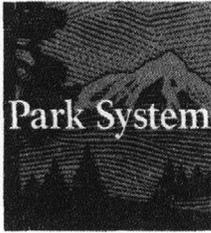National Park System Advisory Board

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National Park System Advisory Board

Education Committee

Family Learning in Free-Choice Educational Settings: A Review of the Literature for the National Park Service

2012

FAMILY LEARNING IN FREE-CHOICE EDUCATIONAL SETTINGS: A REVIEW OF THE LITERATURE FOR THE NATIONAL PARK SERVICE
EXECUTIVE SUMMARY
OCTOBER 2012

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This literature review is part of a National Park Service (NPS) initiative to improve lifelong learning in national parks in anticipation of the NPS centennial in 2016. National parks are free-choice learning environments (also referred to as informal, non-formal, or out-of-school settings), where individuals have significant control over their learning. Families make up a substantial portion of the NPS audience and this literature review aims to inform NPS practices by answering the following questions: What does research literature reveal about the nature of family learning, factors that influence family learning, and recommendations for improving family learning in free-choice learning environments?

Families learn from their conversations and interactions with each other and their visits to free-choice settings are influenced by what Falk and Dierking (2000) categorized as Personal, Sociocultural, and Physical factors. Free-choice settings must address the Personal factors families bring to their visit including motivations, prior knowledge, identities, and diverse learning needs. Researchers who have studied the Sociocultural context of family learning point to the need to encourage social interaction, help parents to facilitate their children's learning, and form reciprocal relationships and partnerships that encourage participation from underrepresented families. When considering cultural differences it is appropriate for practitioners and researchers to consider that we all come from a cultural context and that it is valuable to recognize the lens through which we experience a museum visit before considering other visitor's experiences as well. Finally, the Physical context of family visits, which involves factors such as the layout of the free-choice venue, types of exhibits, and how visitors are oriented to the space, can be improved by implementing technology in family-friendly ways and by creating exhibits that accommodate the various developmental levels of multiple users. Overall, free-choice learning settings must focus on providing enjoyable, collaborative opportunities for families to learn together. Recommendations framed through these three factors.

THE PERSONAL CONTEXT: MAXIMIZING FAMILY ENGAGEMENT AND LEARNING

In order to fulfill both individual family member needs and the family's collective needs as a community of learners, the NPS should consider the following recommendations that help take into account the motivations, expectations, knowledge, experiences, interests, and beliefs that families bring to their visit.

1. Seek to further understand family visitors' individual and collective agendas, motivations, and expectations and subsequently provide families with the "tools and resources they need to evaluate what the museum offers against their agendas for that visit.

2. Help families relate their everyday experiences and prior knowledge to what they see and do in the museum and allow them to investigate issues that interest them (Moussouri, 2003).

3. Reach adults who visit as part of family groups as "learners in their own right," not just facilitators of their children's experiences (Briseño-Garzón et al., 2007a; Sanford et al. 2007, p.148).

4. Differentiate exhibit elements in order to reach individuals from ages 2 to 92 who arrive with different developmental needs, learning styles, and museum-goer identities (Falk, 2009; Gaskins, 2008; Lyons et al., 2010; Moussouri, 2003).

THE SOCIOCULTURAL CONTEXT: MAXIMIZING FAMILY ENGAGEMENT AND LEARNING

Families learn in free-choice contexts by conversing with each other and helping one another mediate the experience. NPS staff and volunteers also mediate programs and park experiences. The following recommendations will enhance those processes. The Sociocultural context also includes visitors' cultural background and upbringing.

1. Develop ways to reward and foster connections between family members since family groups, especially those visiting with grandparents, value the social elements of interacting during their visits to free-choice settings (e.g. Falk & Dierking, 2000; Moussouri, 2003; Sanford et al., 2007).

HELP PARENTS FACILITATE LEARNING

1. Create opportunities for "parents to self-select interpretive support, but not assume that such support will or should be utilized" (Falk 2009 p. 222).

2. Provide information that helps adults quickly recognize what role they should play if the child is the focus audience for the exhibit or experience (Downey et al., X; Falk 2009; Gaskins, 2008).

3. Enhance parent-child interactions or even create new types of interactions using well designed electronic mobile technology (Lyons et al., 2010).
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HELP NPS STAFF AND VOLUNTEERS FACILITATE FAMILY LEARNING

1 Continue to foster "talking with, rather than talking at visitors" (Astor-Jack et al 2007, p. 225; Moussouri, 2003).

2 Create opportunities for novices to work with knowledgeable mentors collaboratively (Falk & Dierking, 2000).

CONSIDER CULTURALLY RELEVANT PARTNERSHIPS

1 Model new program after successful ones using four effective strategies gleaned from other research: (a) ongoing communication, (b) dependable and consistent programs for adults and youths, (c) responsiveness to the community, and (d) community and parent participation (Honey et al, p. 122-126).

2 Attracting new audiences will require collaboratively developing a setting in which "a multitude of cultures feel both welcome and valued and see personal relevance" (Melber, 2006, p. 36; Stein et al., 2008).

3 Create a welcoming atmosphere by providing translated materials, bilingual labels, and interpretation services for those who speak another language (Melber, 2006; Shouse et al., 2010; Stein et al., 2008).

THE PHYSICAL CONTEXT: MAXIMIZING FAMILY ENGAGEMENT AND LEARNING

The third context to be taken into account in order to maximize family learning and engagement is the Physical context. This context was also directly addressed by A Call to Action (2012) action item #19 - Out with the Old (see Appendix 1). What follows are research-based recommendations for preparing families for their visit, extending the visit's benefits beyond the NPS site, and improving content and physical structures at NPS venues.

1 Pre-Visit - Provide pre-visit materials for families (Bachman & Dierking, 2010). Create a 'For Families' section on NPS websites.

2 Post-Visit - Develop questions that prompt families to extend their visit conversations to the drive home or around the dinner table (Falk & Dierking, 2000).

3 Create Exhibits that are Multi-sided, Multi-user, Accessible, Multi-outcome, Multi-modal, Readable, and Relevant (Borun & Dritsas, 1997, p 180).

4 "Implement design elements that intuitively support the kind of interaction that works best for children and parents…." (Wood & Wolf, 2010, p. 48).

5 Supplement existing exhibits with booklets and/or backpacks that scaffold family learning and promote interaction (Tenenbaum et al., 2010).

6 Seating and other accommodations should be provided for visitors with limited mobility, including grandparents (Beaumont & Sterry, 2005; Moussouri, 2003).

Instead of approaching the above recommendations as add-ons to what already exists in the parks, the NPS must rethink all exhibits, programs, and other interpretive media and experiences from a family perspective (Moussouri, 2003). Parks have welcomed families for over 100 years and the future is bright for the NPS to lead the way in innovative, relevant, engaging, and educational opportunities for families.

In addition to the recommendations, it will be important for the NPS to encourage, even promote, research on all types of learning, including family learning. That there was no research to draw from for this literature review indicates the extreme need.

To lead, the NPS must continue to build structures in which parks can communicate and collaborate around best practices as well as with other educational and community organizations. Involving families in exhibit and program planning, design, and evaluation will be important (Bachman & Dierking, 2010; Moussouri, 2003; Sanford et al., 2007). Overall, creating family-centered opportunities and seeking to engage families in deeper levels of learning and collaboration will enable the NPS to reach its A Call to Action (2012) goals and help make our national parks and historic monuments exemplary places for family learning.

Family Learning in Free-Choice Educational Settings:

A Review of the Literature for the National Park Service

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Abstract

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This literature review is part of a National Park Service (NPS) initiative to improve lifelong learning in national parks in anticipation of the NPS centennial in 2016. National parks are free-choice learning environments (also referred to as informal, non-formal, or out-of-school settings), where individuals have significant control over their learning. Families make up a substantial portion of the NPS audience and this literature review aims to inform NPS practices by answering the following questions: What does research literature reveal about the nature of family learning, factors that influence family learning, and recommendations for improving family learning in free-choice learning environments?

Families learn from their conversations and interactions with each other and their visits to free-choice settings are influenced by what Falk and Dierking (2000) categorized as Personal, Sociocultural, and Physical factors. Free-choice settings must address the Personal factors families bring to their visit including motivations, prior knowledge, identities, and diverse learning needs. Researchers who have studied the Sociocultural context of family learning point to the need to encourage social interaction, help parents to facilitate their children's learning, and form reciprocal relationships and partnerships that encourage participation from underrepresented families. When considering cultural differences it is appropriate for practitioners and researchers to consider that we all come from a cultural context and that it is valuable to recognize the lens through which we experience a museum visit before considering other visitor's experiences as well. Finally, the Physical context of family visits can be improved by implementing technology in family-friendly ways and by creating exhibits that accommodate the various developmental levels of multiple users. Overall, free-choice learning settings must focus on providing enjoyable, collaborative opportunities for families to learn together.

Table of Contents

List of Figures

Section 1: Introduction

In 2016 the United States National Park Service (NPS) will celebrate its centennial. The NPS has grown in scope and size over the past one hundred years and its 397 units welcome visitors from all over the country and the world. In 2010 there were 281 million recreational visits to parks (NPS, 2011, p. 1) and based upon previous surveys, approximately half of those visitors likely traveled in family groups (Forist, 2003, p. 17). In 2009, the majority of Yosemite visitor groups (69%) were family groups (Blotkamp, Meldrum, Morse, & Hollenhorst, 2010, p. v). That is to say, families make up a substantial portion of the NPS's audience so it is important to consider family visitors' needs and expectations while seeking to better understand their park experiences and improve parks as free-choice learning institutions.

This paper aims to examine the factors that influence family learning in free-choice learning environments in order to inform how the NPS can increase family engagement, participation, and learning. Falk (2005) defined free-choice learning environments as places where individuals have significant control over their learning. The terms *informal* and *non-formal* are often used synonymously with the term *free-choice* to describe these learning settings, but for the purposes of this paper, the term *free-choice* will be used. Parks are examples of free-choice learning environments and research on family learning has been conducted in settings that have characteristics similar to parks.

Primary Research Question

This extensive literature review focuses on answering the following question: What does research literature reveal about the nature of family learning, factors that influence family learning, and recommendations for improving family learning in free-choice learning environments?

Scope of the Project

The NPS enlisted the expertise of its non-governmental advisory boards to provide recommendations about topics most pertinent and relevant to advancing the NPS. The learning subcommittee was asked to provide guidance about enhancing life-long learning opportunities in parks. Within the topic of life-long learning, the subcommittee chose to use research literature to inform family free-choice learning in the parks.

This literature review utilized articles on topics related to family experiences and learning in free-choice settings[1]. No peer-reviewed articles were found to directly address family learning in parks, so a related body of literature focused on free-choice settings was used. Articles published within the last five years in peer-reviewed journals were the primary focus of the review, although foundational literature on the subject was also incorporated. A limited number of relevant books, non-peer reviewed articles, and web resources were also included.

In order to involve NPS employees and partners in the literature review and its results, individuals were recruited to read, summarize, and respond to articles. These responses contributed to a separate paper highlighting the NPS employee and partner responses that identified connections between the research literature and NPS practices. These responses helped shape this literature review, since volunteers summarized key concepts from recent articles and made relevant connections to the NPS. This literature review and the NPS responses to the

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[1] Articles that used the terms *informal*, *non-formal,* and *out-of-school* to describe learning settings where visitors have significant choice and control of their learning were also used in this review.

literature could inform future subcommittee work, such as the development of additional

strategies, activities, and professional development ideas concerning this topic.

Background

The NPS's original mission: "maintaining and protecting our national parks for the continued benefit and enjoyment of all Americans" (NPS, 2011, p. 2) is arguably as relevant today as it was 100 years ago. However, in its next century of service, the NPS aims to take its mission further to "use the collective power of the parks, our historic preservation programs, and community assistance programs to expand our contributions to society" (NPS, 2012, p. 5). The question is: How can the NPS achieve this goal?

NPS initiatives over the last decade have enlisted the help of experts to plan for park improvements in NPS education and interpretation. First, evaluations revealed weaknesses in some areas. The National Education Council [NEC]'s (2006a) *Interpretation and Education Renaissance Action Plan* found that

> Many parks offer interpretive media (exhibits, wayside exhibits, films, brochures) that are inaccurate, inaccessible, and significantly outdated. In some cases the content and condition of films and exhibits are more than 30 years old and no longer relevant or accessible…. The NPS must improve its media to meet twenty first century standards so that visitors connect with park stories, meanings, and heritage. (p. 9)

While the parks are meant to be parks for all Americans, the *Action Plan* went on to say that, "NPS audiences do not reflect the demographics of America" (p. 11). These concerns are among areas explored in the relevant literature reviewed in this paper.

A decade of NPS evaluation and improvement initiatives culminated in the NPS's (2012) document entitled *A Call to Action: Preparing for a Second Century of Stewardship and Engagement*. *A Call to Action* charted a path into the future and created actions targeting 39 areas for NPS improvement. A few actions involve every park, but managers and superintendents select the most appropriate actions for their program or park to achieve (NPS, 2012). Connecting People to Parks and Advancing the NPS Education Mission are two key

themes the document addresses, and this paper considers these themes in light of the research on

family learning (see Appendix A for the *A Call to Action* elements most pertinent to this paper).

Limitations and Gaps in the Literature

While it is evident that the NPS already contributes to visitor-learning and that

educational programs in the parks are enjoyed by people of all ages, the parks' educational

impacts from a research standpoint are largely unknown. There is little published data or

literature on outcomes and impacts of education in the national parks (Brody & Tomkiewicz,

2002; NEC, 2006a).

> Evaluations of interpretive media other than exhibits are rare. Accessible
> summaries of any NPS evaluations do not exist, and the use of these studies
> beyond each particular park is not known…. There has been very little evaluation
> of informal interpretation, information services, or orientation. (NEC, 2006b, p.
> 45)

A few examples of peer-reviewed articles on national park learning were found, but none

directly addressed family learning (e.g. Benton, 2008; Brody & Tomkiewicz, 2002; Knapp &

Benton, 2004; Novey & Hall, 2007). As an alternative body of research, free-choice learning

literature was used as, "much of the existing informal education literature is considered to be

applicable to park environments" (Brody & Tomkiewicz, 2002, p. 1122). Parks are settings that

often include visitor centers, guides in the form of rangers, interpretive signs, programs, and

opportunities similar to those in museums, aquariums, zoos, nature centers, and other free-choice

learning environments.

Gross and Zimmerman (2002) directly compared parks and museum mentioning their

common audiences, methods of communication, and roles in protecting items of cultural value.

Today the NPS "preserves 100 million museum items" (NPS, 2011, p.2) within visitor centers

and other park buildings. Therefore, when families visit national parks they often visit settings similar to museums.

While parks sometimes feature settings similar to museums, the 397 units of the NPS are actually very diverse and learning in parks can take on many forms and occur in different venues. Whether a family is hiking with a ranger in the Tetons, touring Independence Hall in Philadelphia, reading a roadside sign along the Blue Ridge Parkway, or perusing exhibits at Gettysburg National Military Park Museum and Visitor Center, learning is happening! The similarities between free-choice venues arguably outweigh the differences in their subjects and environments.

It is also worth noting that Dierking and Falk (1994) recognized that much of the research in the field of free-choice learning involved middle class, Caucasian families and that in order to ensure generalizability more research on underrepresented population's use of free-choice settings was needed. While conducting a search for literature on underrepresented families' use of free-choice settings only a few articles were found (e.g. Archer et al., 2012; Gaskins, 2008; Honey et al., 2010; Melber, 2006; Shouse, Lewenstein, Feder, & Bell, 2010; Stein, Garibay, & Wilson, 2008). Almost two decades after Dierking and Falk (1994) noted the lack of literature on diverse visitors, free-choice settings are still not seeing the diversity of visitors they had hoped for and research on underrepresented populations, while increasing, still remains scarce.

Significance of the Project

Our national parks have the potential to fulfill some of our country's educational needs in a unique way. As learners we spend only a small percentage of our lifetime in formal learning settings. Banks et al. (2007), in their report on life-long, life-deep, and life-wide learning, explained that most learning takes place outside of schools. *Figure 1* illustrates the small

percentage of time people spend in formal learning environments compared to informal learning environments.

Figure 1. The LIFE Center Lifelong and Lifewide Learning Diagram (LIFE Center, 2005)

Outside of formal schooling, learning tends to be self-motivated and driven by individual interests, activities, social groups, and surrounding environments. Falk and Dierking (2010) pointed to the United States' "vibrant free-choice learning landscape" as a unique and valuable asset to the country's education system (p. 486). Within this learning landscape national parks and other venues are "contextually relevant and rich places; they are full of real things, situated within relevant contexts" (Falk, 2009, p. 150). The benefits of experiences in these settings are many. However, free-choice settings can continue to make improvements to engage families and contribute to deeper levels of learning. Focusing on educational improvements may lead to far-reaching, positive outcomes for the NPS and the people it serves.

Definition of Terms

For the purposes of this paper, the following definitions will be used.

Family - "Two or more people in a multi-generational group that has an on-going relationship, they may be biologically related, but not necessarily…. If a group defines itself as a family they are one" (Dierking, 2010, para. 3).

Learning - "A personally and socially constructed mechanism for making meaning in the physical world.... It is broad and includes changes in cognition, affect, attitudes, and behavior" (Falk, Dierking, & Foutz, 2007, p. xix).

Family Learning - "Includes the products and processes of social interaction, collaboration, and sharing among members… across the lifespan of the family" (Patchen & Rand, 2007, p. 170).

Free-Choice Settings, Learning Environments, and Venues - Places where individuals have significant control over their learning (Falk 2005). Most of the research in the field has taken place in science museums, but free-choice settings as diverse as art museums, zoos, aquariums, botanical gardens, children's museums, and natural history museums have also been studied. All these places are often included under the umbrella term *museums* in many studies.

Free-Choice Learning - "Learner motivated, guided by learner interests, voluntary, personal, ongoing, contextually relevant, collaborative, nonlinear, and open-ended" (National Research Council, 2009, p. 11).

Underrepresented Populations - Groups of people who do not often visit free-choice settings, including but not limited to particular ethnic or cultural groups and people of different economic backgrounds

Section 2: Literature Review

Family Learning Research Background

What we know about family learning has steadily increased in the last 30 years as more research on family groups has been conducted. In their review of the literature, Dierking and Falk (1994) noted that studies in the early 1990s began to focus on more specific elements of family learning in free-choice settings. They categorized free-choice family learning studies up until 1994 as those that either a) determined conditions that facilitate family learning and examined whether families adopted learning agendas in free-choice settings, or b) found evidence of family learning in free-choice settings (p. 62).

Since family learning is complex, researchers first systematically counted signs and behaviors which pointed to the idea that families were "adopting learning agendas" (Dierking & Falk, 1994, p. 62). An agenda is "a set of desires, needs, and expectations for what the visit will hold" (p. 61). When families gave their attention to exhibits, directed curiosity behaviors toward exhibits, or exchanged verbal or nonverbal information related to the exhibits, these behaviors were considered evidence of a family learning agenda (Dierking & Falk, 1994).

However, evidence of learning agendas is not the same as evidence for learning. Direct evidence of family learning was challenging to quantify because of its complex nature and most researchers were only beginning to recognize those complexities. At first research studies revealed indirect evidence of family learning, but soon studies were developed that clearly showed relationships between learning agendas and actual learning.

In the mid-1990s, Minda Borun and her colleagues embarked upon an extensive and ultimately groundbreaking research project on family learning in museums. *The Family Learning Project* was conducted by researchers from the four museums of the Philadelphia-Camden

Informal Science Education Collaborative (PISEC) and ultimately aimed to use research to enhance family learning by improving exhibit design (Borun et al., 1998, p. 3). Borun, Cleghorn, and Garfield's (1995) literature review concluded that no one had shown "a correlation between observable behavior in the free-choice museum environment and an independent measure of learning" (p. 264). PISEC researchers decided to find out whether or not families that appeared to be learning were actually doing so (Borun et al., 1998).

First, cognitive tests were deemed insufficient to use to measure free-choice learning since they do not take into account the nuances of family learning. Researchers instead measured learning qualitatively through interviews and concluded that individual learning is enhanced by other family members' input (Borun, Chambers, & Cleghorn, 1996). Their data revealed that families in their study did learn from exhibits and there was a relationship between learning levels (depth of learning) and observable behaviors. The PISEC study suggested that "families engage in three levels of discourse: identifying, describing, and interpreting and applying" (Borun et al., 1996, p. 126).

Next, Borun and her colleagues took into account prior research and the results of their interviews and created a list of seven characteristics of family-friendly exhibits to incorporate into their museums and test further. According to Borun & Dritsas (1997) family-friendly exhibits are:

1. Multi-Sided -- Family can cluster around exhibit;

2. Multi-user -- Interaction allows for several sets of hands (or bodies);

3. Accessible -- Comfortably used by children and adults;

4. Multi-Outcome -- Observation and interaction are sufficiently complex to foster group discussion

5. Multi-Modal -- Appeals to different learning styles and levels of knowledge;

6. Readable -- Text is arranged in easily understood segments; and

7. Relevant -- Provides cognitive links to visitors' existing knowledge and experience. (p. 180)

Borun, Chambers, Dritsas, and Johnson (1997) used exhibits in four different science museums to test whether or not exhibits enhanced using the above criteria led to more active family learning than control exhibits. They concluded that the enhanced exhibits did indeed increase active family learning (Borun et al., 1997). These seven characteristics are still being implemented in museums today (Borun 2008).

In summary, the PISEC Family Learning Project advanced the family learning research field by:

1. Developing new methods for observing families

2. Using both qualitative and quantitative assessments of learning

3. Finding a list of "performance indicator" behaviors that show learning is taking place

4. Showing that exhibits that included family-friendly characteristics can improve family learning, and

5. Testing and re-testing both theory and application at a variety of free-choice venues helps show the potential generalizability of approaches to improving family learning (Borun et al., 1997).

Ultimately, "PISEC found that families are learning in science museums and that this learning can be enhanced and extended through thoughtful exhibit design" (Borun et al., 1998, p. 52).

A decade after the PISEC study, Ellenbogen, Luke, and Dierking (2004) took another look at the state of research in this field. Upon examining the literature from the mid-1990s through 2004, Ellenbogen et al. (2004) noticed three trends. First, converging theoretical perspectives led to shared understandings as to what constituted family learning. Second, more

rigorous and standardized methodologies were emerging. Finally, the authors noted that researchers were increasingly regarding families as learning institutions in their own right (Ellenbogen et al., 2004). The authors suggested that these three elements were beginning to reveal a more cohesive body of family learning research.

A Shift in Theoretical Perspectives

In the early years of family learning research (1980s), most studies were based on behaviorist models of learning that assumed that visitors would learn the right material or the right answer if visitors were simply provided with a well-designed exhibit (Falk, 2007). This perspective did not take into account the visitor's background and was a museum-centered approach. To a certain extent behaviorist ideas persist today although now researchers agree that a complex suite of factors contribute to learning in free-choice settings (Falk, 2007). Current researchers are influenced by sociocultural and constructivist theories which advocate taking a holistic view of learning (Ellenbogen et al., 2004; Falk, 2007; Phipps, 2010). These broader perspectives require researchers to look beyond the museum itself to examine "the ways in which the family group is situated within the larger social and cultural context" (Ellenbogen et al., 2004, p. S50).

Families as Learning Institutions

While Ellenbogen et al.'s (2004) literature review concluded that the field was beginning to focus on the family as an educational institution in its own right, Dierking (2010) agreed with the importance of putting the family at the center of the researcher focus. She said,

> The very first learning group a person belongs to is her family and this group is so important that anthropologists, sociologists and social psychologists refer to the family as an educational institution, similar to a museum or school but without the bricks and mortar. (Dierking, 2012, para. 1)

Other reviews of the literature (e.g. Adams, Luke, & Ancelet, 2010) also recognized that

museums were beginning to consider families as educational institutions unto themselves. Other

terms used in the literature are "communities of practice," and "communities of learners" which

are defined as, "groups that, through social interaction come to common understandings of a

topic" (Astor-Jack, Whaley, Dierking, Perry, & Garibay, 2007, p. 222). Ellenbogen et al. (2004)

went on to explain that families use free-choice settings as tools or resources they can use to

build family identity. This shift to a more holistic perspective in the research literature indicates

that many researchers have been taking a more family-centered approach that attempts to view

family learning broadly from multiple perspectives.

Methodologies for Measuring Free-Choice Learning

The challenges of measuring free-choice learning have been well-documented. Falk and

Dierking (2000) explained that,

> Over the years providing compelling evidence for museum-based learning has
> proved challenging. As it turns out, this is not because the evidence did not exist
> but because museum learning researchers and the public alike have had the wrong
> search image and were using flawed tools. (Falk & Dierking, 2000, p. 9)

Methods such as testing cognitive gains are ultimately "impractical, disruptive, and at times

impossible, given the features, norms, and typical practices in museums" as demonstrated by the

fact that visitors are on their leisure time and free to do whatever they wish (Shouse et al., 2010,

p. 147). Falk and Dierking (2000) argued that researchers have asked fundamentally flawed

questions in the past such as "What does an individual learn as a consequence of visiting this

museum, or seeing this exhibition, or attending this lecture?" (p. 11-12). The authors believe

"The better, more realistic question is, 'How does this museum, exhibition, or lecture contribute

to what someone knows, believes, feels, or is capable of doing?'" (Falk & Dierking, 2000, p.11-

12; Falk, 2005). Researchers in free-choice settings have come to the conclusion that

"assessments should fit the kind of participant experience that make these environments attractive and engaging . . . [and] should not undermine the features that make for effective learning there" (National Research Council, 2009, p.77).

Therefore, researchers have adopted methodologies that have evolved in complexity and scope since there are multiple interacting factors in the venue's setting and in its audience that researchers must address in order to identify or measure learning that is taking place (Allen et al., 2007). Studies have built upon procedures that Borun et al.'s (1996) developed and have included "discourse analysis, video and audio recording of moment-by-moment interactions, pre, post, and post-post-interviewing, journaling, talk-aloud cued visits, and providing family members with cameras as a documentation and meaning making tool" (Ellenbogen et al., 2004, p. S51)

Another important element of free-choice learning is that learning is often revealed over time (Ellenbogen et al., 2004). Rennie and Johnson (2007) felt the best way to deal with the issue of time without shadowing a visitor indefinitely was to use different data-gathering techniques during and after the visit to collect and examine "snapshots" of visitors' experiences and memories.

Sanford's (2010) study noted that researchers are still refining which methods are most feasible to use in order to reveal the richness of family learning in free-choice settings. Some indicators (time spent, exhibit engagement, and interpretive talk) are easier to measure because they take less time and effort. However Sanford's (2010) study revealed that measuring only one learning indicator creates an incomplete picture of free-choice family learning. Falk (2007) agreed when he wrote, "Understanding learning in and from museums requires the simultaneous investigation of multiple variables…. Simple, reductionist approaches to understanding learning

from museums will simply not suffice" (p.14). Researchers have continued to invent new ways of interviewing and observing families and gathering data in order to create a more appropriate picture of family learning.

In addition to not knowing exactly how many factors and to what degree those factors influence learning, researchers also agree that the myriad outcomes that can indicate museum impact are also not fully understood (Rennie & Johnson, 2007). Therefore, measuring free-choice learning is an on-going challenge researchers must approach creatively as more and more institutions are looking for clearer indications that learning happens for their visitors as a result of them attending their programs and exhibits.

The Contextual Model of Learning

While measuring the true depth and breadth of learning in free-choice settings is an ongoing challenge for researchers, models have been created that frame the multiple contexts that influence learning. Falk and Dierking's (2000) extensive research led them to develop an initial framework of contexts that visitors bring with them and experience before, during, and after their visits to free-choice settings. Falk and Dierking's (2000) Contextual Model of Learning illustrated how *Personal, Sociocultural, and Physical* contexts overlap and influence visitor learning. The model has evolved with further research, to include 12 factors that influence learning. Those factors are:

    Personal Context

    1. Motivation and expectations

    2. Prior knowledge and experience

    3. Prior interests and beliefs

    4. Choice and control

Sociocultural Context

5. Within group social mediation

6. Facilitated mediation by others

7. Cultural background and upbringing

Physical Context

8. Advance organizers

9. Orientation to the physical space

10. Architecture and large-scale environment

11. Design of exhibits and content of labels

12. Subsequent reinforcing events and experiences outside the museum

(Falk & Storksdieck, 2005, p. 747)

Falk & Storksdieck (2005) explained that

> Research has shown that these 12 factors contribute to the quality of a museum experience, though the relative importance of any one of these factors may vary between particular visitors and venues (e.g., science centers, natural history museums, zoos, planetaria, nature centers, etc.). While there exists evidence that each of these factors influences learning, we do not currently know to what extent each of these factors contributes to learning outcomes, in what ways, and for whom. (Falk & Storksdieck, 2005, p. 747)

Rennie and Johnson (2004) came to a similar conclusion that learning is personal, contextual, and takes time. They reiterated that the factor of time is important, since a visitor's free-choice experiences have the potential to be applied elsewhere in a visitor's life. Over time families may talk about the visit, use it as a catalyst to pursue related learning or experiences, or build upon what they learned about each other to grow closer as a family (Astor-Jack et al., 2007).

The Museum Visitor Experience Model

Falk (2009) has since expanded on the Conceptual Model of Learning to create a

Museum Visitor Experience Model (see *Figure 2*). He used the Contextual Model of Learning as

its base (represented by the intersection of the Personal, Physical, and Sociocultural Contexts at

the center of *Figure 2*). It also illustrates how visitors bring motivations, identities, and

perceptions of what the museum can offer to the visit and subsequently the museum itself has its

own messages and physical setting that influence visitors' experiences. The arrows in the figure

represent time as an additional consideration for visitor experiences. According to Falk (2009),

visitors make meaning of their experiences during and after the visit as a result of the confluence
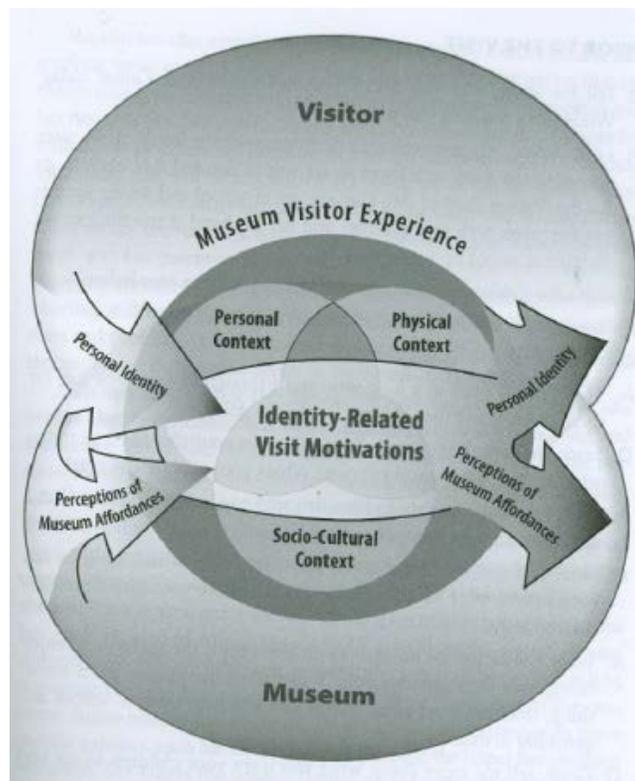
of all the factors in the model.

Figure 2. The Museum Visitor Experience Model (Falk, 2009, p. 161).

Portions of the models mentioned above will be used in the following sections as lenses through which to examine the recent literature on family learning in museums. It is important to keep in mind however, that even though the contexts or factors may be examined separately, they are inseparable and the interaction of the factors is unique for each family and to a certain extent, for each family member. The following section addresses the Personal context that family members bring to their visit and identity-related visit motivations are discussed within the Personal context. Next, the Sociocultural context, which is especially important to family groups, is examined. Finally, the Physical context of the museum is addressed with family learning in mind.

The Personal Context of Learning in Free-Choice Settings

  Motivations and expectations. Motivations, expectations, and visit plans are negotiated among family group members before and during the visit on both a personal level and collectively as a family unit (Moussouri, 2003). Some research studies have interviewed children about their free-choice learning experiences, but because it is more difficult to obtain permission to interview children, most data comes from interviews of adult members of family groups. Moussouri (2003) interviewed and obtained responses from adults and children from 29 families who visited a science and technology exhibit in the United Kingdom. Her study led to a framework for understanding factors that contribute to a family's museum-going agenda. She accounted for factors such as the role the museum serves in the family's social life and the family's perception of the visit as a social activity (Moussouri, 2003).

  Families in Moussouri's (2003) study said they were motivated to visit the museum for multiple reasons including for education, life-cycle traditions (returning to a museum they had

visited as a child), entertainment, and/or as a family outing. Moussouri (2003) also found that prior experiences in museums influenced their visit plans and expectations.

   Parents' motivations and expectations. Moussouri (2003) and Briseño-Garzón, Anderson, and Anderson's (2007b) conducted interviews with parents in their studies about family museum-goer motivations and expectations. They found that their adult subjects' motivations were child-centered. Briseño-Garzón et al. (2007b) found that "overall, the adults of participating families entered the venue with a three-fold recreation-learning-social motivated agenda" (p. 81). In addition, "Most visitors do not see a real conflict between having fun and learning something at the same time" (Briseño-Garzón et al., 2007b, p. 86; Falk, Moussouri, & Coulson, 1998). Packer (2006) concluded that "learning for fun is a unique and distinctive offering of educational leisure experiences" (p. 329).

> Many visitors to museums and other educational leisure settings, when asked whether they came to learn something, will answer, 'No, we just wanted to have a look.' On the surface, this may suggest that visitors are not highly motivated to learn. However, further questioning often indicates that the experience visitors are expecting or hoping to find is one of discovery, exploration and adventure, which at the very least primes them for a learning experience. What they seek from their visit is not so much to *learn something* as to engage in an *experience of learning* that is inherently valuable or enjoyable in its own right, regardless of the learning outcomes that may or may not ensue. (Packer, 2006, p. 329)

   While the experience of learning is fun for many visitors, there are some visitors who arrive at a free-choice setting with the goal of learning about a subject that is important to them. In other words, the reason for their visit involves a particular learning outcome. Other visitors find out by accident during their experience that learning is fun (Packer, 2006). While the formal education field tends to emphasize the *learning* end of the learning- fun continuum, the free-choice education field may have more freedom to offer experiences on the *fun* end of that

continuum. Packer and Ballantyne (2004) argued that "Education and entertainment are not only compatible, but synergistic, in the context of educational leisure settings" (p. 54).

Agendas. Researchers have continued to delve deeper into understanding more about visitor motivations and expectations and how visitor agendas evolve over the course of their visit as a result of the interaction between the visitor's agenda and the museum's agenda. A museum's agenda can be defined as its overall goals for visitor behavior and the messages it wants visitors to consider during and after their visit (Moussouri, 2003). These agendas tend to be static. Briseño-Garzón et al. (2007b) found that for the 13 adults they interviewed, intrinsic factors such as developing interest in a particular subject during the visit and extrinsic factors such as attention span, weather, and crowdedness resulted in adjustments in family agendas during aquarium visits. Moussouri (2003) and Briseño-Garzón et al. (2007b) found that family agendas are dynamic since they are influenced by several complex factors. This supports Falk and Dierking's (2000) and Falk's (2009) models that illustrate the multiple factors influencing learning outcomes.

Grandparent's motivations and expectations. Grandparents often bring their grandchildren to free-choice settings. As American families continue to increase in diversity, Bengston (2001) noted that, "Family relationships across several generations are becoming increasingly important in American society" (p. 1). Bengston (2001) also pointed out that many grandparents will play important roles in their extended families such as serving as caregivers for grandchildren while parents work. Studying grandparent-grandchild groups in free-choice settings is arguable becoming more important as the American population ages.

Few research studies have focused on grandparents and grandchildren as a museum audience (Beaumont & Sterry, 2005; Sanford et al., 2007. Beaumont & Sterry (2005) conducted

a study on the motivations and experiences of 44 grandparents who visited a United Kingdom art gallery with their grandchildren. Grandparents gave several reasons for visiting the museum including but not limited to: (a) their grandchildren wanted to visit, (b) they wanted to share specific exhibits with their grandchildren, (c) they had watched the new gallery being built, (d) they themselves had visited as children, or (e) they were fulfilling their children's request to visit with their grandchildren (Beaumont & Sterry, 2005). Moussouri (2003) interviewed grandparents who were altruistic in their responses to questions about their personal motivations for their visit to a museum. In these cases, the "grandparents denied any personal expectation and stated that their visit was child-oriented" (p. 482). These responses were similar to Briseño-Garzón et al.'s (2007b) study of adults. However, grandparent's motivations may be more socially- oriented than parents'. Grandparents in Moussouri's (2003) study also expected to reminisce and share family history with their grandchildren. For grandparents in this study, the social aspects of the visit were the central focus of the experience.

Home-educating families' motivations and expectations. One special type of family group that Bachman and Dierking (2010) studied was home-educating families. In a small study they found that the 11 home-educating families they studied "use museums to augment on-going projects, engage in community service, and as starting points for new learning efforts" (p. 51). The families valued "connecting with people, institutions, and real artifacts in order to contextualize and deepen their learning" (p. 51). Home-educating families are a particular group that may be a relatively small audience for free-choice settings, but nevertheless come with unique expectations and assets that venues may choose to explore further.

Prior knowledge, experiences, interests, and beliefs. While prior knowledge, experiences, interests, and beliefs are typically examined on an individual basis in free-choice

learning research, families arrive as communities of learners whose members may be at different developmental levels. Nevertheless family members often share similar beliefs and prior leisure experiences as a collective group. The importance of visitors' prior knowledge and experiences has been emphasized in the free-choice learning literature (e.g. Briseño-Garzón et al., 2007b; Falk & Dierking, 2000; Moussouri, 2003). Briseño-Garzón et al.'s (2007b) study revealed that "participants' interests and what they looked forward to obtaining from the aquarium experience were shaped by particular and personally relevant prior events and knowledge" (p. 87). For underrepresented audiences in particular, their lack of experience in free-choice setting and their potentially differing cultural interests and beliefs may result in different types of free-choice learning experiences.

__Underrepresented families' prior knowledge, experiences, interests, and beliefs.__ Little is known about underrepresented families who engage in free-choice learning opportunities. We do know that for National Park visitation "Latinos, Asians, and African Americans are under-represented among visitors compared to their percent of the U.S. population" (Sheffield & Roberts, 2011, p. 4). Stein et al. (2008) noted that many free-choice learning institutions aim to serve diverse audiences and therefore it is important to consider visitor's needs "through the lens of the visitors themselves" (p. 180). Understanding visitors' prior experience or their lack of experience, in free-choice settings can help practitioners to better meet visitor needs. Parents who do not have prior experience in free-choice settings may not feel comfortable mediating the experience for their families. During her doctoral research in which she interviewed Latina mothers at two California natural history exhibit halls, Melber (2006) found that

> Latina mothers who had never visited their local museum before explained a fear
> of not being welcome, not knowing the answers to questions their children may
> ask, and not feeling that they were knowledgeable enough to appreciate the
> museum as a learning environment. (p. 37)

Based on this research, it is clear that museums could do more to support parents of any cultural background who are unfamiliar with such environments.

Another factor to consider is a family's perspective on free-choice settings as places for learning. Shouse et al. (2010) found that,

> The role of museums and other cultural institutions in education varies across cultural groups and may complicate their relationship to museum experiences. For example, some cultural groups may simultaneously express a very strong commitment to education, fail to see museums as a place where education happens, and defer to teachers and schools on matters related to educational practice. (p. 146)

Overall more research is needed to discover why the prior knowledge, interests, and beliefs of underrepresented families may be influencing their choice not to visit free-choice settings as often as other groups.

Children's choice, control, and expectations. Wu, Holmes, and Tribe (2010) conducted a study in Taiwan that shed some light on the role children play in deciding to visit free-choice settings. Thirty-seven families with children were interviewed. In this study, researchers consciously included children in the interview process and considered them "potential active participants" in museum-visit decision making" (p. 711). The study revealed that children wanted to visit museums after hearing about them at school or because they had had positive experiences during previous visits (Wu et al., 2010). The authors found that the more children knew about a museum, and the older they were, the more active part they had in the decision-making (Wu et al., 2010).

Moussouri (2003) interviewed children from 29 family groups and asked about them about their expectations for their visit. She found that children were interested in specific exhibits, particularly in the hands-on and active elements of the visit (Moussouri, 2003).

Children have also been observed making choices about which exhibits the rest of the family visited. Szechter and Carey's (2009) study of 20 parent-child dyads in an informal science education center showed that children were the ones who chose exhibits for their families and used hands-on elements more than parents did. Wood and Wolf (2010) also found that parents at children's museums preferred to let children older than toddlers initiate the activity across a variety of exhibition types. These observations ultimately point to interesting relationships among family members in regards to choice and control in museum settings. Children should not be overlooked as potential leaders during museum visits, as they often take on that role.

Identity-related visit motivations. An emerging area of the research field has centered on the concept that visitors arrive with a museum-goer "identity" and that adults usually fall into one of five identity categories. Identities could be considered a combination of a person's motivations, expectations, needs, interests and desired roles for a particular visit. Thus, for the purposes of this paper, research on museum-goer identities has been included under this "The Personal Context of Learning in Free-Choice Settings" section.

Adult museum-goer identities. The concept of a museum-goer identity is one Falk and his colleagues have begun using to better understand and simplify complex visitor agendas (e.g. Falk, 2009; Falk, Heimlich, & Bronnenkant, 2008; Falk & Storksdieck, 2010). They have been researching ways to use information about visitor's identities to make predictions about what the visitor is likely to value and focus on during their visit, even during their visit with a group, as is the case with adults who visit with their families.

Falk et al. (2008) grouped free-choice adult visitors' descriptions of themselves, their experiences, expectations, and reasons for visiting into 5 categories: (a) Explorers, (b)

Facilitators, (c) Professional Hobbyists, (d) Experience Seekers, and (e) Rechargers[2] (p. 57) (see

Appendix B for descriptions of each identity). Visitors may enter a museum with one or more of

these identities and identities may change between visits and venues (Falk 2009). Falk et al.

(2008) found that for the 1500 adults in their study, "Roughly 55 percent began their zoo or

aquarium visit with a single, dominant, identity-related motivation" (p. 71).

These identity categories reflect the situations most people find themselves in when

visiting free-choice settings. However, Falk has not yet studied the concept of children's

museum-goer identities. Falk (2009) has noted through extensive interviews and studies that

knowing adult identities can generate basic, predictable clues for how the visit will generally

progress. Ultimately, identities along with the personal, sociocultural, and physical contexts of

the visit strongly influence a visitor's choices during his or her visit (Falk 2009).

How identities influence family group dynamics and learning perceptions. The adults

Falk et al. (2008) interviewed were all members of visiting family groups that included children,

so the researchers were able to gather information about how identities influence family group

dynamics. It is important to note that Falk (2009) found that although it may seem as if all

parents would take on a Facilitator identity and be focused on enabling their children's learning

not all parents operate in the Facilitator role. Although many visitors may "display continuous

concern" for their children and their children's well-being, Falk (2009) found that for many adult

visitors in family groups, the children do not primarily motivate their behavior (p. 103).

For example, Falk et al. (2008) found that families in which adults were categorized as

Facilitators were "child-driven," meaning the children primarily chose what to see and do.

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[2] The initial term used for this category was "Spiritual Pilgrims"

Experience Seeker visitors, however, "were evenly divided between those who said the visit was adult-driven and those who said it was child-driven" (p. 68). In addition, "individuals identified as Explorers, Professional/Hobbyists and Spiritual Pilgrims were the least likely to allow their children to lead the way" (p. 68). It is clear from this study that adult identities do influence family group dynamics in free-choice settings.

Interestingly, Falk (2009) concluded that generally Facilitating parents have a need to be perceived as good parents. He found that they recognized and insisted that their museum visit was a great learning experience, but when asked what their child learned, these adults were unable to provide any details of what their child learned (Falk 2009). On the other hand, Briseño-Garzón, Anderson, and Anderson (2007a) found that parents in three of the thirteen families they studied could identify that their children had made cognitive developments as a result of their aquarium visit.

Facilitating parents in Falk's (2009) study may have struggled to state what their child learned, and both Falk (2009) and Briseño-Garzón et al. (2007a) found that adults did not report their own learning. Presumably this is because the adults were focused on their children's learning rather than their own. The Facilitators interviewed were often reluctant to offer examples of what they learned, when they did, what was learned seemed to be the result of an exhibit having caught their attention (Falk & Storksdieck, 2010).

Although Briseño-Garzón et al. (2007a) were studying adult learning and not focused on visitor identities, their interviews revealed similar insights. They were surprised to find that overwhelmingly the 13 parents they interviewed did not consider their experience at the aquarium to have been a learning experience for them personally. These results were surprising for a few reasons. First, some of the adults had mentioned in pre-visit interviews that they were

26

at the aquarium to learn. Second, the adults were observed exhibiting learning behaviors during their visit. Finally, the researchers found evidence of cognitive, social, and affective learning in their study, yet the adults did not seem themselves as learners.

Adults in this study visited an aquarium and displayed new knowledge of conservation-related issues (Briseño-Garzón et al., 2007a). Another outcome of their visit that the adults talked about concerned the social dynamics and learning styles within their families. Furthermore the adults demonstrated affective learning by expressing "appreciation and recognition of marine life diversity and exceptionality" (p. 310). Nevertheless, in the post-visit interviews those same visitors "did not see themselves as learners, but rather as caregivers whose main task was to provide educational and entertaining experiences" for their children (p. 307).

Moussouri's (2003) data differed from Briseño-Garzón et al.'s (2007a). She recognized in her adult subjects' language that they considered themselves active learners, that they used the museum as a learning tool, and that they used the museum to spark their children's interest in science and technology. These results indicate that her subjects may have been Explorers or perhaps were balancing both Explorer and Facilitator roles.

Falk and Storksdieck (2010) shared some interviews that illustrated common themes for Explorer parents. They found that Explorer parents' visits were shaped by their own curiosity and their need to find interesting things to learn during their visit, not necessarily their children's learning needs. A commonality among Explorer parents was that in interviews these adults "specifically and enthusiastically talked about what they learned…with little or no prompting from researchers" (p. 208-209). While the concept of a museum-goer identity is relatively new, it is important to note that it is a tool researchers are beginning to use to find commonalities among

visitors and ultimately develop ways to better meet their goals and needs. However, it is important to keep in mind that these identities are not labels that museum-goers would recognize.

The Personal context of family visits to free-choice settings includes many complex factors that have an influence on family learning and the ways the family experiences their visit. Families that are motivated to be entertained also seek the enjoyment that comes from learning about new things. It is important for practitioners and researchers to continue to develop understandings about how families arrive expecting to experience various degrees of fun, learning, and socialization and that the museum's agenda will also influence how their visit progresses. Grandparent – grandchild, home-educating, and underrepresented family groups may have needs and motivations that are slightly different from those of other family groups. Adult identities also affect family dynamics during free-choice experiences.

The Sociocultural Context of Families' Museum Visits

Falk and Dierking's (2000) Contextual Model of Learning calls for researchers and practitioners to take into account the social and cultural contexts that visitors bring with them to their visit in order to better understand free-choice learning. For families this context is extremely important because they interact with each other frequently throughout their visit. Family members mediate the visit for one another, often taking turns teaching and learning. Staff and volunteers at free-choice venues may also mediate the experience for family visitors answering questions and leading programs. All visitors experience free-choice learning through a lens informed from their cultural background and upbringing. The free-choice venues themselves present content and experiences through a cultural lens that is sometimes intentional, but most often unintentional. These factors and their influence on family learning are considered in the following sections.

Family learning behavior. McManus (1992) described family members as hunter-gatherer groups searching for knowledge. Ash (2003) and Falk and Dierking (2000) observed families that split into dyads and triads during their visit and regrouped throughout to share what they had learned. Falk and Dierking (2000) also observed that some families stayed together throughout their whole visit.

Research from two decades ago, such as Blud (1990), and more recent work such as Packer and Ballantyne (2005) emphasized the importance of family interaction in family learning. Blud (1990) went so far as to say that, "Interaction between visitors may be as important as interaction between the visitor and the exhibit" (p. 43). Borun et al. (1998) emphasized how visitor learning can be enhanced by other family members' insights and input. Families themselves often tell researchers they value the collaborative aspects of learning in museums (Allen & Gutwill, 2009; Briseño-Garzón et al., 2007a). Astor-Jack et al. (2007) argued that in order to understand the nature of learning in museums, one must understand the social processes of learning. As a result, researchers have put substantial focus on studying family conversations as a way to better understand family learning.

The power of conversation for family learning. One way in which the social nature of family learning is evident in how frequently families talk throughout their visit. Researchers have studied family conversations as a way to gain insight into how and what families are learning in these settings. For families, time spent at free-choice settings is typically dominated by conversation, which includes asking questions (usually about specific objects), and sharing knowledge (Falk & Dierking 2000).

Borun et al. (1996) found the most consistent indicators of learning were in conversations that included analysis, synthesis, and explanation. References to or discussions about previous

experiences often come up in family conversations and are used as a way for families connect what they are learning to what they are familiar with from their shared past (Falk & Dierking, 2000; Ellenbogen et al., 2004). That learning then becomes a shared family memory that can be referred to in the future. One reason why it might be particularly easy for many people to access memories of museum visits is that they are rare experiences for most visitors. Crowley and Jacobs (2002) proposed that learning conversations in museums can be powerful foundations upon which further learning can be built because of the novelty of the visit.

Parents' social mediation strategies. Parents take on a variety of approaches when they mediate their child's experience in free-choice settings. Mediation can mean taking on the role of teacher, navigator, questioner, helper, or interpreter of the experience. Children's museums in particular, are often the setting for parent-child interaction research. Gaskins (2008) observed that parents at children's museums quickly assessed their child's interest and ability as well as the exhibit's potential for engaging their child, to see if there was a match and whether or not they should participate.

> If the exhibition appears simple and straightforward, caregivers will tend to let children act on their own. If the exhibition looks somewhat more complicated, then they will tend to interact with their children to bridge the gap between what the children can do on their own and the exhibition's activities. (Gaskins, 2008, p. 12)

According to Gaskins, (2008) in order for parents to support children, adults must quickly understand the exhibit's message and goals and it must be constructed in such a way that it is big enough for adults to use.

Several recent family learning research studies have focused on parent-child interactions (Astor-Jack et al., 2007). Parents have been observed exhibiting what Moussouri (2003) called *spontaneous 'teaching' behavior* while at exhibits and during post-visit interviews with family

learning researchers. Parents, especially those of young children, posed questions and provided clues and explanations in order to assist their children (Moussouri 2003). Parents and caregivers have a variety of styles they use to interact with their children in free-choice settings, depending on the context. Szechter and Carey (2009) found that parents described evidence, gave directions, provided explanations, made connections, and elicited predictions when working with their children during their time using types of exhibits that encourage "Active Prolonged Engagement" through minimally guided, open-ended activities (p. 846). Other forms of parent-child interaction are explained in the sections that follow.

   *Parents who stand back at children's museum***s.** When visiting children's museums, many parents do not intervene in the children's activities at exhibits unless their child needs help (Downey, Krantz, & Skidmore, 2010; Wood & Wolf, 2010). Overwhelmingly parents revealed in post-visit interviews that they stood back because they enjoyed letting their children discover new ideas independently (Wood & Wolf, 2010). Parents also have reported that they value observing their children's learning behavior in order to learn about their children's learning styles and strengths (Moussouri, 2003; Briseño-Garzón et al., 2007a; Wood & Wolf, 2010). However, Wood and Wolf (2010) cautioned that

> When a parent stands back, or appears not to be interacting in the exhibition setting, it should not necessarily be interpreted as non-engagement, nor can the parent be seen as unprepared or unable to interact. It is indeed possible that family learning is still taking place, but understanding the motivation and choice of the parent can provide new directions for the design and development of exhibitions or individual elements. (Wood & Wolf, 2010, p. 48)

The above findings point to the importance of using caution in interpretation of family dynamics while observing free-choice visits.

   Challenges cultivating parent-child interaction. Research on improving caregiver-child interactions is an area of research that has received more attention recently. The Indianapolis

31

Children's Museum chose to change its mission from "serving children" to "serving families" (Borun, 2008; Wood & Wolf, 2010) after taking into account sociocultural learning research that emphasized the importance of adult-child interaction as well as literature that "identifies the benefits to children's learning when parents act as play facilitators" (Downey et al., 2010, p. 15). The change in the Indianapolis Children's Museum's mission can be described as a change in the museum's agenda. Museums wanting to improve their programs and exhibits may incorporate research-based practices or shift their mission.

In a study that was conducted in the four years after this change in language, exhibits, and programs, Wood and Wolf (2010) found that parents continued to stand back at both interactive and non-interactive exhibits. These observations revealed a conflict between the museum's agenda and the parent's agenda and behavior that warranted further examination. In a similar study, Downey et al. (2010) found discrepancies between parents' beliefs about play and museum professionals' beliefs about play. While parents may have good intentions, they may not be aware of the latest research. Some parents may see the museum as a place where their child can safely make choices, experiment, and learn better without their help. Museums that use play as a mechanism for children's learning need to do more to help parents learn about the learning benefits of play and also help them to play alongside their children (Downey et al., 2010). Those resulting understandings could mean more enriching experiences for families (Downey et al., 2010).

Helping parents mediate children's free-choice learning. Astor-Jack et al. (2007) explained that adults must feel comfortable with the subject matter and the museum setting in order to mediate the experience for their children. Schauble et al. (2002) warned that, "unless

careful attention is paid to helping the helpers, the energy and resources devoted to deepening museum learning may be wasted, or at best, underexploited" (p. 449).

Researchers have begun studying how pre-exhibit instructions might help children's caregivers be better teachers. Benjamin, Haden, and Wilkerson's (2010) findings suggested that even brief instructions can improve parent mediation skills at children's museum exhibits. In addition to further information about exhibit concepts, some caregivers in Benjamin et al.'s (2010) study were also given instructions on possible conversational styles and questions to use. When they used the prompts, there was an increase in their interactions with their children and joint talk between children and caregivers compared to caregivers who did not receive these types of instructions (Benjamin et al., 2010).

Gutwill and Allen (2010) ultimately found that "offering parents (or care-givers) a structured, coinvestigative role in exploring phenomena may significantly enhance families' inquiry" (p 738). This coinvestigative role helped parents avoid teaching their children didactically and avoid delegating simple tasks to children while taking on more difficult tasks themselves (Gutwill & Allen, 2010). When parents in the study articulated their thoughts, questions, and discoveries, the family's inquiry skills were also enhanced (Gutwill & Allen, 2010).

Rotating behavioral roles. Parents are not always the ones leading or mediating experiences in free-choice settings. Family members have been observed taking on various roles during visits to free- choice settings. Examples of behavioral roles include a child taking on the role of exhibit chooser in a particular part of the museum, a parent taking on the role of storyteller, or a grandparent acting as a questioner at a living history museum. According to Briseño-Garzón et al. (2007b), leading roles are often shared among members of visiting family

33

groups. They observed that the role of leading the family through an exhibit by choosing what the group sees and does was rotated and shared by both children and adults in most every group in their study of 13 families at the Vancouver Aquarium (Briseño-Garzón et al., 2007b).

Grandparent's roles as mediators. As is the case with other special types of family groups, there were a limited number of studies on grandparent-grandchild interactions (Leinhardt & Knutson 2006). This research has revealed that grandparents, more than parents, are inclined to focus on their grandchildren's enjoyment and the social and emotional aspects of their time together (Moussouri, 2003; Sanford, Knutson, & Crowley, 2007). Grandparents tend to prioritize spending time and talking with their grandchildren in these settings (Sanford et al., 2007). They also choose to co-learn with their grandchildren. Sanford et al. (2007) studied 31 pairs of grandparents and their grandchildren who visited the Franklin Institute in Philadelphia. They observed that 70% of the pairs were learning collaboratively (p. 140).

Researchers have observed grandparents taking on a variety of roles in free-choice learning contexts. Leinhardt and Knutson (2006) in their study of one grandparent-grandchild group visiting a natural history museum categorized and provided examples of three roles that particular pair of grandparents took on during their visit. They named these roles "family storyteller and keeper of family memories," "playmates," and modelers of "social interactions that are respectful of children's emerging understandings" (p. 239). The role of storyteller is a common one for grandparents to take on in free-choice settings, perhaps because many grandparents wish to build relationships and share family history with their grandchildren (Beaumont & Sterry, 2005). The various roles grandparents assume during their visit illustrate the ways in which grandparents choose to mediate their grandchildren's visit experiences.

Sanford et al. (2007) asked 31 grandparents to explain their museum roles in post-visit interviews and found their reported roles to be similar to parental roles in museums. They found that these grandparents self-reported their roles as *teacher, playmate,* or *coach.* They felt that it contrasted Leinhardt and Knutson (2006) who found their grandparent group to be storytellers, playmates, and social modelers. Ultimately, Sanford et al. (2007) concluded that grandparent and parent roles in museums were similar.

Children's roles as mediators. When children visit museums with their families, they too can serve as mediators. They can act as leaders, choosing which exhibits to explore or they can take on a teaching role in free-choice settings. A number of studies have cited examples of children excitedly sharing with their families what they had learned during a previous school visit (Beaumont & Sterry, 2005; Lyons, Becker, & Roberts, 2010; Moussouri, 2003).

In fact, the initial decision to visit a free-choice setting can be a result of a child's particular interest or *island of expertise*. Crowley and Jacobs (2002) defined islands of expertise as topics of interest, such as dinosaurs, that children develop over a period of time. They describe the process as fundamentally social since the child's subject of interest often becomes woven into other family activities (Crowley & Jacobs, 2002). Lyons et al. (2010) noted that some children will act as teachers when they have developed this type of expertise.

Facilitated mediation by others: Family interactions with staff and volunteers. Another element of the social nature of family visits to free-choice settings is that families often interact with free-choice learning staff and volunteers during their experience. This can be a form of facilitated mediation by others. A handful of studies in the late 1970s and early 1980s considered visitors' interactions with museum staff and volunteers (Falk & Dierking 2000).

Falk and Dierking (2000) suggested that skilled staff and volunteers can positively influence and facilitate visitors' experiences. In a living history museum setting where visitors ask questions of docents dressed as historical characters, conversation is the primary means of learning. Rosenthal and Blankman-Hetrick (2002) discovered in their study of five families who visited a living history museum that staff interpreters who engaged in the right balance of dialogue involving all family members inspired family conversations. However, if the interpreter provided too much monologue or too little conversation, the researchers found little indication that visitors were learning. In most museum settings Astor-Jack et al. (2007) made an anecdotal claim that, "most interactions between museum staff and the public remain didactic" and advised museum staff to create more participatory experiences for families (p. 226).

Cultural differences in mediation styles. Although Astor-Jack et al. (2007) noted a lack of research on potential cultural differences in social interactions in museums, a few recent studies were found. Melber (2006) and Stein et al. (2008) cautioned that some family groups from different cultural backgrounds may not encourage children to take on the role of teachers or leaders. Shouse et al. (2010) and Stein et al. (2008) recognized potential differences between the museum agendas that encourage children to lead, teach, or challenge their elders' ideas and a family's agenda that comes from a cultural context that values a didactic approach in which adults are seen as knowledge holders. Gaskins (2008) too reminded practitioners to avoid the assumption that cultures share the same theoretical perspectives of how children learn best.

Gaskins (2008) studied 12 African-American families' interaction tendencies in a children's museum and found that adults from African-American visiting groups in her study spent 60% less time at child-directed exhibits than at non-collaborative exhibits. Gaskins (2008)

concluded that child-directed interaction was definitely not a comfortable style of interaction for

African-Americans" in her study (p. 16). Conversely she found that

> Hispanic American families embraced the opportunity for engaging in a joint
> activity, but… the focus for them was not on the children's learning experience,
> but in accomplishing the goal of building something and that adults, particularly
> male caregivers, maintained control of the event (p.17).

This is relevant information for the NPS to consider because in national parks, "Latinos, Asians,

and African Americans are under-represented among visitors compared to their percent of the

U.S. population" (Sheffield & Roberts 2011, p. 4) and perhaps those groups would be better

represented if they were able to engage in exhibits that incorporated the strengths of their family

dynamics.

Gaskins (2008) pointed out that U.S. children's museums are often dominated by the

theoretical perspective that play leads to learning and that it is appropriate for adults to play

alongside their children. However, play carries different meanings in different cultures and

caregiver expectations differ as well (Gaskins, 2008). Finally, Gaskins (2008) cautioned that her

observation of parents matching their children's ability with the exhibit's content is not universal

since it is necessary for the adult to first be able to recognize and value what the exhibit offers as

a learning opportunity and for the adult to then be willing to collaborate with the child during the

experience to improve learning. As was mentioned above, different cultures have different

theoretical perspectives of teaching and learning.

Families learn through their interactions and conversations with each other in free-choice

settings. It can be challenging, however, for museum practitioners to effectively cultivate parent-

child interactions so as to maximize family learning. Varieties of perspectives, parenting styles,

and cultural values call for a flexible approach to helping parents mediate learning experiences

for their children. Parents are not the only ones that mediate free-choice learning experiences,

37

however. Other family members including grandparents and children have been observed taking on different roles throughout their visit. Staff and volunteers also contribute to the sociocultural context of family learning experiences in free-choice environments. Cultural differences must also be considered when attempting to engage underrepresented populations in free-choice experiences.

The Physical Context of Learning for Families: Exhibits

The physical context of a museum or free-choice setting has a strong influence on family museum visitor experiences. The physical context encompasses elements such as a venue's website, its architectural layout, whether or not seating is available, the order exhibits are arranged, the way information is displayed, and ways visitors might continue their experience after the visit. These factors all play a role in family free-choice learning experiences.

Advance organizers, orientation, and supplemental materials for families. Moussouri (2003) found that families' perceptions of exhibits were heavily influenced by their own personal and social agendas. Even so, when free-choice venues provide elements that orient visitors to the experience or guide or influence the way visits progress they still can influence a family's experience. Museum brochures, special exhibit guides, and websites are examples of what Falk and Dierking (2000) call advance organizers.

Gutwill and Allen's (2010) research is an example of how games can provide families with a structure through which hands-on science exhibits are experienced. "Visitors do not always have the expertise and confidence needed to conduct coherent, in-depth investigations to answer their questions" (Allen & Gutwill, 2009, p. 290). Therefore they designed and tested inquiry games to assist visitors in family groups learn these skills. Gutwill and Allen (2010) compared inquiry games with control conditions for 200 families and found that their "inquiry

games increased the quantity and quality of families' scientific inquiry" (p. 722). In particular a "juicy questions" game was deemed successful at increasing families' inquiry behaviors and everyone in the family participated, collaborated, and articulated their interpretations of the experiment's results (Gutwill & Allen, 2010).

In a fashion similar to an inquiry game, the use of technology can enhance or detract from families' interactions at exhibits. Lyons et al. (2010) predicted that technology will infiltrate informal learning environments more and more and that museums can use technology to support both individual and collaborative learning. Hatala et al. (2009) developed a technology-based activity to enhance social interaction at exhibits. They described the design and initial stages of an evaluation process for determining if the activity could be successful with family groups. Their preliminary results from 18 families' use of the technology in a history museum were promising.

Electronic technology is not the only tool that can be used to enhance family learning. Materials can also be produced that supplement exhibits. Tenenbaum, Prior, Dowling, & Frost (2010) concluded from their study of 58 families' visit to a cultural and history museum in the United Kingdom that family learning can be assisted with the support of booklets or activities designed to guide families through exhibits that may not be as family-friendly. Families in Tenenbaum et al.'s (2010) study "spent more time at the exhibits when assigned to the booklet and backpack conditions compared to the control conditions" (p. 248) and "children engaged in more historical talk when using the booklets" (p. 241). These findings point to ways in which free-choice settings may supplement existing exhibits to assist families without completely redesigning them.

Exhibit design. Exhibit design is certainly a factor that affects family learning in museums. Exhibits serve as the starting point for conversations among family members, but some exhibits facilitate conversation more than others. Museums used to have primarily static exhibits. In the past few decades, thanks to recommendations from Borun et al. (1998) and others (e.g. Falk & Dierking, 2000), free-choice settings have begun to incorporate more interactive, hands-on exhibits conducive to family learning.

Astor-Jack et al. (2007) noted that progress has generally been made in museums over the years to design exhibits to better meet families' needs. They claimed that progress has been made "particularly in exhibition and program development where there has been some effort to embed socially mediated notions of learning into the design process" (p. 225). Active Prolonged Engagement (APE) exhibits have been shown to increase time spent and learning talk for parent-child dyads in science museums (Szechter & Carey, 2009). Allen and Gutwill (2009) added that non-science museums also have been creating opportunities for visitors to ask questions and investigate the museum's collection in an inquiry-based way. It must be noted, however that 12 years after the PISEC Family Learning Project provided seven characteristics of family-friendly exhibits, there is more room for growth in exhibit design for museums to better meeting the needs of family groups (Borun, 2008).

When it comes to the exhibit elements family visitors are drawn to most if they have visited the venue before, Wood and Wolf (2010) observed that hands-on exhibit elements in a children's museum were revisited much more than the exhibits labels. They also observed less interaction among family members who were repeat visitors. The authors concluded that better understanding the influence of repeat visits to museum settings would help develop aids to support family learning in the future.

Reinforcing events and experiences outside free-choice venues. Family learning does not end when visitors walk out of free-choice venues. Learning conversations often continue during the car ride home or around the dinner table. Allen and Gutwill (2009) followed-up with families who used their inquiry games during their museum visit and found 15% of families had used the skills they had learned after their visit. The authors proposed adding web components that would allow families to join citizen science communities to continue their experience beyond the museum (p. 301). These proposals were not intended to replace, but instead supplement the experiences.

Bachman and Dierking's (2010) surveys of home-educating families found pre-and post-visit materials would be helpful. They might also serve to build long-term relationships, provide service and/or behind-the-scenes opportunities. Their results indicate that many families may be interested in extending their free-choice learning even further based on their experiences. Adults from 6 of the 13 family groups interviewed by Briseño-Garzón et al. (2007b) indicated that they intended to engage in future activities related to their aquarium visit. Although the researchers were not able to follow-up on whether subsequent related activities occurred, the researchers concluded that "The learning impact of an informal experience not only resides in the experience itself, but also in the days and weeks following the visit" (Briseño-Garzón et al., 2007b, p. 87). This supports the importance the element of time plays in free-choice learning experiences.

In summary, there are research-based ways to enhance family learning by optimizing the Physical context of a family museum visit. Strategies for enhancing the physical elements of a free-choice setting include using inquiry games, technology that enhances family interactions, and pre-and post-visit materials that allow families to extend the experience over time.

Section 3: Discussion

Conclusions from the Literature

Ellenbogen et al. (2004) concluded that "The field of family learning research remains in a critical development period" but that researchers have benefitted from using diverse methods and ideas while still uniting around common language, beliefs, and values (p. S55). These common values often center on constructivist and socio-cultural theories. Reflecting upon the last decade of research on learning in and from museums, Falk, Dierking, and Foutz (2007) recognized advances in the field and the need for further growth. They said, "The museum community continues to struggle to meaningfully document the impacts of its exhibitions, media, community-based programs, websites, and other educational efforts, and to apply those findings to the creation of useful and valid frameworks for exemplary practice" (Falk et al., 2007, p. xiv).

David Ucko of the National Science foundation agreed and wrote,

We certainly have a greater [theoretical] understanding than we used to have 10 to 20 years ago, but that has still not been translated into the different ways in which people design informal science education experiences. Not all practitioners have knowledge of this research. And for those who do, it's not obvious how to translate it into specific applications…. [Professionals are] not necessarily learning from evaluations that are done elsewhere or even from their own institution's evaluations done in previous years. So the field needs to do much better in terms of building on resources based on prior experience. It's the only way for a field to move forward. (Falk, Dierking & Foutz, 2007, p. xv)

Given that the field is still developing and refining ways to document its impacts, it is clear that further research is needed to continue to increase understanding of families and their experiences and learning from free-choice environments.

Two models that have helped unify understandings about the nature of learning in free choice settings include Falk and Dierking's (2000) and Falk & Storksdieck's (2005) updated Contextual Model of Learning and Falk's (2009) Museum Visitor Experience Model. These

models summarized the factors that influence learning and can be used as starting points from which to examine family or individual experiences during and after visits to free-choice settings. The Museum Visitor Experience Model encompasses the factors from the Contextual Model of Learning and adds Identity-Related Visit Motivations, the element of time, and effectively illustrates the interface between visitors and the museum itself.

Using these models has helped researchers gain a deeper understanding of the nature of family learning in free-choice settings. Since multiple factors influence family experiences at free-choice settings, these models are particularly useful for simplifying and categorizing the complex elements visitors bring to their visits. These models have been used in this paper as frameworks to address areas of research in the field.

Family learning in free-choice settings can be measured using a variety of approaches, but measurements must go beyond cognitive tests to encompass social and affective elements as well. Ultimately learning is personal, contextual, and takes time (Rennie & Johnston, 2004). Research studies have consistently revealed that families learn through their social interactions with each other and their conversations. Given these understandings, there are a number of implications, considerations, and recommendations for the NPS to consider in order to improve family experiences at NPS units. Striving to make learning easy and enjoyable for families is a simple starting point, Borun (2008) suggested. A more extensive list follows.

Implications for the National Park Service

The NPS must grow as an educational innovator and can more effectively meet the needs of its millions of family visitors by considering the results of family learning research in free-choice settings. Further research, evaluation, and implementation will require institution-wide collaboration and comparison of best practices. Incorporating family-centered goals and action

items into changes inspired by *A Call to Action* (2012) NPS may be one way to address park visitors' needs.

   A Call to Action (2012) (see Appendix A) aims to implement practices that will reach the goals of Connecting People to Parks and Advancing the NPS Education Mission. By more effectively engaging families in park programs, exhibits, and interpretive media, the NPS can help foster visitors' life-long connections to parks and as a result, enhance visitors' life-long learning since children who visit free-choice settings often return as adults (Beaumont & Sterry, 2005; Moussouri, 2003). In addition to reaching young people through school partnerships, the NPS needs to connect youth to parks through more effective family programs. History programs that involve older adults are another way to connect multi-generational families to parks.

   Enhancing park's connections with families by using current free-choice educational research and best practices will also help reach the NPS *A Call to Action* (2012) goal of Advancing the NPS Education Mission. Much of the literature about the Physical context of learning can be connected to *A Call to Action* item #19 - "Out with the Old" (see Appendix A). It states that the NPS will replace thousands of interpretive exhibits and other media. This action item, if carried out with family free-choice learning research and recommendations in mind, could substantially increase family learning in parks.

Considerations

   While embracing a family-centered approach to exhibits and programming, it will be important to note that more research is needed to understand the importance of social interaction for other visitor groups (Packer & Ballantyne, 2005; Novey & Hall, 2007). However, exhibits and programs designed for families that encourage social interaction and allow for multiple users

to participate will also work for visiting school groups and other adult groups (Borun, 2008;

Kiihne, 2008).

While improving family learning in parks and finding ways to better assess the various

ways families make meaning during their park visits, it is important to remember that park units

provide other benefits and outcomes for families besides learning. Packer (2008) argued that,

> Even the most broadly defined learning outcomes may not be sufficient to explain
> the value and benefits of the museum experience. In seeking to demonstrate the
> social worth of museums, researchers are starting to look beyond their undeniable
> educational value, to a range of other beneficial outcomes for visitors. (pp. 33-34)

For example, 44 interviews of visitors to the Queensland Museum revealed that their visit

improved their well-being (Packer, 2008). Fifty-nine percent of the participants experienced

psychological benefits such as personal growth and 57% reported that their visit resulted in

restorative benefits (pp. 46-48). Both the NPS and families themselves may consider these visit

outcomes just as important, if not more important than learning outcomes.

When considering cultural differences it is appropriate for practitioners and researchers to

consider that we all come from a cultural context and that it is valuable to recognize the lens

through which we experience a museum visit before considering other visitor's experiences as

well. When the NPS makes changes in order to serve families better, it is possible that the

changes may not have the intended effect. Factors such as cultural differences or differences in

parenting style could cause results similar to The Children's Museum of Indianapolis, who saw

parents still standing back while their children experienced exhibits. These changes will require

further research, flexibility, education and training for staff and volunteers, and most

importantly, evaluations that are used to inform ongoing changes in exhibits and programs.

Additionally, considering the diversity of families' cultures will allow exhibit and

program designers to "explore diversity as a positive resource" that adds richness to our

understandings and perspectives (Shouse et al., 2010, p 145). Shouse et al. (2010) recommended

that institutions consider alternatives to the term "outreach" because this term does not imply the

partnering or reciprocity that has been shown to be more effective and valuable to the process of

involving underrepresented populations in free-choice learning experiences (Honey, Augare, &

Sachatello-Sawyer, 2010; Stein et al., 2008). Additionally, the NPS must consider looking into

ways to evaluate programs for underrepresented populations in culturally relevant ways (Honey

et al., 2010).

Recommendations from the Literature

The Personal, Sociocultural, and Physical contexts from Falk and Dierking's (2000)

Contextual Model of Learning were used in the following sections to frame recommendations

from the literature. The use of this model is not to encourage the separation of these

recommendations, as some of the recommendations may fall under multiple contexts, but instead

to organize them in a usable fashion.

The personal context: Maximizing family engagement and learning. In order to fulfill

both individual family member needs and the family's collective needs as a community of

learners, the NPS should consider the following recommendations that help take into account the

motivations, expectations, knowledge, experiences, interests, and beliefs that families bring to

their visit.

1. **Visitor Agendas -** Seek to further understand family visitors' individual and collective agendas, motivations, and expectations and subsequently provide families with the "tools and resources they need to evaluate what the museum offers against their agendas for that visit. Priority should be given to first-time family visitors" (Moussouri, 2003, p.486). Agendas of special groups such as grandparents visiting with their grandchildren, underrepresented populations, or multi-generational families should also be considered.

2.   **Prior-Knowledge -** Help families relate their everyday experiences and prior knowledge to what they see and do in the museum and allow them to investigate issues that interest them (Moussouri, 2003).

3.   **Adult Learners -** Reach adults who visit as part of family groups as "learners in their own right," not just facilitators of their children's experiences (Briseño-Garzón et al., 2007a; Sanford et al. 2007, p.148).

4.   **Exhibit Elements -** Differentiate exhibit elements in order to reach individuals from ages 2 to 92 who arrive with different developmental needs, learning styles, and museum-goer identities (Falk, 2009; Gaskins, 2008; Lyons et al., 2010; Moussouri, 2003).

The sociocultural context: Maximizing family engagement and learning. Families learn in free-choice contexts by conversing with each other and helping one another mediate the experience. NPS staff and volunteers also mediate programs and park experiences. The following recommendations will enhance those processes. The Sociocultural context also includes visitors' cultural background and upbringing.

1.   **Social Connections** - Develop ways to reward and foster connections between family members since family groups, especially those with grandparents, value the social elements of interacting during their visits to free-choice settings (e.g. Falk & Dierking, 2000; Moussouri, 2003; Sanford et al., 2007).

Help parents facilitate learning.

1.   **Optional Help** - Create opportunities for "parents to self-select interpretive support, but not assume that such support will or should be utilized" (Falk 2009 p. 222).

2.   **Support Multiple Roles -** Provide information that helps adults quickly recognize what role they should play if the child is the focus audience for the exhibit or experience (Downey et al., X; Falk 2009; Gaskins, 2008). Roles that allow parents to co-investigate with their children using a structured approach can help enhance inquiry skills (Gutwill & Allen, 2010). Offer ideas for multiple roles family members can rotate through during their visit (e.g. teacher, learner, storyteller) (Gaskins, 2008; Leinhardt & Knutson, 2006).

3.   **Technology –** Electronic mobile technology has the potential to enhance parent-child interactions or even create new types of interactions if designed well (Lyons et al., 2010). Technology such as Hatala et al.'s (2007) Kurio

system may promote new forms of family interaction in free-choice settings. Devices could be used to provide memory cues and prompts when family members regroup to share experiences (Lyons et al., 2010). Helping parents with question-posing strategies during their visit is one way technology could be used to improve parent mediation strategies (Lyons et al. 2010).

Help NPS staff and volunteers facilitate family learning.

1.   **Communication Training -** Continue to foster "talking with, rather than talking at visitors" (Astor-Jack et al 2007, p. 225; Moussouri, 2003). Train facilitators to communicate well with visitors of all ages. Good facilitators will be able to reach children especially, but also engage other members of multi-age families (Falk & Dierking, 2000; Rosenthal & Blankman-Hetrick, 2002).

2.   **Collaborate -** Create opportunities for novices to work with knowledgeable mentors collaboratively (Falk & Dierking, 2000).

Consider culturally relevant partnerships.

1.   **Model after Successful Programs** – Program leaders of the Blackfeet Native Science Field Center successfully engaged youth and their families in ongoing informal science education programs by valuing reciprocity, involving multiple generations and community members, and identifying four effective strategies: (a) ongoing communication, (b) dependable and consistent programs for adults and youths, (c) responsiveness to the community, and (d) community and parent participation (Honey et al, p. 122-126). Similar approaches could be applied in parks.

2.   **Go Beyond an Invitation** - Attracting new audiences will require collaboratively developing a setting in which "a multitude of cultures feel both welcome and valued and see personal relevance" (Melber, 2006, p. 36; Stein et al., 2008).

3.   **Translate and Interpret** - Create a welcoming atmosphere by providing translated materials, bilingual labels, and interpretation services for those who speak another language (Melber, 2006; Shouse et al., 2010; Stein et al., 2008).

The physical context: Maximizing family engagement and learning. The third context

to be taken into account in order to maximize family learning and engagement is the Physical

context. This context was also directly addressed by *A Call to Action* (2012) action item #19 -

Out with the Old (see Appendix 1). What follows are research-based recommendations for

preparing families for their visit, extending the visit's benefits beyond the NPS site, and improving content and physical structures at NPS venues.

1. **Pre-Visit -** Provide pre-visit materials for families (Bachman & Dierking, 2010). Create a "for families" section on NPS websites. Inform parents of "the full range of possible types of learning so that they could take full advantage of all the museum had to offer" (Falk, 2009, p.234).

2. **Post-Visit -** Develop questions that prompt families to extend their visit conversations to the drive home or around the dinner table (Falk & Dierking, 2000). Provide opportunities for families to contribute to ongoing citizen science projects based on skills they learned during their visit may help them extend their experience.

3. **Exhibit Characteristics -** Create Exhibits that are Multi-sided, Multi-user, Accessible, Multi-outcome, Multi-modal, Readable, and Relevant (Borun & Dritsas, 1997, p 180). In addition exhibits for families should be collaborative and "feature repetition (multiple stations offering the same experience)" (Borun, 2008, p. 9; Kiihne, 2008).

4. **Flexibility -** "Implement design elements that intuitively support the kind of interaction that works best for children and parents – and that are also flexible enough to support multiple orientations to parent involvement" (Wood & Wolf, 2010, p. 48).

5. **Supplemental Materials -** Supplement existing exhibits with booklets and/or backpacks that scaffold family learning and promote interaction (Tenenbaum et al., 2010).

6. **Seating** – Provide seating and other accommodations d for visitors with limited mobility, including grandparents (Beaumont & Sterry, 2005; Moussouri, 2003).

Conclusions

Instead of approaching the above recommendations as add-ons to what already exists in the parks, the NPS must rethink all exhibits, programs, and other interpretative media and experiences from a family perspective (Moussouri, 2003). Parks have welcomed families for over 100 years and the future is bright for the NPS to lead the way in innovative, relevant, engaging, and educational opportunities for families. Packer (2006) concluded that, "learning for

fun is a unique and distinctive offering of educational leisure experiences" (p. 329). She added, "Perhaps one of the most important contributions that museums and other educational leisure settings can make to society is in enabling their visitors to rediscover the joy of learning" (p. 341).

In addition to the recommendations above, it will be important for the NPS to encourage, even promote, research on all types of learning, including family learning. That there was no research to draw from for this literature review indicates the extreme need. This research, however, does not need to start from scratch; it should be built on the quarter century of solid work done in museum-like setting, some of which has been highlighted in this paper. An initial direction would be for researchers to look for ways in which the specific nature of learning in NPS settings differs, if at all, from what we know from other free-choice settings.

While budgets and logistics may be hurdles to overcome, now is the time to consider bolstering the NPS's approach to family visitors as the NPS looks to its second century. To engage more Americans and secure funding, the NPS must find ways to communicate activities, conduct further research, and communicate research findings in order to increase public and policy maker awareness that the NPS provides exceptional places for life-long learning and fulfills an important role in society. "There is evidence that such learning can support lifelong hobbies, encourage career decisions, and teach people the joy of learning" (Astor-Jack et al. 2007, p. 227).

To lead, the NPS must continue to build structures in which parks can communicate and collaborate around best practices as well as with other educational and community organizations. Involving families in exhibit and program planning, design, and evaluation will be important (Bachman & Dierking, 2010; Moussouri, 2003; Sanford et al., 2007). Overall, creating family-

centered opportunities and seeking to engage families in deeper levels of learning and

collaboration will enable the NPS to reach its *A Call to Action* (2012) goals and help make our

national parks and historic monuments exemplary places for family learning.

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A Call to Action

A Call to Action: Preparing for a Second Century of Stewardship and Engagement
(NPS, 2012) Retrieved from
http://www.nps.gov/calltoaction/PDF/Directors_Call_to_Action_Report_2012.pdf

The document's themes, goals, and actions most relevant to this paper are:

Connecting People to Parks

Develop and nurture life-long connections between the public and parks—
especially for young people—through a continuum of engaging recreational,
educational, volunteer, and work experiences….

Welcome and engage diverse communities through culturally relevant park stories
and experiences that are accessible to all.

2- **Step by Step**- Create deep connections between a younger generation and
parks through a series of diverse park experiences…

3- **History Lesson**- Expand the meaning of parks to new audiences and provide
an opportunity for communities to learn more about their heritage …

7- **Next Generation Stewards**- Create a new generation of citizen scientists and
future stewards of our parks …

13- **Stop Talking and Listen**- Learn about the challenges and opportunities
associated with connecting diverse communities to the great outdoors and our
collective history… (NPS, 2012, pp. 9-11)

Advancing the NPS Education Mission

Strengthen the Service as an education institution and parks as places of learning
that develop American values, civic engagement, and citizen stewardship.

Use leading-edge technologies and social media to effectively communicate with
and capture the interest of the public.

16- **Live and Learn**- Provide multiple ways for children to learn about the
national parks and what they reveal about nature, the nation's history, and issues
central to our civic life…

17- **Go Digital**- Reach new audiences and maintain a conversation with all Americans by transforming the NPS digital experience to offer rich, interactive, up-to-date content from every park and program…

19- **Out with the Old**- Engage national park visitors with interpretive media that offer interactive experiences, convey information based on current scholarship, and are accessible to the broadest range of the public. To that end we will replace 2500 outdated, inaccurate, and substandard interpretive exhibits, signs, films, and other media with innovative, immersive, fully accessible, and learner-centered experiences

20- **Scholarly Pursuits** - Sponsor excellence in science and scholarship, gain knowledge about park resources, and create the next generation of conservation scientists. (NPS, 2012, pp. 13-15)

Appendix B

Museum-Goer Identities

Falk et al. (2008) described the five museum-goer identity categories as follows:

    -Explorers are curiosity-driven with a generic interest in the content of the museum.
They expect to find something that will grab their attention and fuel their learning.

    -Facilitators are socially motivated. Their visit is focused primarily on enabling the
experience and learning of others in their accompanying social group.

    -Professional/Hobbyists feel a close tie between the museum content and their
professional or hobbyist passions. Their visits are typically motivated by a desire to
satisfy a specific content-related objective.

    -Experience Seekers perceive the museum as an important destination, so their
satisfaction derives mainly from having "been there and done that."

    -Rechargers (formerly called Spiritual Pilgrims) are primarily seeking to have a
contemplative, spiritual and/or restorative experience. They see the museum as a refuge
from the work-a-day world (p. 57).

Appendix C

Special Topic: Family Science Learning in Free-Choice Settings

Much of the research on family learning in free-choice settings occurred in science

museums. Science, as a subject matter learned in free-choice settings, often comes up in the

literature. For example the National Research Council, (2009) argued that "Learning science in

informal environments has the potential to bolster science education broadly on a national scale"

(p.13).

Allen and Gutwill (2009) argued that free-choice settings are ideal environments for

learning science inquiry skills. Some museums use open-ended, experimentation- based exhibits

specifically to teach inquiry skills rather than science content. Active Prolonged Engagement

(APE) exhibits were found to support scientific inquiry and increase observation making and

predicting among family visitors to a museum (Szechter & Carey, 2009). (APE) exhibits have

multiple options and lead visitors to ask more questions and spend more time at exhibits (Allen

& Gutwill, 2009, p. 290).

> Falk and Dierking (2010) agreed and provided additional context to the issue.
> Average Americans spend less than 5 percent of their life in classrooms, and an
> ever-growing body of evidence demonstrates that most science is learned outside
> of school. We contend that a major educational advantage enjoyed by the U.S.
> relative to the rest of the world is its vibrant free-choice science learning
> landscape… [including] national parks…We believe that non-school resources –
> used by learners across their lifetimes from childhood onward – actually account
> for the vast majority of Americans' science learning" (p. 486).

Concern with declining youth interest in the study of science, technology, engineering,

and mathematics (STEM) prompted Archer, DeWitt, Osborne, Dillon, Willis, and Wong (2012)

to survey of 9,000 elementary school children in the U.K about their attitudes toward science.

Their study revealed that a complex mix of factors including family activities and parent's

attitudes toward science contribute to a child's science career aspirations. Therefore, based on

their findings, a family's decision to visit a free-choice setting with science opportunities may impact a child's science career aspirations. "Parental attitudes to science plan an important role in shaping children's science aspirations" (Archer et al. 2012, p. 8).

> Children's aspirations and views of science careers are formed within families, and these families play an important, albeit complex role in shaping the boundaries and nature of what children can conceive of as possible and desirable and the likelihood of their being able to achieve these aspirations. (p. 22)

Additionally, parks can help improve science literacy by involving families in science and scholarship. Increasing family science programming, working with traditionally underserved audiences, and sharing and highlighting science-related careers in the parks to parents and children, especially elementary aged children may help children "see science as a 'conceivable' and potentially desirable career option" (Archer et al., 2012, p. 25). Citizen science projects that involve families could enhance science literacy and forge lasting relationships between families and parks that could have positive, far-reaching effects beyond their visit. Bertschi, Benne, and Elkins (2008) found success fostering children's' emerging science literacy by creating a learning environment that fostered parent-child interactions and featured skill-building activities, subjects intriguing to both adults and children, and also included elements that required parents to get involved and help. Exhibits designed using Active Prolonged Engagement (APE) principles allow for interactive experimentation and inquiry and may be appropriate at certain NPS sites.

Appendix D

Special Topic: Intergenerational Programs

Intergenerational Learning - "Arises from activities which purposely involve two or more

generations with the aim of generating additional or different benefits to those arising

from single generation activities… it may or may not involve members of the same

family." (Thomas, 2009, p. 5)

Intergenerational programs can promote social growth and learning between the young

and the old. As the baby boomer generation ages "there is now a global recognition of the need

to see older people as learning resources and as assets to their communities" (Newman &

Hatton-Yeo, 2008 p. 38). Intergenerational learning can occur when different-aged members of

the same family interact, but free-choice educational programs have paired older adults and

children who may or may not be related. This type of learning can include the exchanging of

skills, knowledge, and history while promoting citizenship and social inclusion (Newman &

Hatton-Yeo, 2008). Newman and Hatton-Yeo (2008) explained the reciprocal aspects of

intergenerational learning in that it can enhance learning and growth for both older adults and

children. They mentioned that as the U.S. population ages, intergenerational learning will

become increasingly important and relevant. In their study of intergenerational program,

Newman and Hatton-Yeo (2008) found that both adults and children considered the program to

be an enjoyable learning experience.

Co-learning workshops conducted at various locations in the United States over a 3 year

period were found to be more successful than a tutoring approach for youth and older adults in

Morgan, Bertera, and Reid's (2007) study. 2,826 older adults completed post-assessment

evaluations and 4,103 children, most under 9 years of age, also provide evaluations. The researchers found "significant gains in science knowledge, attitudes, and beliefs for older adults and children" (p. 35). Older adults reported that they had learned something and that the children had learned too. 79.5% of children reported that they liked the session a lot and 70.2% reported that they thought they had learned a lot from the session (p. 38). They found that "both biologically related and unrelated intergenerational pairs benefitted equally in the workshop settings" and participants found the experience to be an "appealing and 'fun' learning environment" (p. 38). The researchers' program evaluations revealed that their workshop approach was a successful model that was replicated across the country.

10 Steps to Encourage Family Learning at Your Institution

The following is a resource from familylearningforum.org

USS Constitution Museum Foundation (2006)

Retrieved from: http://www.familylearningforum.org/resources/forms.htm

10 Steps to Encourage Family Learning at Your Institution

Developed by the Family Learning Team of the USS Constitution Museum, Boston, MA

Funded by an IMLS National Leadership Grant

We invite you to explore family learning and assess where your institution is along the ten steps! Families of all shapes and sizes are visiting our institutions in record numbers. Family learning in a museum takes place when two or more people (with an on-going relationship) walk around, look, converse, and engage in activities together. Conversation is key to encouraging family learning so the steps focus on elements of visitor services and exhibition offerings that will assist families in their personal engagement. Below is a list of ten steps to consider if you want to foster family learning. Each step is explored further in an exercise on the following pages. We welcome your comments and suggestions via e-mail on these ten steps and accompanying exercises. (www.familylearningforum.org)

1. Get acquainted with your family visitors: How many are coming in?

2. Step into the shoes of your family visitor: How family friendly is your facility?

3. Check out your exhibitions: Are there effective elements for family interaction?

4. View your program schedule: What types of events do you offer for families?

5. Reread your institutional mission and goals: Are you ready to welcome families?

6. Consider your commitment: Are you willing to be a family learning advocate?

7. Observe your visitors: Find out what they already enjoy in your museum!

8. Practice a family-friendly perspective: Transform a program to attract families!

9. Revisit your exhibition: Try a new technique to engage all family members!

10. Reflect on your "family friendliness": Strategize possibilities at your institution!

Additional materials related to the above list can be found at:

http://www.familylearningforum.org/resources/forms.htm

Appendix F

Family-Friendliness Checklist

From (Kelly et al, 2004, p. 49-51)

According to Kelly et al. (2004), "this checklist was developed by Denise Fowler, Public

Programs Coordinator, National Museum Australia (d.fowlder@nma.gov.au), as part of a

Master's degree in Environmental Education and Interpretation at the Queensland University of

Technology" (p. 49)

Family-Friendliness Checklist

Pre-visit
-effective promotion aimed at families
-pre-visit family packs and/or activity guides
-resource and reference material available
Orientation
-clear map with family facilities marked
-attention to families' social agenda
-handouts aimed at children/families
Exhibit design
-safe, robust, and easily maintained
-indoor/outdoor access
-accessible
-multi-sided: more than one person can access
-multi-user: promotes and encourages social interaction
-multi-modal: reflects multiple ways of doing and knowing
-multi-outcome: allows for variety of learning outcomes and information
-multi-sensory: engages all the senses
-open-ended
-participatory, interactive, hands-on
-encourages children to apply principles rather than just push buttons
-staffed
-appeals to different stages of development
-offers choice
-updates/new things for repeat visitors
-dedicated spaces for children
-uses bold, primary colours
-challenging, but non-threatening
-provides enjoyment
-allows for different types of movement
-juxtaposes scale

-special areas for children under five
-encourages play
-provides for a variety of educational experiences
-interactive displays, a variety of high quality exhibits, audio and visual displays
-provides a balance of sensory stimulation sensitive to the cues and signals of visitors
-appeals to adults as well as child

Content
-appeals to children's interests
-links to children's existing knowledge and experience
-emphasizes the child's perspective
-takes children from:
>   -simple to complex
>   -known to unknown
>   -self to other
>   -whole to part
>   -concrete to abstract
>   -enactive to symbolic
>   -exploratory to goal-directed
>   -impulsive to self-controlled

-recognizes children's work and reflects children's interests
-developmentally appropriate
-novel and unusual
-provides supporting information for accompanying adults

Labels/text
-words used cautiously
-text arranged in easily understood segments
-text provides concrete information about the exhibits
-child's language used where appropriate and possible
-humor used where appropriate

Programs
-opportunities for families to be together
-facilitates developmentally-appropriate child-centered programs
-opportunities for storytelling activities
-allows for role play and play
-provides inter-generational programs

Practical Considerations
-shopping opportunities, with suitable merchandise to suit family budgets
-access for strollers, with alternatives to stairs
-family tickets
-opening hours and program times suitable for families
-adequate cloak rooms, appropriate toilets and parent rooms
-access to simple, reasonable cheap food in clean, cheerful surroundings

Audience-Specific
-**Infants and toddlers**:
>   -programs are language-rich
>   -centered around one-on-one interactions with significant adult

           -encourage imagination, role play, and dress-up

           -reflect the child's environment and everyday life

           -include music, drawing and sculpture, dance, tactile experiences and group activities

           -activities involve exploring, investigating, and imagination

-**Primary/secondary:**

           -programs build upon curriculum goals

           -make interdisciplinary connections while learning across subject areas

           -provide opportunities for practical and investigatory work

           -written materials and resource lists provided

           -links made to other information sources

(Kelly et al, 2004, p. 49-51)

Appendix G

Family Amenities Checklist

From : (Wilkening & Chung, 2009, p. 55-56)

Overall:
Museum should be clean and tidy (especially restrooms and food-service areas

Restrooms/ Nursing Areas:
Handicapped restrooms that can do double-duty as family restrooms
Stools to help little ones reach sinks
Diaper changing stations (in men's and women's restrooms)
Nursing rooms for private nursing (not a restroom)
Spare, clean children's clothes… just in case

Food Service
Designated place for snacks, inside and out (especially if there is no food service available)
High chairs and booster seats
Child-friendly menu options
Peanut-free food preparation (including no peanut oil)

Exhibit Amenities
Children's activity pages
Interactives that involve small groups rather than one person
Labels that use language parents can use when talking to their children
Outdoor trails and exhibits
Family tracks on audio guides
Stools to reach interactive components

Safety and Miscellaneous
Small baggies with ice cubes in freezer (for bumps and bruises)
Assorted bandages, etc.
No exposed cords or outlets
All cleaning supplies secured
Lots of benches and seating
Stroller loan
 (Wilkening & Chung 2009, p. 55-56)

Author's Biography

After graduating from Saint Mary's University of Minnesota with a B.A. in English Literature and a B.A. in French, Colleen joined the Lasallian Volunteers, and served as a middle school and high school tutor and field trip coordinator in Oakland, California for a year. Colleen then continued her service and spent two years teaching middle school students on the Blackfeet Indian Reservation in northern Montana. Fieldtrips in Glacier and Yellowstone National Parks with her students inspired Colleen to complete a year-long Professional Residency in Environmental Education graduate program at the Teton Science Schools in Jackson, Wyoming. She also completed her M.A. in Instruction at Saint Mary's University of Minnesota. After working with learners of all ages in a variety of education settings in the West and in the Midwest, Colleen pursued her M.S. in Natural Science at the University of Wyoming and hopes to continue growing as an educator.

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