along with other museums, both locally and nationally, who may be interested in implementing a similar study in their institution.

Use of visual data in research

Visual images provide insight into the participant experience that is not available through other means (Banks, 2007). The use of visual data and photovoice in qualitative research is an important way to gain perspective into the experiences of participants (Quigley, 2011). Photovoice is a qualitative method in which researchers or educators provide cameras to participants so that they can document what is important to them (Cook, 2010). The use of photovoice in visitor studies adds a new dimension to the way that Museums currently understand the visitor experience. Common research trends in visitor studies involve understanding the visitor experience through observations of visitors using methods like tracking and timing or through various types of interviews with the visitors themselves. Handing a camera to the visitor allows researchers to see the Museum through the eyes of the visitors. This eliminates a layer of interpretation, as researchers who use tracking and timing methods often have to interpret what visitors are looking at or experiencing, while photos from visitors provide their own account of the visit. Having visual documentation of their experience allows for first-hand knowledge not only of where visitors went, but also what they considered interesting enough to share with the researcher.

Photovoice brings the experiences of children and adults to life for the researcher. It engages visitors in their experience in new ways, encouraging them to consider their own experiences and engaging them in participatory research (Cook, 2010). Visitors who participate in a photo study not only share their experience with the research team, but may develop new insights into themselves, and consider their experience, including the choices that they make and where they spend their time, in new and different ways.
Allowing both adults and children (with the permission of a consenting adult) to participate in the study provided a wider range of understanding of experience than would have been captured through other means. The Museum looks different through the eyes of a child, and allowing them to document their experience in this unique way provides insight for the Museum into how these young visitors view their experience. Because experiences can be understood in different ways depending on the participant’s social, personal, and professional contexts, they permit multiple forms of analysis (Gibbs, 2008). Researchers can connect with the visitor experience in the Museum on many different levels, learning from the choices they make about where to go, how long to spend in different areas of the Museum, and what they chose to engage with by documenting their view of the experience. For example, researchers can learn through the photo study that visitors to the Egyptian Mummies Hall consistently engage first with the sarcophagus at the front of the exhibit, as indicated by the frequent images of the sarcophagus first, and may then move in either direction to experience the rest of the exhibit.

Pairing images with quantitative data develops further connections, producing meanings not only through the images themselves, but through understanding the connections of the images to visitors’ concepts of time and space. Quantitative data which was collected from visitor groups allows for the creation of different types of paths through the Museum based on the ages and/or genders of group members, whether the group includes Museum members or not, and amount of time a group has available to explore the Museum.

**Significance of the study**

This type of photo study with visitors has never been done before in a large city museum. Through this qualitative study, researchers will experience what visitors experience in the Museum in new and innovative ways, and will able to provide valuable insight into the visitor experience for educators, curators, and other Museum staff, which will lead to improvements in the educational experience of visitors. The study opens new doors for Museums to understand where their visitors are going, what they are looking at, and where they are spending their time, without relying upon the traditionally used but costly and recourse intensive methods of tracking and timing.

Use of visitor-generated images allows for a large amount of data to be collected simultaneously, limited only by the number of cameras available. This study provides not only quantitative data about time spent in and popularity of exhibits, but also visual representations of visitor experiences and interactions with Museum exhibits through their own viewpoints, rather than only through the separate viewpoint of the researcher.

The data obtained from the pilot study also provide opportunities for further research, such as further exploration of the photographs taken in different sections of the Museum to understand movement and experiential processes within individual exhibits. The photos will also allow for
the development of common paths through the Museum and will promote the expansion of resources and the creation of learning experiences based on typical visitor patterns of exposure and interaction. Visitor-generated images may also be used to advocate for certain types of learning experiences which have been shown to hold visitors’ attention, and to improve the educational quality of the typical Museum experience by making exhibits more accessible and approachable. Overall, the study will allow for a greater understanding of the experiences of Museum goers at the Denver Museum of Nature & Science, and will further the Museum and educational communities’ understanding of how Museums can better meet both the educational and entertainment needs of their visitors.

**Photo Study Protocol and Coding**

*Setting/Set-up*

The setting for the photo study was the Denver Museum of Nature & Science, which consists of three floors and approximately twenty exhibition halls. It also includes a restaurant, an IMAX theatre, and a planetarium. The Museum averages 1.4 million visitors per year, and has 63,000 member households (Denver Museum of Nature & Science, 2010).

It was determined that the optimal location to set up the study at DMNS was at the Visitor Will Call desk. There were both pros and cons to this location. It was selected because it provides the researcher maximum time to make contact with visitors before they enter the Museum, as the Will Call desk is located between where visitors pick up their tickets and where their tickets are scanned for entry into the exhibits. There are often people in this area waiting for other members of their party to arrive, and every visitor passes through this space to enter the Museum, so this location provided the best opportunity to catch the most visitors before they enter the Museum and disperse to different exhibits. The location is also convenient for visitors to return the cameras as they exit the Museum. Other essentials of this location include the desk for the researcher to sit and for participants to fill out the consent form, and the availability of outlets, which are necessary for recharging camera batteries and plugging in the computer and hard drive to store the visitor photos.

Negative aspects of this location were the constant visitor traffic for reasons other than the study. Because of the sign above the desk, visitors assumed that the researcher was able to print off will call tickets for them. As this was not the case, visitors were often frustrated. The desk also proved to be a draw to visitors needing answers to all sorts of questions about the Museum, ranging from questions about locations of the restrooms or exhibits, to the times of IMAX showings and other exhibitions, to the locations of the nearest restaurant. While the researcher was happy to answer these sorts of questions, doing so used valuable time that the researcher could have used to code visitor images. Another negative of the location was the sun. During the summer, there is a one hour period where the desk is not conducive to computer
work, as the sun shines in from the skylights at a particular angle. These issues were addressed through the use of a lower chair and table behind the desk, where the researcher could sit when not directly interacting with visitors, receive fewer visitor questions, and stay out of the sun.

Personnel

The study requires at least one researcher to be available for the duration of time that the Museum is open on the days that the study is conducted. This researcher needs to be available consistently, as visitors may come back with their cameras at any time, and must be prepared to stay later than the Museum closes to wait for all cameras to return. For the purposes of this pilot study, one researcher was used for the collection of all data. It is recommended that in future iterations of the study, the data collection shifts are divided between two people each day, as the time frame is quite intense for one person to manage without breaks, which are not feasible due to the set up of the study.

Equipment

The following is a list of equipment needed for each day of data collection. This will change slightly when the number of cameras used in the study changes.

- Computer
- Computer power cord
- Two sets of rechargeable batteries for each camera (2 batteries x 2 sets x 4 cameras = 16 total)
- 4 Cameras
- Battery Charger
- USB cord to connect cameras to computer
- External hard drive
- Lock box
- Museum and Planetarium Passes (incentives for participation)
- Back in Five Minutes sign (See Appendix H)
- Notes for Cameras (See Appendix G)
- Envelope to keep track of consent forms
- Forms:
  - Consent form (See Appendix A)
  - Refusal log (See Appendix B)
- Files (on external hard drive)
  - Image Storage Protocol (See Appendix C)
  - Image Location Coding Scheme (See Appendix D)
  - Excel file to track declines
  - Excel file to track demographic data
Incentives

Visitors who participated in the photo study were given passes to either the Museum or the planetarium for each member of their group.

Visitors who asked that their pictures be sent to them were also emailed their pictures. This was possible because of the small scale of this initial pilot study, but for future iterations it is recommend only providing a souvenir picture of the group which could be emailed out to the group, because emailing all pictures is quite time and labor intensive.

Prior to Data Collection

Equipment for the photo study is stored in the locked file cabinet outside of the Visitor Research and Program Evaluation office so that it can be accessed outside of regular office hours. The file cabinet is accessed through the elevator in the South Atrium.

The researcher begins each day of data collection by:

- setting up the laptop and the external hard drive at the work station,
- ensuring that an adequate number of copies of the consent form have been printed,
- making sure there is a turn down tally sheet to record declines,
- ensuring that all cameras have reminder notes attached (See Appendix G),
- make sure all cameras have adequate battery power,
- checking that each camera has the correct date and time setting, and
- making sure that all pictures from previous participants have been removed from the cameras. This involves not only checking that there are no pictures stored on the camera, but also that there are images from all data collected from the previous date of data collection stored on the hard drive before any images are deleted.

Data Collection Process

The researcher stands in the entry way and approaches visitors to ask if they would like to help the Museum out with a photo study today. If visitors decline to participate, the researcher notes their reason for declining on the form to track turn downs. If the visitor agrees to participate, then the researcher directs them over to the Will Call counter, where they are asked to fill out the consent form. The consent form includes basic demographic information (age, sex, ethnic background, Museum member or not, number in group, and why visiting). Visitors sign the release form and select whether they would like to allow the photos they take to be used as determined by the Museum, or used for the photo study only. See Appendix A for a copy of the consent form.
Visitors also receive some instruction about what is expected of participants. They are instructed to take a picture every 3-5 minutes while they are in the Museum, and that they can take more pictures if they would like. Visitors are asked to take pictures of anything they found memorable. Visitors are also instructed not to take pictures in the restroom or in the temporary exhibit for the period of this pilot study. If they are visiting the temporary exhibit, the Imax, or the planetarium, visitors are asked to take a picture upon entrance to, and exit from, those spaces for tracking purposes. The researcher should also remind visitors not to erase any images from their cameras, and that the photos will be time stamped, so that the Museum will be able to tell what time the picture was taken. The cameras also have a reminder note attached which provides instructions on how to use the camera, reminds visitors to take pictures every 3-5 minutes, that they cannot take pictures in the special traveling exhibit, to not erase any photos, and to try not to take pictures of people who are not in their group (see Appendix G for the reminder note).

Visitors are also told that they will receive passes to the Museum or planetarium to be used on another visit for their participation in the study. The researcher retains a driver’s license while the visitor is in the Museum to ensure the camera is returned. The driver’s license is kept in the lockbox for greater security.

The researcher writes on the consent form the visitor’s camera number, the time that the visitors left the Will Call desk, and the visitor’s ID number. Visitor ID numbers are assigned in numerical order, beginning with 001. This number connects the visitors’ release form to their images when they have been loaded on to the hard drive. During the initial round of data collection ID numbers 001 to 069 were assigned. When a new round of data collection begins, ID numbers should be assigned beginning with number 070.

When all of the cameras have been assigned to visitors, the researcher should begin data entry for the day. The demographic information from the release form is entered into the demographic information spreadsheet. Not all information will be able to be filled in at this time as some information will have to be entered when the visitor returns. Some additional information that is also entered on the spreadsheet is the number of people in the group, the genders and approximate ages of each member of the group not listed on the release form (the current release form listed only the primary adult in the group, and the names and ages of any children in the group. Additional adults will need to be noted with approximate ages). This information should be added to further iterations of the release form, so that the data collector does not have to remember to keep track of it. See Appendix E for the complete list of demographic data fields stored in the spreadsheet.

Once all demographic information has been entered in to the demographic information spreadsheet, the researcher should work on coding photo data from previous days of data collection. See the following section labeled “Coding,” for further information.
When visitors return with the cameras, the data collector should briefly ask them about their experience. Comments are documented on the back of their release form. The visitors are then thanked for their time and input, and given the choice of either Museum or planetarium passes for each member of their group. The researcher should note on the release form the time that the visitors return, and should make sure that the visitor’s driver’s license is returned before they leave.

Photos are then uploaded on to the computer, labeled with the visitor ID code and a number, which corresponds to the order that the pictures were taken in, beginning with 001 for the first picture taken. Photos are then filed by the visitor ID code and the date the visitor participated in the study. Photos are then erased from the camera. See Appendix C for complete image storage information.

The researcher then begins the data collection process over, intercepting visitors in the entry way and inviting them to participate in the study. In order to ensure that the most data possible is collected each day, the researcher should seek to get the camera sent back out with another visitor as soon as possible, rather than waiting for several cameras to return before sending them out again. This will also ensure that a range of visitor entry times are represented in the study, as the cameras come back at different times. Using four cameras, data from approximately eight to nine visitor groups are collected on each full data collection day. Data collection days which began at noon rather than ten o’clock have fewer participants, averaging six to seven visitor groups per day.

Once the cameras have been sent out with another visitor group, the remainder of the information on the demographic spread sheet is entered and calculated. This includes the time the visitors returned with the camera, the total active time the visitors had with the camera (excluding any time spent in the temporary exhibit, the planetarium, or the Imax), the total number of pictures taken, and the average number of minutes between pictures.

**Ending Data Collection for the Day**

The researcher should not try to send out cameras with new visitors later than 3:30pm on any day of data collection. Asking visitors to participate in the study after 3:30pm often results in irritation, as visitors have a very limited time left in the Museum, and most do not want to take the time to consent to the study. Thus, it is a more beneficial use of the researcher’s time to continue coding rather than seeking new participants if it is past 3:30pm.

The researcher ends the study for the day when all cameras have been returned. Generally, this occurs between 4:45pm and 5:30pm. All study equipment needs to be returned to the file cabinet located outside of the Department of Visitor Research and Program Evaluation office.
Coding

A location coding scheme has been developed to link each photo to a location in the Museum. This scheme labels each floor with a number, and each exhibition hall or hallway with a letter. For example, a picture taken in the Gems and Minerals exhibit on the first floor of the Museum is labeled with a 1G. The “1” indicates the first floor, while the “G” corresponds to the Gems and Minerals exhibit. The floor numbers were included in the coding scheme in order to be able to more easily track visitor movement across levels of the Museum. The complete location coding scheme is included in Appendix D. It will need to be updated to take into account any special exhibits occurring in the atriums of the Museum (such as the Ice Age Spectacular, which occurred over two days during the summer of 2011). It will also need to take into account any new traveling special exhibits and additions to or remodeling of the Museum.

Each photo is also coded with the following items, each of which corresponds to a field in the coding excel file:

- Visitor ID code
- Photo number
- Time that the photo was taken
- Location code from the location coding scheme
- Whether a photo includes people
- Whether a photo includes objects (from the Museum displays)
- Whether a photo includes other information (such as a sign or a photograph)
- Whether a photo includes people not from the visitor group (this is further categorized to indicate whether the person included in the photo is Museum staff, and whether the person is identifiable. This code is included for easy removal of photos with non-consenting people if the Museum decides to use the photos for any public reason).
- Whether the photo needs further coding (such as if the location or object is not easily identifiable).

A complete list of the codes used for each image is included in Appendix F.

Initial findings

The initial pilot study took place over ten days during the summer of 2011. Data collection days were June 25th, July 1st, 2nd, 7th, 22nd, 23rd, 29th, and 30th, and August 3rd and 6th. Five data collection days were Saturdays, three were Fridays, one was a Thursday, and one was a Wednesday. The study was designed to collect data on both the week days and the weekends in order to determine if there were differences between weekend and weekday visitors. The study was set up and run according to the protocol mentioned in the “Photo Study Protocol and Coding” section above.
Demographic Information

The pilot sample consisted of 69 groups, with a total of 235 participants. One group consisted of a leader with a large group of international students; these students are not reflected in the participant count or the other demographic statistics, as it was not possible to obtain accurate information about their demographics. The average group size was 3-4 people, but the majority of groups contained either two or three people. See Table 1 for complete group size statistics. Slightly more females than males participated in the study, with 129 females participating (54.9%) compared to 106 males (45.1%). Most of the groups who participated in the study included children under the age of 18. In total, 53 groups out of 69 (76.8%) contained at least one child. In total, 99 children participated in the study. See Table 2 for a complete list of the ages of participants, along with the number of groups which included at least one person from that age range. Participants also listed the ages of their children under 18 separately. The most common ages of children participating in the study were six and nine. Over half of the children who participated in the study were between the ages of six and eleven. See Table 3 for complete child age statistics. Participants were also asked to list their ethnic background or heritage. Participants could select more than one option from the list of choices. Seventy-eight percent of participants self-identified as “White, Caucasian, or European American.” The second largest category was “Latino, Hispanic, Chicano, or Latin American,” but their numbers were significantly lower, with only 13% of participants identifying themselves as such. Complete ethnic background and heritage information is included in Table 4. Please note that only the person filling out the release form for their group indicated their ethnic heritage, so the sample size is 69, and is not necessarily representative of all members of participating groups.

Table 1. Group size (n=69)

<table>
<thead>
<tr>
<th>Group Size</th>
<th>Number of Groups</th>
<th>Percent of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 people</td>
<td>22</td>
<td>31.9%</td>
</tr>
<tr>
<td>3 people</td>
<td>17</td>
<td>24.6%</td>
</tr>
<tr>
<td>4 people</td>
<td>13</td>
<td>18.9%</td>
</tr>
<tr>
<td>5 people</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>6 people</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>7 people</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>More than 8 people</td>
<td>1</td>
<td>1.5%</td>
</tr>
</tbody>
</table>
Table 2: Age Distribution (n=235)

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Number of Participants</th>
<th>Percent of Participants</th>
<th>Number of Groups containing at least one person in age range</th>
<th>Percent of Groups containing at least one person in age range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 18</td>
<td>99</td>
<td>42.1%</td>
<td>53</td>
<td>76.8%</td>
</tr>
<tr>
<td>18-25</td>
<td>18</td>
<td>7.7%</td>
<td>13</td>
<td>18.8%</td>
</tr>
<tr>
<td>26-35</td>
<td>32</td>
<td>13.6%</td>
<td>18</td>
<td>26.1%</td>
</tr>
<tr>
<td>36-45</td>
<td>36</td>
<td>15.3%</td>
<td>24</td>
<td>34.8%</td>
</tr>
<tr>
<td>46-55</td>
<td>26</td>
<td>11.1%</td>
<td>15</td>
<td>21.7%</td>
</tr>
<tr>
<td>56-65</td>
<td>16</td>
<td>6.8%</td>
<td>10</td>
<td>14.5%</td>
</tr>
<tr>
<td>66-75</td>
<td>8</td>
<td>3.4%</td>
<td>4</td>
<td>5.8%</td>
</tr>
<tr>
<td>76 or older</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Table 3. Age Distribution of Participants under 18 (n=99)

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of Children</th>
<th>Percent of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>7.1%</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>5.1%</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5.1%</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>11.1%</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>8.1%</td>
</tr>
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<td>8</td>
<td>7</td>
<td>7.1%</td>
</tr>
<tr>
<td>9</td>
<td>11</td>
<td>11.1%</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>8.1%</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>8.1%</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>6.0%</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>5.1%</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>4.0%</td>
</tr>
</tbody>
</table>
Table 4. Ethnic Background or Heritage (n=69)*

<table>
<thead>
<tr>
<th>Ethnicity/Race</th>
<th>Number of Groups</th>
<th>Percent of Groups**</th>
</tr>
</thead>
<tbody>
<tr>
<td>African, African American, or Black</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>American Indian, Native American, or Alaskan Native</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Asian or Asian American</td>
<td>4</td>
<td>5.8%</td>
</tr>
<tr>
<td>Latino, Hispanic, Chicano, or Latin American</td>
<td>9</td>
<td>13.0%</td>
</tr>
<tr>
<td>Middle Eastern, Arab, or Arab American</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Native Hawaiian, Filipino, or Pacific Islander</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>White, Caucasian, or European American</td>
<td>54</td>
<td>78.3%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Did not identify</td>
<td>1</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

*Please note that only the participant who filled out the release form for their group indicated their ethnic background, so these numbers are not necessarily representative of all members of participating groups.

**Please note that participants could select more than one category of ethnicity/race, so percentages will not add up to 100%.

Reasons for Visiting the Museum

Study participants were almost equally split between Museum members and non-members, with 35 participating groups indicating that they were Museum members, and 34 groups indicating that they were not. Participants were asked why they came to the Museum, and many indicated that they came to see the Real Pirates exhibit (27 groups). Other common reasons noted were that they were on vacation, or that they were at the Museum for fun and entertainment.

Time at the Museum

The mean visitor group participating in the study stayed at the Museum for two hours and thirty nine minutes, but the median length of visit was two hours and twenty five minutes. Visits ranged from 25 minutes to 6 hours, 45 minutes.

Many groups were visiting the Real Pirates exhibit, the Imax, or the Planetarium, and were not able to take pictures in these areas (33 groups). As a result, the average time that visitors were active with their cameras was also calculated. The mean time that participants were active with their cameras was two hours and one minute, with a median time of one hour and 55 minutes.
The range of active times with the camera remained the same as the total time at the Museum ranges, from 25 minutes to 6 hours, 45 minutes.

**Pictures Taken**

Totaling the images from all 69 groups, 3742 pictures were taken over the course of the pilot study. This averages to approximately 58 pictures per participant group. Numbers of pictures taken by a group ranged from 3 to 235 pictures, with a median of 43 pictures.

Participants were instructed to take pictures every three to five minutes throughout their visit. Most participating groups (86.9%) complied with this instruction and averaged at least one picture every five minutes. This level of compliance indicates that most visitors were able to complete the task of taking pictures throughout their visit without additional prompting. If the Museum is interested in higher rates of compliance with the study protocol, they may want to consider providing participants with a timer or buzzer of some sort, which would remind them to take pictures. However, this will also increase the burden of participation on visitors, as they may have to reset a timer or be constantly interrupted by it. It is recommended that the Museum address the issue not by introducing the use of a buzzer or timer, but simply by collecting more cases, which will provide the Museum with a rich source of data without burdening their participants, the majority of whom complied without additional prompting.

Many participants took pictures more often than every five minutes. Participants took a picture an average of every 3.18 minutes of their visit, with a median length of time between pictures of 3.1 minutes. Half of all participating groups took a picture at least every 3 minutes. Table 5 below shows how often groups took a picture. Please note that these are averages; some groups had small gaps when they forgot to take pictures. However, the majority of the times that this happened, groups still averaged to taking a picture every five minutes. It was still possible to see where the visitor group was during that time, as they often remained in the same exhibit. It is speculated, and some visitor groups confirmed, that they simply became too engrossed in an exhibit and forgot to take pictures.

**Table 5. Average length of time between pictures (n=69)**

<table>
<thead>
<tr>
<th>Average number of minutes between pictures</th>
<th>Number of Groups</th>
<th>Percent of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 minute</td>
<td>8</td>
<td>11.6%</td>
</tr>
<tr>
<td>1-2 minutes</td>
<td>16</td>
<td>23.2%</td>
</tr>
<tr>
<td>2-3 minutes</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>3-4 minutes</td>
<td>13</td>
<td>18.8%</td>
</tr>
<tr>
<td>4-5 minutes</td>
<td>9</td>
<td>13.1%</td>
</tr>
<tr>
<td>5-6 minutes</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>&gt;6 minutes</td>
<td>9</td>
<td>13.1%</td>
</tr>
</tbody>
</table>
Location and Object Findings

Participants visited every location included in the location coding scheme. The total number of pictures per location ranged from five pictures (3rd floor “Other” locations and the Anschutz Family Sky Terrace) to 616 pictures (Prehistoric Journey). The average number of pictures taken per location was 107, while the median number was 70 pictures per location. The most popular locations in terms of the numbers of pictures taken were Prehistoric Journey (616 pictures, 16.5% of pictures) and Gems and Minerals (527 pictures, 14.1% of pictures). The most popular location in terms of the number of unique visitor groups which took pictures in the location were Space Odyssey, which 45 unique groups visited, and the first floor of the Museum (most commonly, pictures of the Mars rover replica outside of Space Odyssey), with 40 (58.0%) unique visitor groups. See Table 6 for complete numbers of images taken in each location and the number of unique groups who visited each area.

Out of the 3742 pictures, only 1100 (29.4%) of them included people. 2633 pictures (70.4%) did not include people, and 9 (0.2%) were not identifiable. This appears to indicate that visitors were much more interested in taking pictures of the objects that they were looking at than including people from their group in their photos. Perhaps this is a result of the fact that visitors will not have access to their images once they return the cameras. Images were also coded as to whether or not they included objects from the Museum’s collection in them. 3024 photos (80.8%) included objects, while 709 (19.0%) did not (as above, 9 were not identifiable). Given that the majority of photos included objects, this may not be a code worth pursuing in future iterations of the study. Four hundred fourteen photos were also categorized as “Other,” which included pictures of images on a wall, or video screens, or Museum signs.

The most common objects that participants took pictures of were the Mars rover outside of Space Odyssey, and the Gems and Minerals sign. Perhaps because these are in areas where most people walk through, whether they go in to these exhibits or not, they were very popular places to stop and take a photo.

Participants were instructed not to take photos of people not in their group, and overall, participants were remarkably compliant. Only 86 pictures (2.3%) included other people in them who could be identified. An additional 172 pictures (4.6%) included people who were not part of their group, but who could not be identified from the picture. Forty two pictures (1.1%) included Museum staff in them as well, often times they were depicted interacting with a member of the group.
Table 6. Number of Pictures per Location (n=3742)

<table>
<thead>
<tr>
<th>Location in the Museum (Location Code)</th>
<th>Number of Pictures</th>
<th>Percent of Pictures</th>
<th>Number of Unique Groups</th>
<th>Percent of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other 3rd floor (library, classrooms, etc.) (3M)</td>
<td>5</td>
<td>0.1%</td>
<td>5</td>
<td>7.2%</td>
</tr>
<tr>
<td>Anschutz Family Sky Terrace (4A)</td>
<td>5</td>
<td>0.1%</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>3rd floor Atrium (3L)</td>
<td>7</td>
<td>0.2%</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>1st Floor Atrium (1H)</td>
<td>14</td>
<td>0.4%</td>
<td>7</td>
<td>10.1%</td>
</tr>
<tr>
<td>Gift Shop (1B)</td>
<td>15</td>
<td>0.4%</td>
<td>8</td>
<td>11.6%</td>
</tr>
<tr>
<td>Northern and Rare Birds (3G)</td>
<td>22</td>
<td>0.6%</td>
<td>9</td>
<td>13.0%</td>
</tr>
<tr>
<td>Not able to be coded</td>
<td>23</td>
<td>0.6%</td>
<td>15</td>
<td>21.7%</td>
</tr>
<tr>
<td>2nd Floor Atrium (2G)</td>
<td>23</td>
<td>0.6%</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>South Pacific Islands (2D)</td>
<td>28</td>
<td>0.7%</td>
<td>9</td>
<td>13.0%</td>
</tr>
<tr>
<td>South America (3K)</td>
<td>29</td>
<td>0.8%</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>Escalator (1C)</td>
<td>30</td>
<td>0.8%</td>
<td>21</td>
<td>30.4%</td>
</tr>
<tr>
<td>Explore Colorado (3F)</td>
<td>34</td>
<td>0.9%</td>
<td>10</td>
<td>14.5%</td>
</tr>
<tr>
<td>Ticket Area (1A)</td>
<td>47</td>
<td>1.3%</td>
<td>29</td>
<td>42.0%</td>
</tr>
<tr>
<td>Gem Carvings (3J)</td>
<td>49</td>
<td>1.3%</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>TRex Café (1D)</td>
<td>51</td>
<td>1.4%</td>
<td>15</td>
<td>21.7%</td>
</tr>
<tr>
<td>Birds of the Americas (3E)</td>
<td>56</td>
<td>1.5%</td>
<td>12</td>
<td>17.4%</td>
</tr>
<tr>
<td>Botswana, Africa (3H)</td>
<td>61</td>
<td>1.6%</td>
<td>10</td>
<td>14.5%</td>
</tr>
<tr>
<td>IMAX/ Second floor halls (2A)</td>
<td>66</td>
<td>1.8%</td>
<td>32</td>
<td>46.4%</td>
</tr>
<tr>
<td>Australia (2E)</td>
<td>73</td>
<td>2.0%</td>
<td>19</td>
<td>27.5%</td>
</tr>
<tr>
<td>Other 2nd Floor (pictures with Pirates, looking over railings, etc. (2L)</td>
<td>73</td>
<td>2.0%</td>
<td>29</td>
<td>42.0%</td>
</tr>
<tr>
<td>Insects (1E)</td>
<td>75</td>
<td>2.0%</td>
<td>22</td>
<td>31.9%</td>
</tr>
<tr>
<td>North American Indian Cultures (2F)</td>
<td>84</td>
<td>2.2%</td>
<td>11</td>
<td>15.9%</td>
</tr>
<tr>
<td>Other First floor (1J)</td>
<td>87</td>
<td>2.3%</td>
<td>40</td>
<td>58.0%</td>
</tr>
<tr>
<td>3rd floor hallways (3A)</td>
<td>87</td>
<td>2.3%</td>
<td>34</td>
<td>49.3%</td>
</tr>
<tr>
<td>Real Pirates Exhibit (3B)</td>
<td>92</td>
<td>2.5%</td>
<td>36</td>
<td>52.2%</td>
</tr>
<tr>
<td>Snow Mastodon Exhibit (1K)</td>
<td>107</td>
<td>2.9%</td>
<td>5</td>
<td>7.2%</td>
</tr>
<tr>
<td>Discovery Zone (2K)</td>
<td>108</td>
<td>2.9%</td>
<td>15</td>
<td>21.7%</td>
</tr>
<tr>
<td>Bears and Sea Mammals (2H)</td>
<td>120</td>
<td>3.2%</td>
<td>25</td>
<td>36.2%</td>
</tr>
<tr>
<td>Edge of the Wild (2B)</td>
<td>143</td>
<td>3.8%</td>
<td>24</td>
<td>34.8%</td>
</tr>
<tr>
<td>Egyptian Mummies (3D)</td>
<td>146</td>
<td>3.9%</td>
<td>29</td>
<td>42.0%</td>
</tr>
<tr>
<td>North American Wildlife (2C)</td>
<td>151</td>
<td>4.0%</td>
<td>22</td>
<td>31.9%</td>
</tr>
<tr>
<td>Expedition Health (2J)</td>
<td>298</td>
<td>8.0%</td>
<td>31</td>
<td>44.9%</td>
</tr>
<tr>
<td>Space Odyssey (1F)</td>
<td>390</td>
<td>10.4%</td>
<td>45</td>
<td>65.2%</td>
</tr>
<tr>
<td>Gems and Minerals (1G)</td>
<td>527</td>
<td>14.1%</td>
<td>35</td>
<td>50.7%</td>
</tr>
<tr>
<td>Prehistoric Journey (3C)</td>
<td>616</td>
<td>16.5%</td>
<td>33</td>
<td>47.8%</td>
</tr>
</tbody>
</table>
Participant reaction to the study

Overall participant reaction to the study was overwhelmingly positive. When asked if they enjoyed the experience when they were returning their cameras, most indicated that they had enjoyed it. Many also reported interest in what the photos will be used for. It may be worth adding a couple of specific questions to ask participants upon their return to capture this data in a more systematic way. Data could be recorded on the back of the release form, and then later added to the demographic data file. It is recommended that this be kept brief however, as not all visitors will want to talk in detail about their experience, as they are ready to exit the Museum for the day.

Visitors who declined to participate

Over the course of ten days of data collection, 179 people were approached to participate in the study. A total of 69 agreed to participate in the study and 110 declined, for a participation rate of 38.5%. Most people did not give a reason for why they did not want to participate in the study, and simply said no. Some indicated a reason; such as that they were in a hurry, were from out of town, or had a small child with them which made it difficult to participate. A complete list of reasons visitors declined to participate is included in Table 7 below.

Table 7. Reasons Visitors Declined to Participate (n=110)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>Percent of Declines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just “No”</td>
<td>62</td>
<td>56.4%</td>
</tr>
<tr>
<td>In a hurry or no time</td>
<td>17</td>
<td>15.5%</td>
</tr>
<tr>
<td>Going to Imax only</td>
<td>6</td>
<td>5.5%</td>
</tr>
<tr>
<td>From out of town</td>
<td>6</td>
<td>5.5%</td>
</tr>
<tr>
<td>Small child</td>
<td>3</td>
<td>2.7%</td>
</tr>
<tr>
<td>Going to Real Pirates only</td>
<td>3</td>
<td>2.7%</td>
</tr>
<tr>
<td>Just bought a membership</td>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td>Too many children</td>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td>Other (reasons listed here had only one response; examples included: just want to enjoy the Museum, do not like taking pictures, do not want to sign consent form)</td>
<td>9</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

Lessons Learned

Because this was a pilot study, there were many things that could have been done differently to make the process run more smoothly. This section is meant to note some minor things to be aware of. First, there are several issues pertaining to the cameras that need to be addressed regularly. Batteries are an issue with the cameras, and need to be monitored closely. It often
appears that the camera batteries are 2/3 full, but then they will die suddenly. As such, batteries should be changed after they have been in use for one whole day or more and have reached the 2/3 battery level, whether they seem close to dying or not. This will eliminate the problem of batteries dying on visitors. The other issue with the cameras is that they need to be checked regularly to make sure that the date and time stamp are correct. Sometimes these get off as visitors handle the camera and change settings. The date and time stamp should be checked each time before the camera is sent out with another visitor group. It is also a good idea to let the security desk know each day that the study is going on. In the event that a camera is lost in the Museum, security will know to return the camera to the data collection workstation.

When approaching people to participate in the study, know that some days will be harder to get participants than others, and that this is hard to predict. However, it was clear that the greater number of people at the Museum on weekend days meant that it was easier to find people willing to participate in the study. It should also be noted that if a visitor has already approached you to ask a question, they will rarely agree to also participate in the study. It is worth approaching people who have not approached your desk first. It is also of note that it was hard to get mothers with young children to participate in the study unless they had another adult with them. It may be worth exploring the use of further incentives to induce this group of Museum-goers to participate in the study, as they are a large portion of the Museum’s target audience.

Other helpful tips:

- Make sure to learn how to use the automated ticket machines, as you will be asked to help people on a regular basis.
- Have a list of entry times for special exhibits, and show times for the planetarium and the IMAX. You will be asked about these a lot.
- Know that if you do not know where to direct a visitor, you can send them to the Visitor information desk around the corner for help.
- It is a good idea to check on the number of incentives that you have available at the end of each data collection shift. You will want to make sure you have enough to last through weekend shifts, when access to more Museum and planetarium tickets is not available.

Recommendations

The following is a list of further recommendations to improve future iterations of the photo study.

- Modify the Photo Study Release form
  - Some minor modifications to the release form will greatly improve the data collection process. I would recommend the following changes:
Add a line to the top left corner of the consent form to indicate the time that the visitor group returns with the camera. The current consent form only includes a line for when the visitors leave with the camera.

Add a place to mark the ID given to the participant. This could be most easily included in the bottom right hand corner of the consent form.

Revise the age question so that the ages of all members of the group are included. This will help to collect more accurate data about the ages of all members of the group.

Like with the age question, provide open lines to indicate how many males and how many females are in the visitor group.

Add an optional line for an email address, where a picture can be sent later if desired (See Incentives recommendation below). This could easily be added to the bottom of the consent form.

The current consent form asks visitors specifically whether they are attending the Real Pirates exhibit. The consent form should also ask visitors specifically whether they are attending the IMAX or the Planetarium, as these are other areas where visitors will not be taking pictures, and should be noted to explain gaps in photo taking, and to ensure accurate understanding of visitors’ total active time with the camera.

The Release Form will need to be updated to remove the references to the Real Pirates exhibit, and to add in any new exhibits where visitors are not allowed to take pictures.

See Appendix I for a reworked consent form which incorporates these changes.

- **Develop a code book**
  - The development of a codebook of where each Museum object in the Museum would greatly improve the coding process. Coding is not a problem for exhibits such as Gems and Minerals and Space Odyssey, where it is fairly clear where the picture was taken. However, this is not the case with the diorama exhibits, where it is often very hard to tell which exhibit a specific animal is in. A code book would allow coders to easily identify a picture of an animal’s location.

- **Purchase additional cameras**
  - Purchasing additional cameras will allow for more data collection to occur on one day. This will be a more efficient use of project staff time, as they can pursue more participants each day instead of waiting for the cameras to return. I would recommend purchasing 10 cameras, which will allow for 15-20 sets of data to be collected on each full day of data collection. I would also recommend purchasing cameras which are the same size as the current cameras, but which
work faster (i.e., have less delay time between pictures) and which take higher quality pictures.

- **Repeat the study yearly**
  - Repeating the study yearly will be an interesting way to track changes in the Museum. I would recommend collecting 100 cases each time the study is run. With 10 cameras in circulation, data collection should be accomplished in approximately 6 days. I would also recommend running the study at different times of the year, to better understand different visitor characteristics, which may be different in the summer when compared to the rest of the year.

- **Include different incentives**
  - It was hard to attract visitors from out of town to participate in the study. Museum or planetarium passes were not good incentives for them, as they would not be back in the area. It would be beneficial to come up with another type of incentive to offer to these visitor groups, in order to be able to collect data from this different type of visitor. Perhaps something from the gift-shop or something with the DMNS logo.
  - Another group of people who were often not included in the data collection process were mothers with young children. These visitors often declined participation, especially if they were the only adult there with their children. It would be good to come up with some further incentive to entice this key demographic group to participate in the study.
  - It would also be nice to include a picture of the visitor group that could be emailed to the family after their visit if they would like.

- **Make coding protocol revisions**
  - It will be important to make some revisions to the coding protocol. I would specifically recommend including a place to code for blurry pictures, so they are not included in the analysis. It would also be beneficial to come up with further categories than simply person or object. Too many images were coded as object for this to be a useful code. I would recommend adding codes such as picture, video, sign, and background. I would also recommend adding a way to code for excellent pictures, so that locating images to use in promotion of the study, or for other uses is an easy process, rather than searching through thousands of pictures each time a photo is needed.

- **Obtain participation from minority demographic groups**
  - The majority of participants in the pilot study identified themselves as White, Caucasian, or European American. Though this is consistent with the
demographics of Museum visitors overall, it may be worthwhile to devote a day of data collection to minority group participation. This would ensure that you have input from these groups that are not always adequately represented.

- **Photograph each group at the beginning**
  - Taking a photo of the entire visitor group at the beginning of their time at the Museum will provide a concrete view of who is in the group to use when making decisions about whether pictures contain people outside of the group who may be identifiable.

- **Develop a way to make the photo study images publically available**
  - Coming up with a way for visitors to see their images online after they took them at the Museum would be rewarding for participants. This could be accomplished through the use of a Flicker account to present the visitor experience. This would involve some upkeep, as photos would need to be coded first, to ensure that other people are not included without their consent. It would also be beneficial to remove images which are blurry, as visitors will not want to work their way through these. This would also provide a way for visitors to download their own images if they wanted a copy of them.
  - Alternatively, or perhaps in addition, it would be valuable to include visitor images on the Museum website in some way. This would highlight Museum efforts to interact with visitors in new and engaging ways.

**Further study opportunities**

There are many additional opportunities to use this pilot photo study data in new and innovative ways. This report only begins to report on the type of data that has been collected in these images. Further study opportunities include:

- **Using the data to develop common paths through the Museum.**
  - It would be interesting to use the photo study data to better understand how visitors move through the Museum and to develop common paths that could provide information to visitors about what they could do in the length of time they have to spend at the Museum, or ideas for where to visit based on the ages of their children.

- **Looking at differences among visitors on different days of the week.**
  - The photo study data provides a unique look at how visitors move through the Museum. Data could be used to determine if weekend visitors spend more or less time at the Museum than weekday visitors, if they visit different exhibits, or move through the Museum in different ways. Further studies could be done
among the weekdays as well, to determine if different days attract visitors with different demographic characteristics. The current data set does not include much variation in week days, so further data would need to be collected to do this type of analysis.

- **Understanding the amount of time visitors spend in exhibits.**
  - The photos are time stamped, so they could easily be used to track and analyze how long visitors spend in different exhibits within the Museum.

- **Conducting further analysis within individual exhibits in the Museum.**
  - The photo study data could be used to delve deeper into specific exhibits within the Museum. For instance, the data could be used to track how visitors specifically move through Expedition Health. Is there a common path that visitors take through this exhibit? Are there certain areas or exhibits which are extremely popular?

- **Expanding the study to include more qualitative data.**
  - There is a great opportunity for future expansion of the current method to include visitor narrative about their experience taking the photos. This could be accomplished by asking visitors specific questions about their experience taking photos in the Museum.
  - Another way to approach this would be to go through the pictures with the visitors themselves to gain a richer understanding of the process they went through, and the decisions they made. However, this may require an additional incentive, and may not be feasible with each visitor group.

**Conclusion**

The pilot photo study at the Denver Museum of Nature & Science opens up many new and exciting opportunities to explore the visitor experience in the Museum. This study builds upon the Museum’s already great foundation of programming and study of the needs and interests of Museum visitors which are taking place in the Department of Visitor Research and Program Evaluation. This study also opens new horizons for visitor studies in general, demonstrating how this new and unique type of study can be implemented in a large Museum setting, like the Denver Museum of Nature & Science.

The pilot data itself also provides fascinating insights into where visitors go in the Museum. It clearly shows which exhibits the most visitors go to, and, through the number of photos taken in an exhibit, indicates a level of interest. It is also clear that this data can provide further understanding of how long visitors spend in different exhibits within the Museum, as well as illuminate the paths that visitors take through both the Museum itself and individual exhibits.
There are many opportunities to expand upon the results presented here and open up new methods of understanding visitors and their Museum experiences.

Overall, the pilot photo study at the Denver Museum of Nature & Science demonstrates great potential and multiple opportunities to greatly enhance the current understanding of how visitors experience the Museum, and offers many ways to expand understanding both within the Museum itself and beyond to the field of visitor studies at large.
Works Cited:


Appendix A: Photo study release form

Date __________ Time __________ Camera Number:____

DENVER MUSEUM OF
NATURE & SCIENCE

Photo Study

The purpose of this photo study is to discover the Museum through YOUR eyes, and to see what YOU see while you are at the Museum. We are learning this by asking you to take pictures every 3-5 minutes, wherever you are. These pictures can be of anything- where you are, what you are looking at, the people in your group, etc.

For participating in this study you will receive a complimentary pass for each member of your group for another visit to the Museum. (If you are a Museum member, you may opt for a Planetarium pass instead of admission.)

Please tell us a little bit about your group today:
(All information about your group will be kept private and confidential)

Are you a member of the Museum? Yes. ☐ No. ☐

Are you...? Male. ☐ Female. ☐

What is your age? Under 18. ☐ 18 to 25. ☐ 25 to 35. ☐ 35 to 45. ☐ 45 to 55. ☐
56 to 65. ☐ 65 to 75. ☐ 75 or more. ☐

What is your ethnic background or heritage? (Check as many as apply)
☐ African, African American, or Black
☐ American Indian, Native American, or Alaskan Native
☐ Asian or Asian American
☐ Latino, Hispanic, Chicano, or Latin American
☐ Other, please specify ______________________

Why did you come to the Museum today? ______________________________

Are you going to the Real Pirates exhibit? Yes. ☐ No. ☐

Please select one:
☐ I/We hereby grant to the Denver Museum of Nature & Science the rights to use my image and the images taken by me within the context of the DMNS Photo Study for public relations, advertising, Museum exhibit displays, and/or associated educational programs.
☐ I/We would like the images I/we take today to be used for the DMNS Photo Study only.

Print Name(s): ______________________________

Signed ______________________________

Children's Names & Ages: ______________________________

Description of images: Images taken in DMNS by visitors for Photo Study

A25
Photo Study: Turn Down Tally Sheet

Date: __________________________________________

RA: __________________________________________

Shift: _________________________________________

<table>
<thead>
<tr>
<th>Reasons Given</th>
<th>Number of Turn Downs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex. Late for IMAX</td>
<td>III</td>
</tr>
</tbody>
</table>

A26
Appendix C: Image storage protocol

When a camera returns with new visitor images, store the images this way:

1. Create a new folder in the Pictures folder, labeled with the date of data collection and the numbers of the Visitor IDs assigned that day.
2. Within this folder, create folders for each Visitor ID which has been assigned that day.
3. Each image should be downloaded with the label as the Visitor ID. The program will then automatically assign each image a number, starting with 001.
4. For example:
   a. Folder: 001-009 June 25th
      i. Subfolders: 001, 002, 003, 004, 005, 006, 007, 008, 009
         1. Picture labels: 001 001, 001 002, 001 003, etc.
5. Images will need to be checked to ensure that they were downloaded sequentially. Sometimes, they get downloaded out of order, and will need to be renumbered. You will be able to tell if they have been downloaded out of order by looking at the time stamp on the images.
Appendix D: Image location coding scheme

1A= Ticket Area
1B= Gift Shop
1C= Escalator
1D= Trex Café
1E= Insects
1F= Space Odyssey
1G= Gems and Minerals
1H= Atrium
1J= other first floor areas
1K Temporary Ice Age Spectacular exhibit

2A= IMAX/ 2nd floor hallways
2B= Edge of the Wild
2C= North American Wildlife
2D= South Pacific Islands
2E= Australia
2F= North American Indian Cultures
2G= Atrium
2H= Bears and Sea Mammals
2J= Expedition Health
2K= Discovery Zone
2L= Other (pictures with pirates, looking over, etc.)

3A= 3rd floor halls, escalator
3B= Pirates
3C= Prehistoric Journey
3D= Egyptian Mummies
3E= Birds of the Americas
3F= Explore Colorado
3G= Northern and Rare Birds
3H= Botswana, Africa
3J= Gem Carvings
3K= South America
3L= Atrium
3M= Other (library, classrooms, etc.)
4A= Anschutz Family Sky Terrace
Appendix E: Demographic data

The following items correspond to the fields in the Demographic Data excel spreadsheet. Most are data are collected from the release form, however some are calculated, and some are learned through the images themselves.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Date of Visit</td>
</tr>
<tr>
<td>ID Number</td>
<td>Assigned to Group</td>
</tr>
<tr>
<td>Camera Number</td>
<td>1-4</td>
</tr>
<tr>
<td>Time out</td>
<td>Time the group left entered the Museum with the camera</td>
</tr>
<tr>
<td>Time in</td>
<td>Time the group returned with the camera</td>
</tr>
<tr>
<td>Total Time</td>
<td>Total time the group was in the Museum</td>
</tr>
<tr>
<td>Number in Group</td>
<td>Total number of people in the group</td>
</tr>
<tr>
<td>Number of Females</td>
<td>Number of Females in group</td>
</tr>
<tr>
<td>Number of Males</td>
<td>Number of Males in group</td>
</tr>
<tr>
<td>Ages</td>
<td>Age of each member of the group</td>
</tr>
<tr>
<td>Other Exhibits?</td>
<td>Indicate whether the group visited Real Pirates, Imax, or the Planetarium</td>
</tr>
<tr>
<td>Time in other Exhibits</td>
<td>Amount of time spent in other exhibits</td>
</tr>
<tr>
<td>Time Active with Camera</td>
<td>Total time the group spent taking pictures (excludes time spent in Real Pirates, Imax, and the Planetarium).</td>
</tr>
<tr>
<td>Number of Pictures</td>
<td>Total number of pictures taken</td>
</tr>
<tr>
<td>Minutes per Picture</td>
<td>Average amount of time between pictures (total time divided by total number of pictures)</td>
</tr>
<tr>
<td>Museum Member?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Ethnic Background</td>
<td>African, African American, or Black; American Indian, Native American, or Alaskan Native; Asian or Asian American; Latino, Hispanic, Chicano, or Latin American; Middle Eastern, Arab, or Arab American; Native Hawaiian, Filipino, or Pacific Islander; White, Caucasian, or European American; Other, please specify.</td>
</tr>
<tr>
<td>Why did you come to the Museum today?</td>
<td>Participants wrote this on the consent form</td>
</tr>
<tr>
<td>Publicity or Study only?</td>
<td>Whether the participant wants their photos to be used for Museum publicity purposes, or for the study only.</td>
</tr>
</tbody>
</table>
Appendix F: Image data

The following items correspond to the fields in the Coding excel spreadsheet.

<table>
<thead>
<tr>
<th>Visitor ID</th>
<th>Id assigned to visitor group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo Number</td>
<td>Number of the photo</td>
</tr>
<tr>
<td>Time</td>
<td>Time the image was taken, found in the time stamp</td>
</tr>
<tr>
<td>Location</td>
<td>Image Location code</td>
</tr>
<tr>
<td>What is it a picture of?</td>
<td>Write what the picture shows here</td>
</tr>
<tr>
<td>People?</td>
<td>Are there people in the picture? Yes or no</td>
</tr>
<tr>
<td>Objects?</td>
<td>Are the Museum objects in the picture? Yes or no</td>
</tr>
<tr>
<td>Other</td>
<td>Are there other things in the picture, such as pictures on the wall or signs? List what they are here</td>
</tr>
<tr>
<td>Other People?</td>
<td>Are there people in the picture who are not from the group? Indicate yes if there are, also indicate if they are identifiable, or if they are Museum staff.</td>
</tr>
<tr>
<td>Further Coding needed?</td>
<td>Indicate if the picture needs further coding here (such as if you are not sure about location, or what the image is of)</td>
</tr>
</tbody>
</table>
Appendix G: Notes for cameras

Thank you for helping the Museum

with this important study!

Remember:

• Please take a picture at least every 5 minutes, unless you are in the Real Pirates exhibit. You can take more pictures if you like!
• The camera is a bit slow; you have to push the button slowly to take a picture, and wait for the green light before you can take another picture.
• Please don’t erase any pictures!
• Try not to take pictures of other visitors who are not in your group.

Please return me when finished!

Thank you for helping the Museum

with this important study!

Remember:

• Please take a picture at least every 5 minutes, unless you are in the Real Pirates exhibit. You can take more pictures if you like!
• The camera is a bit slow; you have to push the button slowly to take a picture, and wait for the green light before you can take another picture.
• Please don’t erase any pictures!
• Try not to take pictures of other visitors who are not in your group.

Please return me when finished
Appendix H: Back in 5 minutes sign

PHOTO STUDY

BACK IN 5 MINUTES
Appendix I: Revised photo study release form for future use

Date:______  Time out:______  Time in:______  Camera Number:______

DENVER MUSEUM OF NATURE & SCIENCE

Photo Study

The purpose of this photo study is to discover the Museum through YOUR eyes, and to see what YOU see while you are at the Museum. We are learning this by asking you to take pictures every 3-5 minutes, wherever you are. These pictures can be of anything - where you are, what you are looking at, the people in your group, etc.

For participating in this study you will receive a complimentary pass for each member of your group for another visit to the Museum. (If you are a Museum member, you may opt for a Planetarium pass instead of admission.)

Please tell us a little bit about your group today:
(All information about your group will be kept private and confidential)

Are you a member of the Museum? Yes...☐ No...☐

In your Group:  # of Males_______   # of Females_______

What are the ages in your group? Under 18____  18 to 25____  25 to 35____  35 to 45____
(please indicate the number in each age group)  46 to 65____  66 to 85____  66 to 75____  75 or more____

What is your ethnic background or heritage? (Check as many as apply.)
☐ African, African American, or Black  ☐ Middle Eastern, Arab, or Arab-American
☐ American Indian, Native American, or Alaskan Native  ☐ Native Hawaiian, Filipino, or Pacific Islander
☐ Asian or Asian American  ☐ White, Caucasian, or European American
☐ Latino, Hispanic, Chicano, or Latin American  ☐ Other, please specify:______________________________

Why did you come to the Museum today? ________________________________________________________________

Are you going to the special exhibit? Yes...☐ No...☐  Are you going to the Imax? Yes...☐ No...☐

Are you going to the Planetarium? Yes...☐  No...☐

Please select one:
☐ Yes...I hereby grant to the Denver Museum of Nature & Science the rights to use my image and the images taken by me within the context of the DMNS Photo Study for public relations, advertising, Museum exhibit displays, and/or associated educational programs.

☐ Yes...I would like the images I/we take today to be used for the DMNS Photo Study only.

Print Name(s): __________________________________________________________

Signed: __________________________________________________________________

Children’s Names & Ages: ____________________________________________________________________________

Description of images: Images taken in DMNS by visitors for Photo Study

email address (optional): __________________________  Visitor ID:______