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**INTERPRETIVE TECHNOLOGY IN PARKS:
A STUDY OF VISITOR EXPERIENCES WITH
PORTABLE MULTIMEDIA DEVICES**

By

Lee Gregory Rademaker

B.S. The University of Montana, Missoula, MT, 2004

Thesis

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for the degree of

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In Recreation Management

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Approved by:

Dr. David A. Strobel, Dean
Graduate School

Norma P. Nickerson, Ph.D, Chair
Department of Society and Conservation

Wayne Freimund, Ph.D
Department of Society and Conservation

Yolanda Reimer, Ph.D
Department of Computer Science

ABSTRACT

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Interpretive Technology in Parks: A study of visitor experience with portable multimedia devices

Committee Chair: Norma P. Nickerson

The GPS Ranger is a new portable technology that provides visitors to Cedar Breaks National Monument (CBNM) with interpretive information specific to a location. The GPS Ranger uses a built in global positioning system to trigger video, audio, or slideshows that are displayed on a 4 inch display.

The GPS Ranger is new to natural area parks like CBNM. Technological advancements have enabled devices like the GPS Ranger to be used in many new places. Researchers have a history of investigating and publishing literature on park visitor experiences with interpretive media. However, no exploration of the experiences visitors have with technology like the GPS Ranger exists. The purpose of this study was to undertake an exploratory investigation of GPS Ranger experiences. In doing so, it will begin to fill important gaps in literature and guide land managers and researchers to make more informed decisions.

Specifically, this study used the qualitative process of hermeneutics to guide the investigation of the experiences GPS Ranger users have at CBNM in southwest Utah. The following central question guided this study: What experiences do GPS Ranger users have at Cedar Breaks National Monument? In order to investigate the central question, the following research questions were investigated: 1) What expectations do visitors have when coming to Cedar Breaks? 2) What experiences do GPS Ranger users have at Cedar Breaks? 3) What are the experiences GPS Ranger users have with the technology?

Interviews were collected from 27 GPS Ranger users following their experiences at CBNM. Results showed visitors primarily expect to experience elements of nature during their visit. Furthermore, GPS Ranger users primarily had experiences focused around nature and learning. Technology was not identified as major part of their CBNM experience. Finally, visitors' experiences with the technology are positive but some problems were identified.

The GPS Ranger was enjoyed by nearly all users. They perceived the device benefiting their experiences by giving information they would have otherwise missed. The device may have caused positive and negative changes in behavior. Future research can use this study as a starting point to better understand information gathering behavior, the difference between users and non users, and to investigate potential impacts of technology on natural area visitors.

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Long before this document began to take shape and prior to the development of the research plan, my family, friends, and colleagues have all supported and encouraged my sense of curiosity. In doing so, they have helped me develop the necessary skills of a researcher. More specifically and more recently, my committee chair, Norma Nickerson has encouraged and pushed me to achieve what once seemed insurmountable. Thanks to my committee members Wayne Freimund and Yolanda Reimer who have provided guidance and ideas that shaped this study.

This study would have never happened had it not been for the efforts of the staff of Cedar Breaks National Monument, the Zion Natural History Association, my friends at the Student Conservation Association, and Lee Little, the CEO of BarZ Adventures. Each one has contributed to my success and for that I am grateful.

Closer to home, Ariel deserves so much more than a simple thanks. She has lent her time and energy to this project. She has been understanding and supportive during a very demanding process. Thanks to my parents for starting me down this path years ago by introducing me to two topics that were once mutually exclusive, National Parks and high technology.

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CHAPTER ONE: INTRODUCTION

In 1916, an act of Congress created what was to be called the National Park Service. The original document, which became known as the Organic Act, charged the new agency to

“...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purposes of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”
-Organic Act, 1916 (U.S.C., title 16, sec 1.)

In 2007, 91 years after the formation of the National Park Service (NPS), the agency managed sites hosted nearly 276 million recreation visits (National Parks Service Public Use Statistic Office, 2008). The NPS defines a recreational visit as “the entry of a person onto lands or water administered by the NPS for recreational purposes” (National Parks Service Public Use Statistic Office, 2008). The NPS’s total excludes NPS staff on duty, concessionaires, and people traveling to homes within the site.

The experiences NPS site visitors seek during their visit vary greatly between visitors. However, the NPS mission statement provides some insight into what is being provided to visitors across the range of properties. The primary mission of the NPS is the preservation of natural and cultural resources and values (National Park Service, 2008). The NPS’s mission states that these resources are preserved for the “enjoyment, education and inspiration of this and future generations” (National Park Service, 2008). The mission flows naturally from the founding legislation, the Organic Act.

For years the NPS has provided educational and entertaining opportunities to visitors to help accomplish their mission. A visitor arriving at a site is likely to be offered pamphlets,

maps, and other educational reading material. These are some of the forms of interpretive media that the NPS relies on to connect with and educate the visitor. Additionally, when driving through many sites, hiking trails, or at viewpoints visitors are often exposed to interpretive signs that provide information specific to that location. Visitor centers also help the NPS sites achieve their mission by providing hands on exhibits, educational videos, and ranger presentations. Finally, interpretive rangers spread educational messages at campfire talks, impromptu discussions, and ranger led hikes. Classically, these interpretive methods make up the bulk of educational or interpretive offerings.

Times are changing. Today, the guiding principles of the NPS encourage the agency to use new technologies to improve their visitor services. While it is true that parks have been using technologies (i.e., audio/visual presentations, self-guided audio tours, Internet, etc.), recent advancements in portable technologies have allowed the NPS to take advantage of new popular technologies.

Consumer technologies recently embraced by various NPS sites include cell phones and iPod portable video/music players. The NPS is following their guiding principles but the agency is also following very popular trends in society. One estimate places cell phones in the hands of 89 percent of U.S. adults in the last quarter (calendar) of 2007 (DigiTimes, 2008). Also, iPods were in the hand of an estimated 60 million Americans in October of 2007 (Siklos, 2007).

A number of parks have experimented with offering guided cell phone tours (i.e., Minute Man National Historic Park, Valley Forge National Historic Park, Independence National Historic Park, and Springfield Armory National Historic Site). Recently, the Lincoln Memorial began offering free cell phone tours. The site chose to use the technology for its improved accessibility to the public, saying, “With the introduction of free telephone

educational talks, the public will be able to learn more about President Abraham Lincoln and his memorial 24 hours a day from any location” (National Park Service, 2007).

iPods are also a technology the NPS has begun to use. Specifically, parks or organizations associated with parks are producing educational podcasts. A podcast is a downloadable audio or video file that computer users can watch at home or view on location. One of the obvious benefits of iPod versus most cell phones is the ability to display quality video and do so in locations too remote for cell tower reception. Glacier National Park and Yellowstone National Park both offer podcast downloads via the Apple iTunes store. Glacier specifically, has linked the podcasts videos to specific locations throughout the park. Signs along the Going to the Sun Road cue the visitors to play certain files on their iPod. One of the drawbacks of this system is that it requires the user to either have a laptop with them when they visit a site (to load the video/audio onto the iPod at the visitor center) or they must plan ahead and download the podcasts before visiting. Furthermore, visitors need to be told when to play the podcasts if they are location specific. This requires the park to install environmental cues (i.e., signs).

Location-based service is a term referring to a service that is tied to a specific geographic coordinate. Commonly, location-based services are programs linked to databases within a device that provide the user with information relevant to their location. For example many consumer grade in-car personal navigation devices can be used to provide drivers with information about their surroundings (i.e., traffic reports, restaurants, and hotels). The information is considered a location based service. In parks, many of the onsite interpretive exhibits that visitors are exposed to are location specific. Many of the podcasts in Glacier are location specific. While, the iPod is not currently able to automatically provide location-based service, a new device called the GPS Ranger can automatically provide location-based

service. The first NPS site, Martin Luther King Jr. National Historic Site began using the GPS Ranger in October of 2006 (National Park Service Press, 2007). In July of 2007 the device was implemented in Cedar Breaks National Monument (CBNM).

The GPS Ranger works by automatically triggering interpretive content as visitors approach points of interest. The format of interpretive content can vary greatly with the needs of the site, however it often features audio and video recordings of park rangers. Visitors rent the device at a location such as the site's visitor center and then are free to walk or drive around the property visiting places that interest them. When content exists for a specific place the GPS Ranger alerts them with a chime and a video begins to play on the LCD screen. Visitors can also access content on demand using the touchscreen. See Appendix A for an image of the GPS Ranger.

The purpose of the GPS Ranger is to provide visitors with educational information while visiting a park. While the technology has been used on NPS since sites 2006 and in zoos for some time before that, the technology is untested in parks. Historically, the NPS carries out visitor service project (VSP) surveys in which they evaluate the use of services including interpretive media. VSPs are ongoing within the system but have not yet addressed the use of new technologies. Before the park service begins to address issues related to the use of technology in the parks they need to have some basic understanding of the experiences that people have with these technologies. No such study has been carried out on the use of new, high technology, location based services like the GPS Ranger.

Purpose

The purpose of this study was to undertake an exploratory level investigation of GPS Ranger experiences. The results of this study will aid practitioners and future researchers in better managing and understanding the expanding use of technology in places like CBNM. Finally, there is a growing gap in literature focusing on the use of technology in recreation or wilderness areas and interpretation activities. It is this researcher's belief that one of the fundamental causes of the gap, is the lack of exploratory literature on the issue. This study provides a starting point for future studies.

Central Question

The central question of a qualitative research study helps to focus and direct the study (Creswell, 2007). For study the central question is:

- What experiences do GPS Ranger users have at Cedar Breaks National Monument?

The central question was asked at a very broad level as it is used to guide a series of more focused subquestions. Specifically, the researcher was interested in the possible impacts of the GPS ranger on a visitor's experience in Cedar Breaks as well as more specific experiences with the GPS Ranger.

Topical Subquestions

In order to better focus the broad central question, topical subquestions were used. The subquestions can also be used to help categorize interview questions for analysis. The following subquestions were used for this study:

- What expectations do visitors have when coming to Cedar Breaks?
- What experiences do GPS Ranger users have at Cedar Breaks?

- What are the experiences GPS Ranger users have with the technology?

The first subquestion seeks to explore the expectations that visitors have about their Cedar Breaks visit. This helps to describe their intentions for visiting. Visitors may have a wide variety of expectations, such as hiking, learning, relaxing, and sightseeing. Also, visitors stop at Cedar Breaks because it is a common travel route between other parks and for some it is a destination. By understanding expectations the researcher was able to explore whether the GPS Ranger was involved in achieving visitor expectations.

Subquestion two investigates experiences that GPS Ranger users have at Cedar Breaks. This question collects information about general park experiences and about the more specific GPS ranger experiences. Experiences visitors talk about are important in describing what visitors get from using the device. This subquestion will help determine if the GPS Ranger is an overriding component of a visitor's Cedar Breaks experience. It will also likely uncover issues or problems that users have as well as highlights of using the GPS Ranger.

Subquestion three explores the potential issues of technology. These issues include the impacts of technology on the classic park experience, technical failures, and user conflicts.

Thesis Organization

This study is exploratory in nature and thus broad in scope. Furthermore, it is based on a qualitative interpretive research paradigm that encourages answers to the research question to emerge naturally from the data. Prior to data collection a limited literature review was carried out followed by a more in-depth investigation of literature post analysis. In chapter 2 the full literature review is presented. The chapter contains literature on experience research, informal learning research, and technology research in parks. Chapter 3 provides a description of the hermeneutic research methodology used to guide this study. Chapter 4 provides the results of the hermeneutic analysis and discusses the themes identified by the researcher. Chapter 5 includes conclusions from the study and provides suggestions for managers and future researchers.

CHAPTER TWO: LITERATURE REVIEW

In this chapter, literature relevant to three main topics directly related to this study is explored. The first topic explores the concept of an “experience” and studies of outdoor recreation experience will be reviewed. The second topic of this review focuses on the concept of informal learning and its connection to national park experiences. The final section of this literature review focuses on the use of technologies used in parks to provide informal learning opportunities to visitors. This literature review was done in two stages. The first stage occurred prior to data collection and was limited in scope. Specifically, the first stage looked at the methods used to explore and guide experience literature. This was followed by a much more in-depth investigation that added depth and specificity to the experience literature and moved into informal learning, national park specific literature, and use of technology in parks and other natural areas. A two stage literature review was done to encourage research finding to naturally emerge from the data and limit potential external impacts from literature (McGhee, Marland, and Atkinson, 2007).

Experience Research Directions

The investigation of outdoor recreation experience has been undertaken by many researchers in the past (Brown, 1989; Clawson and Knetsch, 1966; Coe, 1985; Driver, Brown, Stanky, and Gregoire, 1987; Driver and Tocher 1970; Hammitt, 1980; Manfredo, Driver, Brown, 1983; Mannell and Iso-Ahola, 1987; Williams, 1989) and has been further developed, more recently, by a number of authors (Borrie and Roggenbuck, 2001; Hull, Stewart and Yi, 1992; McIntire and Roggenbuck, 1998; Patterson, Watson, Williams, and Roggenbuck, 1998; Stewart, 1998). Strictly speaking, these experience studies can be divided into two sub-groups. Much of the early experience literature fits into what Patterson et al.

(1998) calls the goal-directed paradigm, while many recent studies fit into the emergent experience paradigm. The distinction between the groups are explored shortly, however, the evolution of experience research from strictly goal-directed to emergent experience has occurred in a somewhat punctuated fashion. Beginning in the 1960s, the early views and theories (goal-directed) were dominant. Borrie and Roggenbuck (2001) noted that through the 1970s and 1980s, little attention was given to the dynamic nature of leisure experiences. However, they describe the topic as “flourishing” in the 1990s when the body of emergent experience literature began to form. This section will explore the growing body of recreation/leisure experience literature. Additionally, experiences can be studied in various ways. Borrie and Birzell (2001) list the four common methods as satisfaction approaches, benefits-based approaches, experience-based approaches and meaning-based approaches.

Satisfaction and benefits-based approaches are commonly quantitative investigations (Andereck, Bricker, Kerstetter, and Nickerson, 2006). A satisfaction-based experience measurement often uses Likert scales, allowing the study participants to indicate their level of satisfaction for activities, objects, or experiences in general. Satisfaction-based experience literature fits into what Patterson et al (1998) describe as the goal-directed paradigm introduced earlier. High satisfaction is equated to a positive experience.

Manfredo, Driver, and Brown (1983) describe the benefits-based approach as measuring the preferences of psychological outcomes, setting attributes, and potential management actions. The preferences are measured using a Likert-type scale that asks participants if the item in question “most strongly adds” through “most strongly detracts” from their experience (Manfredo, Driver, and Brown, 1983).

Experience-based and meaning-based approaches to understanding experiences are more commonly undertaken as qualitative investigations. These approaches are used to

investigate deeper into what visitors' experiences mean to them and to understand how the experiences occurred over time (Patterson et al., 1998). The deeper understanding of experience is often achieved and often only possible using in-depth interviews or by the researcher participating in the experience (Andereck et al., 2006).

Experience Research

The term 'experience' is perhaps so commonly used that its meaning has become somewhat clouded. In an effort to reign in the flexible word, this study will define experience as "the act or process of directly perceiving events or reality" (Merriam-Webster, 2002). Early literature noted that experiences are not composed of a singular point in time but occur over time and can be divided into distinct phases (Borrie and Roggenbuck, 2001; Clawson and Knetsch, 1966; Coe, 1985; Hammitt, 1980; Stewart, 1998;). Often this is referred to as the multiphasic nature of experience. Researchers Clawson and Knetsch (1966) separated experiences into five phases: anticipation, travel to the site, on-site experiences and activities, travel-back phase, and the recollection phase. They described the on-site experience phases as the point where the majority of satisfaction is created. They also describe the recreation experience as needing to balance the sum of satisfaction and dissatisfaction against the total costs of the experience (Clawson and Knetsch, 1966). Satisfaction is described as a goal of any experience. Clawson and Knetsch's model is consistent with the goal-directed paradigm. Clawson and Knetsch's early theory was empirically supported by Hammitt (1980) in a study of college students' moods as they visited a bog on an educational/recreation field trip. Later, Coe (1985) identified six phases: anticipation, lack of distraction, novelty, fulfilled expectations, emotional involvement, and reinforcement. More recently, Stewart (1998) challenged the field of leisure research to more effectively explore the concept of the

multiphasic nature of experiences. In doing so, he identified some of the weaknesses of past research and the potential strengths of others.

Stewart acknowledges that while the “Clawsonian” five stage model was an effective starting point for experience research, a more thorough understanding of the emergent process of experiences need to be undertaken (1998). Moving beyond the multiphasic “Clawsonian” model that describes satisfaction as a singular motivating factor, Patterson et al. describe the recreational experience as an emergent process (1998). They argue that past theories of experience were often based on understanding the end state or motivation of recreation experiences and did not seek to understand what those experiences meant to the recreationist.

The emergent-experience paradigm that Patterson et al. describes is based on two major assumptions. First, while an experience may be divided into parts (i.e., Clawson’s five stage model), it is best understood and as a whole (Patterson et al., 1998). Thus, measuring only the satisfaction recreationists have with their onsite experience greatly limits a researcher’s ability to understand and describe the experience. The second assumption is that the concept of situated freedom best characterizes recreation experiences in natural environments (Patterson et al., 1998). Patterson et al. explain situated freedom as the idea that “there is structure in the environment that sets boundaries on what can be preserved or experienced, but that within those boundaries recreationists are free to experience the world in highly individual, unique, and variable ways” (Patterson, et al., 1998, p.425).

Patterson et al. describe the goals of research with the nature of the experience under the emergent experience paradigm as “identify[ing] the boundaries of the environment and the types of experience that visitors are obtaining within those boundaries” (1998, p.426).

Other researchers have undertaken similar experience studies. Borrie and Roggenbuck (2001)

and Patterson et al. (1998) explored the experiences of wilderness visitors. Davenport, Borrie, Freimund, and Manning (2002) sought to describe the relationship between a visitor's desired experiences and their support for management actions in Yellowstone National Park. Bullock and Lawson (2007) worked on examining the effects of management actions on visitors experience at Acadia National Park.

Wilderness Experiences

Literature exploring wilderness experiences adds to the understanding of nature based experiences. Patterson et al. (1998) focus on describing the wilderness experience of visitors to Juniper Prairie Wilderness in the Ocala National Forest in Florida. Their study utilized the emergent experience paradigm and the qualitative methodology of hermeneutics to guide their research. Hermeneutics is an interpretive paradigm that attempts to understand the meaning behind human action (Patterson, 1993). Hermeneutics is defined by Kvale (1983) as the study of "objectivations of human cultural activity as text with a view to interpreting them, to find out the intended or expressed meaning, in order to establish a co-understanding, or even consent." Their research was aimed at uncovering and exploring the meaning of visitors' wilderness experiences. Patterson et al. (1998) found that four dimensions of wilderness experience were often described by their 30 interviewees: challenge, closeness to nature, decisions not faced in everyday environments, and stories of nature. While the results of the study may be reduced to four dimensions, the methodology that Patterson et al. used allowed them to describe in great detail and depth what each dimension meant to the visitor. Powerful descriptive ability is often highlighted as one of the strengths of qualitative research (Patterson, 1993).

McIntyre and Roggenbuck (1998) took a different approach to that of Patterson et al. as they used the experience sampling method to collect quantitative data and then followed up by collecting written personal accounts from participants. The experience sampling method (ESM) was developed by Csikszentmihalyi and colleagues (Csikszentmihalyi, Larson, and Prescott, 1977; Larson and Csikszentmihalyi, 1983) as a method to collect real-time data on a wide variety of situations, activities, or experiences. In McIntyre and Roggenbuck's study 28 students participating on a black-water rafting trip (rafting in a cave system) in the Waitomo caves in the North Island of New Zealand were studied. At five points along the three-hour trip the student were surveyed using the ESM then shortly after the trip the participants wrote about their experience as though they were telling a friend or family member about the trip. Using both quantitative and qualitative analysis techniques, McIntyre and Roggenbuck found that the "person-environment transaction are rich and complex, and result in moods which vary in intensity and character as the qualities of the natural setting change" (1998, p.419).

In a third study of wilderness experiences Borrie and Roggenbuck took a quantitative approach to measuring the "dynamic, emergent, and multiphasic nature of on-site wilderness experiences" (2001, p.202). The study collected questionnaire data from 63 visitors to the Okefenokee Wilderness in southeastern Georgia using the experience sampling method (ESM) (Csikszentmihalyi, Larson, and Prescott, 1977; Larson and Csikszentmihalyi, 1983).

In Borrie and Roggenbuck's study electronic beepers signaled the participants to fill out an ESM questionnaire at preprogrammed random points. The questionnaire contained a series of scales designed to test five modes of environmental experience, and six aspects of wilderness experience. Three research questions were investigated: 1) what leisure states of mind are measurable during the wilderness experience? ; 2) Are these leisure states of mind

dynamic and evolving during the course of the wilderness experience? ; 3) Can the leisure states of mind be characterized as multiphasic during the on-site experience? (Borrie and Roggenbuck, 2001). The results indicated that there were measurable states of mind that occurred in a dynamic, evolving and multiphasic nature. Thus, Borrie and Roggenbuck's study supported much of the past research on wilderness/ recreation experience and further developed the understanding of leisure states of mind for onsite wilderness visits.

While drawing direct comparisons from the wilderness to national parks may be difficult and limit the application of some of Borrie and Roggenbuck's findings and methods to this study, their use of technology in wilderness does provide some applicable theory. Borrie and Roggenbuck discuss the use of technology in collecting data in a wilderness area and the potential impacts of this use on experience and on their data collection. They comment that the "introduction of beeper technology into a wilderness setting is antithetical to the ideal of wilderness as free from modern technology" (2001, p.224). They further discuss the intrusive nature of the device and its potential impacts to data measuring wilderness experience attributes. Finally, Borrie and Roggenbuck note that while the experience sampling method does add to the general understanding to wilderness experiences it may not explore the emergent story and meaning that visitors to wilderness develop over time about their experiences (2001).

National Park Experiences

While experience is often the singular focus in wilderness studies, national park experience studies often seek to explore visitors' experiences within a specific topic. Davenport, Borrie, Freimund, and Manning (2002) investigated the importance of various visitor experiences in Yellowstone National Park and visitors' agreement with park management actions. This data was collected using mail-back questionnaires. When

Davenport et al. investigated the results of the questionnaire they found that visitors' desired experiences did not match up with visitors' support for management actions (2002). To better understand this "discord" Davenport et al. used in-depth interviews to gain insight on the experiences/management support issue. The quantitative data identified a variety of experiences that visitors to Yellowstone seek, the most important experiences, and why visitors find them important. The qualitative data found, among other things, natural scenery and wildlife to be common and important themes in visitors' descriptions of experiences (Davenport et al., 2002). Davenport et al. suggest that by collecting the qualitative data along with the quantitative data they "added depth and meaning to the complexities inherent in visitor desired experiences and support for management actions" (2002, p.63).

A study by Daigle and Zimmerman (2004) looked at the impacts of an intelligent transportation system (ITS) experience in Acadia National Park. Their study used onsite interviews and mail-back questionnaires to catalogue satisfaction with travel information, parking information, experiences with display technology and with the ITS bus on-board annunciator. After collecting 1,500 onsite interviews and 928 questionnaires, the analysis demonstrated that a high percentage of ITS users had positive experiences with the technology. Daigle and Zimmerman's investigation was limited in its theoretical depth but provided important satisfaction information to managers in the early developmental stages of the ITS deployment. However, they do describe the research as demonstrating that the ITS "technologies contribute positively to their visitor experience" (Daigle and Zimmerman, 2004, p.159).

Bullock and Lawson (2007) studied the potential effects of management actions on visitor experiences on the summit of Cadillac Mountain in Acadia National Park. Bullock and Lawson used qualitative, semi-structured interviews to gather data from 33 participants.

Data collection was stopped when data saturation regarding the visitors experience was achieved (Bullock and Lawson, 2007). Data saturation occurs when additional data collection is unlikely to add new themes or experiences to the study (Corbin and Strauss, 2007; Creswell, 2007; Glasser and Strauss, 1967). Data was analyzed using the procedures of grounded theory. The results of the analysis demonstrated the role of Cadillac Mountain in visitor experience at the park. Additionally, the study identified a number of defining elements of visitors' experiences on the summit of the mountain. Bullock and Lawson found that visitors often described the views/scenery, height/mountain top, beauty of nature as calming and peaceful, and that other people were part of the experience. In respect to the effects of management actions, Bullock and Lawson found that visitors were most concerned about management actions that would impact the aesthetics and visitor freedom as negatively affecting their experiences. However, visitors described management actions that could improve their experiences as those that "promoted a sense of ownership/stewardship" (p. 149) and those management interventions that are perceived as polite and unobtrusive means of communication also improve their experiences.

Bullock and Lawson's study helped show that in national parks visitors seek many of the aesthetic and calming effects of nature but also recognize that people can be an important part of a visitor's experience. Further, they demonstrated that the management messages even when regulatory or restrictive can also be seen by visitors as enhancing their experiences.

National Park Experience and Informal Learning

Another aspect of National Park experiences studied by researchers is the process of informal learning. Informal learning in national parks often refers to interpretive activities (i.e., brochures, ranger talks, self-guided trails, etc.). However, in a broader sense, informal

learning is characterized as any learning experience that takes place outside of a school environment (Brody, Tomkiewicz, and Graves, 2002). National parks and many other protected areas are ideal places for visitors to learn informally. Csikszentmihalyi (1987) identified the components of “prior knowledge” and “opportunity” as being necessary for informal learning to occur. Ramey-Gassert (1997) describes the characteristics of the informal learning environment as motivational, engaging, enjoyable, nonthreatening, hands-on, experiential, and personal. National parks contain these elements making them ideal settings for informal learning to occur and according to Brody et al. (2002) national park visitors arrive with some prior knowledge that primes them to take advantage of the learning opportunities.

While Yellowstone has been a national park since 1872, as of 2002 only one study of park visitor experience and the outcomes of informal learning has been conducted (Brody et al., 2002). The first study of informal learning in Yellowstone, by Brody et al., “investigated the development of park visitors’ knowledge, values and beliefs during their visit to the Midway Geyser Basin” (2002, p.1119). The researchers conducted a pre/post test of visitors to the geyser basin. The pretest helped the researcher uncover any previous knowledge that the visitors had about the area. After being exposed to a variety of informal learning opportunities (i.e., brochures and interpretive information) along a loop trail the same visitors were intercepted again and interviewed a second time. A total of 191 people (making up 40 groups) were interviewed with pre and post interviews averaging 30-60 minutes when combined (Brody et al., 2002). Their results, qualitatively analyzed using an interpretive approach, demonstrated that the visitors “build upon prior knowledge and experiences, especially with additional information provided by the interpretive brochure and the experience of visiting and observing the geyser basin” (Brody et al., 2002, p. 1130). The

results also showed that the social interaction that often occurred in groups helped to more deeply develop understanding and when the group used interpretive materials they often developed an even deeper, more extensive new understanding, values and beliefs. Social interaction is believed to develop the understanding of new experiences because knowledge is socially constructed (Falk and Dierking, 2000). Additionally, Patterson et al. (1998) describe the human experience as an emergent narrative that is mutually defined by the “transactional relationships among setting, individuals with unique identities, and situational influences” (p.427).

The work by Brody et al. was groundbreaking in the sense that it was the first study of its kind in a park such as Yellowstone. However, more importantly it demonstrated that the well developed theories and literature relevant to informal learning in museums, science centers, and zoos are consistent and relevant to national park research. Brody et al. admit that even with the congruencies identified by their findings there is a need for additional research in the area.

Informal learning in national parks is directly linked to the development of deep, understanding, values and beliefs (Brody et al., 2002; Orams, 1997). The research by Brody et al. investigated informal learning related to the use of common interpretive media such as brochures and standard park service interpretive signs. However, technological advancements have allowed the National Park Service to use portable electronics to deliver multimedia interpretive messages to visitors.

Stewart, Hayward, Devlin and Kirby (1998) worked to develop a “place based” approach to evaluating interpretation. They describe interpretation as a process of communication that either explicitly or implicitly attempts to stimulate people’s understanding of place (Stewart et al., 1998). Their study in Mount Cook National Park in

New Zealand utilized qualitative interviews over two seasons to investigate visitors' use of interpretation. Stewart et al., found four typologies of visitors. The typologies were generated by splitting the visitors into groups based on how or if they acquired interpretive information. Seekers and stumblers made up the majority of the visitors interviewed, 47 and 41 percent respectively (Stewart et al., 1998). Shadower and shunners made up the remaining minority, consisting of eight and five percent respectively (Stewart et al., 1998). Table 1, below, provides definition of the main categories and subcategories of each user group.

Table 1 Typology of interpretive users (Stewart, Hayward, Devlin, & Kirby, 1998).

<p>Seekers- Visitors who actively seek out sources of information and interpretation</p> <ul style="list-style-type: none"> • Learners- those who seek interpretation specifically to learn about the place; • Gatherers- those who seek information (as opposed to interpretation) about place; • Fillers- those who seek information and interpretation to fill in time;
<p>Stumblers- Visitors who stumble across information and interpretation sources</p> <ul style="list-style-type: none"> • Satisfied- those who are satisfied to stumble over interpretation in the place; • Frustrated- those who are frustrated to stumble over interpretation;
<p>Shadowers- Visitors who were chaperoned by other people through interpretation</p> <ul style="list-style-type: none"> • Formal- those who are chaperoned by guides around interpretation in the place; • Informal- those who are chaperoned informally around interpretation in the place;
<p>Shunners- Visitors who shun sources of information and interpretation</p> <ul style="list-style-type: none"> • Avoiders- those who purposely avoid interpretation in the place; • Passive- those who are uninterested in interpretation in the place.

Technology and Experience

Novey and Hall (2006) investigated the effects of audio tours on learning and social interaction in Carlsbad Caverns National Park. Audio sources have been studied in other settings and found to attract and stimulate visitor interests (Novey and Hall, 2006).

Specifically, Peart (1984) found museums exhibits using sound attracted more visitors, held their attention longer, and helped visitors learn more. Other studies (i.e., Beer, 1987;

Davidson, Herald, and Hein, 1991; Odgen, Linburg, and Maple, 1993) demonstrated similar positive results of auditory exhibits in museums, and zoos.

Novey and Hall (2006) used a pre/posttest of visitors who used or did not use the audio tour in the cave system. Observations of social interaction and time spent at exhibits were also collected. The researchers collected 254 total questionnaires from audio and non-audio tour visitors. The analysis of the results showed that visitors on the audio tour spent more time at most locations than non-audio tour users, scored equally well on knowledge assessments as non-users, were more likely to recognize the park's primary message and main themes than non-users, and appeared to be just as social as non-users (Novey and Hall, 2006).

Ironically, national parks owe much of their popularity to technology. According to Louter (2005), the early implementation of transportation technology (the automobile and trains) helped to encourage visitation to early parks such as Washington's Mount Rainier in 1910 (six years prior to the formation of the NPS). More recently, transportation has been a conduit through which many technologies and technology studies have been undertaken in national parks (Daigle and Zimmerman, 2004; Dilworth, 2003; White, 2007). The recent studies on transportation technology have focused much of their attention on visitor experience with intelligent transportation systems. More specifically, studies have concentrated on the ease of use, adoption of use, and acceptance of intelligent transportation systems. Technologies that may be used specifically for informal learning (i.e., GPS Ranger, iPod, etc.) have not been formally studied within national parks. However, research does exist for other settings and researchers are beginning to investigate and question emerging technologies.

Information technology (IT) is a broad category that incorporates managing and processing technology (Chang, Fisher, and Gleason, 2001). However, many technologies that people carry with them in parks have the capabilities of information technology. For instance, Personal Digital Assistants (PDA), multimedia players, cell/smart phones, computers, and personal navigation devices all have the ability to store, manage and retrieve large amounts of data. Further, the convergence of technologies has led to “all in one devices” that conveniently pack a variety of capabilities into one product. These technologies have been wildly popular. Cell phones are projected to be used by 50 percent of the world’s population and 75 percent by 2011 (Portio, 2006). Dilworth (2003) notes that the increasingly used technologies are likely to start showing up in National Parks.

The National Park Service has begun to take advantage of these technologies to help provide interpretive media to its visitors. For instance in 2007 the Lincoln Memorial began offering self-guided cell phone tours (National Park Service, 2007). By calling a toll free number anyone can hear free educational talks about Lincoln or the Memorial 24 hours a day (National Park Service, 2007). While this informal learning tool has not been evaluated, like other audio tours (Novey and Hall, 2006) it may have very positive effects on visitors.

In Great Smokey Mountains National Park, Dye and Shaw (2007) describe a new technology used to help park visitors plan their trip. The technology is called a spatial decision support system and integrates a geographic information system with an “easy-to-use” user interface (Dye and Shaw, 2007). New visitors to the park face the task of deciding what activities to undertake. This system is designed to help visitors plan activities that suit their constraints and preferences (Dye and Shaw, 2007). The visitor supplies the computer based system with information (i.e., traveling by: foot or horse or car; trail difficulty: easy or moderate or hard or strenuous; importance of points of interests [high-medium-low]

waterfalls or lookouts or historical) and the computer supplies them with a list of places that meet their criteria. The system is in its infancy and has not been assessed at the park but its designers hope to expand the system to the entire national park system.

Beyond changing visitor experiences, some researchers claim that technology may change visitor behaviors. Specifically, communication technologies (e.g., cell phones, avalanche beacons, and two-way radios), may actually increase risk-taking activities (Borrie, 1998; Ewert and Shultis, 1999; Wiley, 2005). The idea behind this argument is that people feel empowered or a sense of safety when carrying communication technologies into the backcountry. An example of this impact is that a user carrying a cell phone may attempt a risky hike knowing that help is available with only a phone call. Also related to the possible risk taking behavior is the idea that technology can remove many of the traditional skill barriers that users faced in the past (Borrie, 1998; Sawyer, 2002). Using a GPS may enable people who cannot navigate with map and compass to comfortably hike new trails or off trail. However, contrary to some of these arguments, recent research indicates that cell phones do not increase risk-taking behavior and do not significantly increase the feeling of security (Holden, 2004). However, Holden's study did find that the presence of a phone does impact wilderness experience. A satellite phone was found to detract from the wilderness experience and interfere with connections to nature (Holden, 2004). This important finding supports others who have theorized that the wilderness experience is somehow changed by the presence of technology (Borrie, 1998).

While Holden's (2004) study identified some impacts, other researchers describe the impacts of technology as a set of tradeoffs. The tradeoffs of carrying a phone in wilderness are identified by Freimund and Borrie (1997):

Bringing a cell phone into the wilderness may change the intensity of your experience, but enable you to go on a trip that you otherwise wouldn't be able to experience at all. Linking from a wilderness area to a grade school classroom may reduce your sense of escape but stimulate awareness and curiosity about wilderness in the minds of future advocates. Providing information about a wilderness area may increase use of selected places but failure to provide information through dominant mediums may reduce critical awareness and constituency for the wilderness ideal. (p.22)

The tradeoffs may occur between two users, as described by Freimund and Borrie, with one group seeing an obvious benefit while the other group sees a potentially negative impact. These tradeoffs may also occur completely within a single user's experience. For instance, a user of the GPS Ranger may learn a great deal about the site they are visiting, but this may come at the expense of a sense of exploration or the unknown.

Ewert and Shultis note that some technologies are enabling users to experience outdoor recreation that they may otherwise not experience (1999). In addition, they point out that the information users obtain from technologies has the ability to encourage lower impact recreation, increase public knowledge, and better connect managers and users (Ewert and Shultis, 1999). While the use of technologies may not have all negative impacts, it may open the door to additional changes down the road.

In a paper exploring the potential effects of technologies on the human-nature relationship, Wiley (2005) works to demonstrate the connections between experience and technology. He argues that the use of technologies such as the cell phone effectively connect people to the world they may be trying to escape. Ewert and Shultis also support the concern that technologies may be connecting us to a place we are trying to escape (1999). People visit natural areas, in part, because they are fundamentally different from the place where they live or work. The connection that Wiley argued for could occur simply by hearing a phone ringing or some other electronic noise along a hiking trail or in some other natural area. The

sound or sight of a phone may remind the visitor of tasks or duties waiting for them on return to civilization. Several studies in soundscape management have supported claims concerning unnatural noise, such as those created by electronics, and their disruptive abilities (Anderson and Mulligan, 1983; Mace, Bell, and Loomis, 2004; Monz, Smith, Knickerbocker, 2005; Taylor, Schuster, and Johnson, 2004). These unnatural sounds make it more difficult to achieve a specific experience. The relics of cell phone use (e.g. sounds and visuals) and perhaps simply the presence of the phone may change the setting, which could lead to changes in experience. For now, the ways that the setting is manipulated by cell phones and other electronic technologies have limited empirical tests backing up a collection of theories.

Another concept that Wiley explores is technological mediation versus direct experience (2005). He specifically makes this case with GPS technologies because of the way a GPS filters activities and movement. GPS users may be following an arrow on a screen rather than letting their own choices guide their experience. Specifically, Wiley states that a “user may rely on a GPS to see, interpret, and move through the landscape” (2005). The final argument that Wiley makes is one of knowledge vs. mystery (2005). One feature of a wild place is that there are unknowns, there is room for exploration, and the question of what is around a mountain or over a hill may lie unanswered to a visitor for many years. Wiley makes the case that GPS can instantly answer these questions thus removing some aspects that draw visitors back. Others echo the same concern about knowledge vs. mystery and its effect on experience (Borrie, 1998).

GPS Ranger

As discussed and predicted by Dilworth, new technologies are showing up in parks. One of the most recent technologies that visitors to parks like Cedar Breaks National Monument have access to is the GPS Ranger. Few people have experience with technology like the GPS Ranger and thus the following paragraphs describe the device in detail. Because the GPS Ranger is a proprietary technology, literature describing the workings of the device does not publicly exist. Therefore the descriptions below come from information pamphlets and the researcher's exploration of the device.

The designers of the GPS Ranger describe the device as “a handheld GPS (Global Positioning System) mobile guiding device that can deliver your message to visitors” (BarZ, 2008). Prior to visitors renting the GPS Ranger, content must be created. The GPS Ranger is capable of delivering audio, video, still images, interactive maps, and other types of interactive content. This content is then programmed with specific geographic coordinates that will be used by the GPS Ranger to trigger content to play. Content is also programmed to be offered to GPS Ranger users as “additional information” for GPS triggered content. All the content and programming information is then loaded into the built-in memory of the GPS Ranger.

Inside the visitor center a potential user is first introduced to the device (see Appendix A for an image of the GPS Ranger). The GPS Ranger is meant to be displayed on a rack system looping a video demo of the system. The rack system also provides an internet uplink to keep track of rentals and allows for rapid/seamless content updates. An internet uplink was not available at the time of this study and thus another setup was used. The setup used signs and other displays to describe the GPS Ranger. Furthermore, the researcher or visitor center staff would provide demos of the GPS Ranger to visitors who showed interest.

After paying \$9.95 to rent the GPS Ranger, being informed of a \$500 security, deposit and reading/signing a use agreement the renter was given the GPS Ranger. The four inch display shows a “Begin Tour” button that displays an orientation video when pressed using the touchscreen. The video introduces the user to the touchscreen controls, hold switch, left/right buttons. It also introduces the user to the mapping feature and methods of accessing content. The users then listened to an introductory video of the park. From this point the videos that play depend on the locations the GPS Ranger user visits.

As a visitor walks to viewpoints, hikes trails or drives the roads the built in GPS in the device cues content play. For instance, as a user approaches a viewpoint called “Point Supreme” a video about the formation of Cedar Break's natural amphitheater plays. At the ends of most videos, a screen is automatically displayed that offers the visitor additional content similar to the video that most recently played. Visitors then use the touchscreen to play or ignore the additional information. If the GPS Ranger user only listens to the content that is played automatically for them at CBNM, they had the chance to view 18 videos. The 18 videos totaled 28 minutes in length. If the visitor watches all available content they potentially have access to an additional 32 pieces of content or 26 minutes. A full listing of CBNM GPS Ranger content can be found in Appendix B.

Another way to access the information in the GPS Ranger is to directly access the media files. The designers of the GPS Ranger made accessing the list of files simple and encouraged users to do so in the introductory video. Using this method, the user can open folders containing different topics or the user can access all videos in an alphabetically organized folder.

The GPS Ranger can be rented for the entire day, 8:00am to 5:00pm. However, a limitation of the device is the battery life. The battery life was expected to be around four hours; however, the length depends on the amount of use. To allow for users to get more than four hours of use, a vehicle charging cable could be sent along with the user. The GPS must be returned by 5:00 p.m. the same day it is rented or the user risks being charged a \$500 security deposit.

Summary

Experience researchers have developed powerful methods that can be used to produce a deep understanding of a visitor's emergent experience (Patterson et al., 1998). Further, informal learning has been demonstrated to affect a visitor's experience with parks (Brody et al., 2002). Finally, technology, be it an audio tour or more advanced technologies, can improve visitors' use and enjoyment of informal learning technologies. However, the links between the technology, informal learning, and the visitor's experience are poorly understood and have not been explored in literature. This study begins to fill an ever more important and relevant gap in technology and experience literature by exploring the experiences of visitors to CBNM who use the GPS Ranger portable multimedia device.

CHAPTER THREE: METHODOLOGY

This study was exploratory in nature. An exploratory level inquiry was undertaken since very little research has been carried out on the experiences of nature-based visitors' use of technology. The major tenets of the hermeneutic research approach were used to guide this study. This chapter will describe theory of hermeneutics, its methodology as it was implemented in this study, the study's sample and sampling technique, and the analysis procedures used.

Research Approach

Qualitative research is defined by Strauss and Corbin as research that produces findings not arrived at by statistical analysis or other means of quantification (1990). This description is expanded on by Denzin and Lincoln when they described qualitative research as,

“multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural setting, attempting to make sense of or interpret phenomena in terms of the meaning people bring to them.” (1994, pg.2)

In addition to the definitions above, Lincoln and Guba add that another important component of qualitative research is the interaction with the natural surroundings in which the research takes place (1985). In qualitative research, the context under which an event takes place is important to describing and understanding the phenomena. Lincoln and Guba also describe the concept of investigator-as-instrument as a key component of qualitative research (1985). This is because only a human instrument has the ability to comprehend interactions with natural surroundings and the context of a phenomenon. For this reason qualitative research relies on open interviewing or other flexible means of data collection.

A qualitative approach was chosen for this study for several reasons. First, one goal of this study was to explore visitors experience with the GPS Ranger. The phenomenon of an experience is best represented by a qualitative measure because of its inherent complex nature. The interactions and multiple realities that each GPS Ranger user brings to the study cannot be predicted prior to the study and thus no single quantitative survey could effectively collect the data. People experiencing the same phenomenon can come away with different descriptions of the same event. Qualitative data formats and collection methods aid in capturing this variability. Additionally, Strauss and Corbin (1990, p.13) maintain “qualitative methods can be used to uncover and understand what lies behind any phenomenon about which little is yet known.”

A second reason that a qualitative approach was chosen was based on the limited literature available on GPS Ranger like devices and the impacts that these devices may have on visitor experiences. The GPS Ranger technology was only beginning to emerge as late as 2005. Many quantitative methodologies rely heavily on prior literature and theory to guide the research process. Without a preliminary understanding of the experiences visitors have with the GPS ranger, applying previously established theories of visitor experience could prove inaccurate and misleading. Thus, by using a qualitative approach the researcher was able to effectively explore an emerging phenomenon in a way that could aid in the development or application theory during future studies.

Finally, quantitative studies often use relatively large sample sizes to produce results that can be applied to a much larger population. Collecting a large enough sample of GPS Ranger users would not be possible given two limitations. First, CBNM is the only primarily natural area that uses the GPS Ranger and the park only generated a small number of GPS Ranger use. Second, given the rate of GPS Ranger rentals, the research would have needed to

span several years to collect an adequate sample size to provide reliable and generalizable quantitative results.

Theoretical Framework

Within the qualitative paradigm a number of research approaches can guide the exploration of social phenomenon. The qualitative research approach of phenomenology was chosen to guide this study. Phenomenology seeks to describe the meaning of lived experiences that groups of individuals have surrounding a phenomenon (Creswell, 2007). For example, in this study the researcher is seeking to explore the experiences of visitors to CBNM who use the GPS Ranger. In order to achieve the goal of phenomenology, the researcher looks for patterns in the experiences of individuals. This is done in order to seek out the universal essence of the phenomenon (Creswell, 2007) also referred to as the global understanding (Patterson and Williams, 2001). Creswell maintains that in phenomenology the researcher “write[s] a description of the phenomenon, [while] maintaining a strong relation to the topic of inquiry and balancing the parts to the whole” (2007, pg. 59). The importance of the individual’s experience is a key component of the phenomenological process. The balancing Creswell describes is expanded on by Kvale. As the process moves from a collection of individual experiences to a global understanding the process is not considered complete. Instead the global understanding is applied back to the individual experiences in order to illicit a more complete understanding of the experience (Kvale, 1983). This process has been described as the hermeneutic circle (Patterson and Williams, 2001).

Within phenomenology, there are differing research approaches. This study will be guided by the productive hermeneutic approach. This approach moves beyond the guidelines

of general phenomenology by applying certain commitments. In order to undertake this research approach, the researcher needs to acknowledge and accept commitments of the technique. Hermeneutics is defined by Kvale (1983) as the study of “objectifications of human cultural activity as text with a view to interpreting them, to find out the intended or expressed meaning, in order to establish a co-understanding, or even consent.” The task of interpretation is the first commitment (ontological) of the approach (Patterson et al, 1998). In a quantitative study the participant filling out the survey must interpret how their experience fits into the scales or questions used by the researcher. In a hermeneutic study it is the researcher’s duty to interpret the meaning of interview and contextual data. Instead, Connolly and Keutner describe productive hermeneutics as a system in which the researcher takes a role in identifying the meaning of experiences (1988). Connolly and Keutner highlight a second commitment (epistemological) of the approach; researchers cannot set aside their experiences and prior knowledge. From the viewpoint of productive hermeneutic “the researcher cannot ‘bracket’ their preconceptions nor can they truly empathize with another’s experience” (Patterson and Williams, 2001, p. 12). Bracketing refers to the process of setting aside personal beliefs and experiences in order to obtain a wholly unbiased “read” of another’s experience. A common practice is to bring transparency to the research process by documenting the researcher’s prior experience and knowledge. The description by Connolly and Keutner places productive hermeneutics in the realm of constructivism verses the more classic representation of science as an objective process (1988). Heidegger refers to the previous knowledge and experience of the researcher as the “forstructure of understanding” (Patterson and Williams, 2001, p.13). Each individual reader of the research or data brings their own “forstructure of understanding.” It is important to note that different interpretations

of the same experience exists and are referred to as multiple realities by hermeneutics literature (Patterson and Williams, 2001).

Forstructure of Understanding

The commitments and framework identified above were used as a guide to the research process. One of the more important commitments of hermeneutics is the belief that the researcher's own experiences play a role in their interpretation of the phenomenon under investigation. In regards to this study, the "forstructure of understanding" of this researcher was created through a limited literature review and past experience with technology, natural resource management and national park interpretation.

A literature review was carried out prior to data collection. However it was limited in depth and scope. Specifically, the review identified current methodologies used in national park and wilderness experience research. A limited review was done to limit the impact of previous literature on the researcher's interpretation of interview data thus encouraging themes to naturally emerge from the data. Literature relating to park experiences with technology information behavior, information gathering, and informal learning was avoided until after the analysis was completed.

While undertaking a past research project the researcher exposed park visitors to GPS technology. While the goal of the study was not aimed at understanding the impacts of technology, it was at this time that the researcher became aware of the potential impacts. The researcher is considered by others as a technology expert and commonly uses or is exposed to emerging technologies. Finally, as a student of recreation management the researcher has explored visitor experiences in national parks and other protected areas.

Study Location

Cedar Breaks National Monument (CBNM), in southwest Utah, is located 20 miles east of Cedar City. The site is accessible by Utah Highway 14; however, due to its elevation and heavy snow, accessibility during winter and early spring is often limited. The main feature of the monument is a 2,000-foot deep and three-mile diameter natural amphitheater (NPS Cedar Breaks, 2007). The study area is a NPS managed site of 6,155 acres and ranges in elevation from 8,100 feet to 10,662 feet (O'Dell, 2004). The complex topography and a minimal road system of the study area limit many visitors to a small portion of the eastern third of the national monument. Data collection took place from July 6 to July 31 of 2007. Historically, the month of July averages close to 80,000 visitors to the monument (National Parks Service Public Use Statistics office, 2007). The site offers visitors the chance to view natural and human histories through a visitor center, viewpoints, interpretive exhibits, and hiking trails. This park can be considered mainly a frontcountry park. Frontcountry refers to the developed area of a protected area (in comparison to wilderness-like backcountry). The official trails in the park both contain some level of development. The two-mile Ramparts trail ends in a developed viewpoint that acts to protect visitors from a steep cliff. The two-mile Alpine pond trail is a self guided nature trail with numbered posts marking points along the trail. Like nearby parks (e.g., Bryce and Zion), Cedar Breaks attracts many visitors who are interested in the unique geologic formations of the region. Additionally, the native plants and animals are also popular attractions for visitors. This is especially true during the late spring and early summer wildflower festival that occurred during the study period. See Figure 1 below of a basic site map of the area.

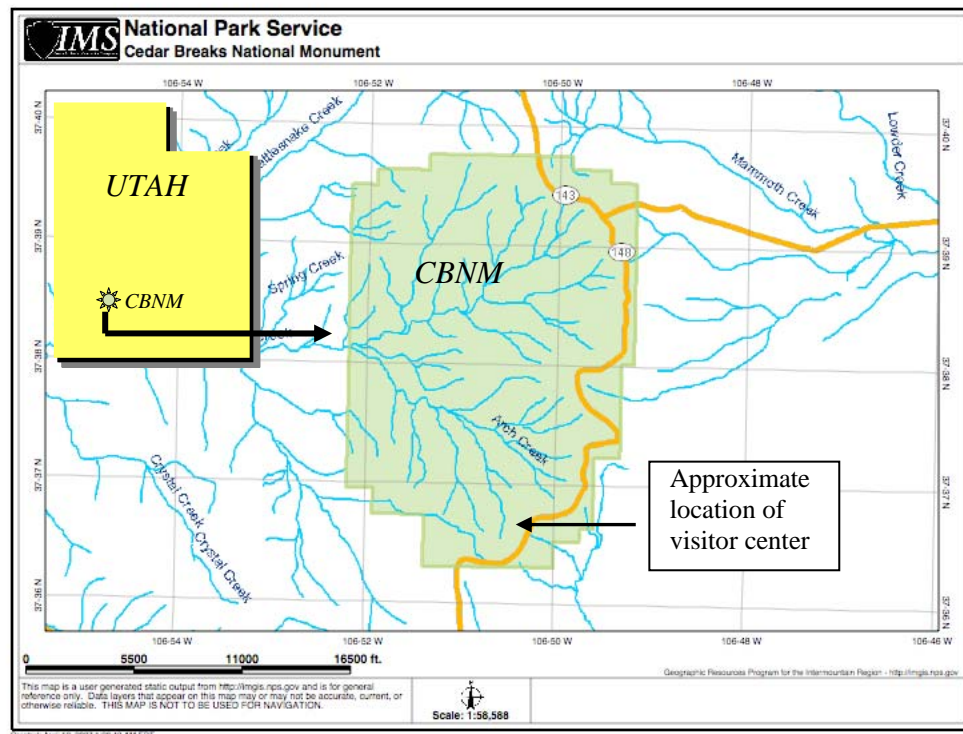


Figure 1: Site map of Cedar Breaks National monument in southwest Utah.

Sample Frame

Qualitative and quantitative studies often investigate phenomenon that are far too large for researchers to gather data from all available points. For this reason, sampling is undertaken to allow researchers to reliably represent a large phenomenon using a subset of its elements (Patterson and Williams, 2002). From this concept, the quantitative paradigm developed the concept of generalizability. Generalizability allows a researcher to apply the characteristics of the subset, or sample, to the entire population. Qualitative studies do not seek generalizability. Instead, these studies collect a sample of the population with the goal of providing transferability (Creswell, 2007). In order to facilitate transferability the researcher catalogues or describes the sample and the circumstances under which the sample was collected in a way that enables readers to assess whether the results of the study can be

transferred to similar phenomenon. The delimitations below describe the criteria that were used to aid in selecting the sample.

Delimitation aid the researcher in selecting interview participants. But more significantly they aid the researcher in defining the boundaries of the study. The primary delimitation of this study is it is exploratory in nature. This limits its theoretical depth, but will aid in future theory-driven investigation. Furthermore, it delimits the depth in the investigation into any one subject, instead directing the researcher to explore the broad meaning of the experience. In order for a visitor to CBNM to qualify as a participant of this study they needed to fulfill the following two requirements:

1. The visitor, or group of visitors, must have used the GPS Ranger
2. The interview must have occurred on the day the visitor used the GPS Ranger

The delimitation criteria ensure that the visitor had a current experience with the GPS Ranger. It was important to immediately interview participants in order to avoid memory decay issues. The researcher was able to interview every GPS Ranger user (27 interviews) during the month long research period. Effectively, this study collected a census of the GPS Ranger users in July. Finally, while delimitations were employed to help select participants, the GPS Ranger users were ultimately self-selected. There was a subset of the 80,000 July CBNM visitors that decided the use the GPS Ranger prior to being selected or invited to participate in the research. Furthermore, the visitors had to be willing to pay \$9.95 to rent the GPS Ranger and to place a \$500 security deposit on their credit card.

Patterson and Williams (2001) note the hermeneutic approach does not specify a single sampling procedure. Further, the goal of this study's sampling procedure was not to interview every user. Instead this study's goal for sample size was guided by the concepts of "data saturation" and theoretical sampling. Unlike quantitative studies, many qualitative

research approaches cannot predict sample size prior to data collection. The concept of theoretical sampling focuses on providing data that will best aid in gathering relevant interview data (Corbin and Strauss, 2007). Specifically, the researcher is guided to locate interview participants that will bring new experiences to the researchers' data set. Data saturation is achieved when new themes or ideas do not emerge with subsequent interviews. Creswell notes that saturation can occur after as few as 20 interviews but may take many more when complex phenomenon are under investigation (2007).

Intercept Site Description

The GPS Ranger was rented from the Cedar Breaks Visitor Center between the hours of 8:00 am and 4:00 pm daily. The visitor center is a small, one-room, log cabin built in 1933 on the rim of the Cedar Breaks amphitheater. Within the visitor center is a small gift shop and a collection of interpretive exhibits. The researcher was stationed in the visitor center from 8:00 am to 5:00 pm seven days a week, from July 6th 2007 to July 31, 2007.

The location was not by choice but rather dictated by necessity. The GPS Rangers had to be rented at and returned to the visitor center. Further, the researcher was interested in the experiences with the GPS Ranger and thus did not want to collect data until after their on-site experience with the GPS Ranger had ended. Site limitations did not permit the researcher to interview in locations free of potential distractions. However, the researcher chose interview locations that would be comfortable to the participant.

Initial contact with GPS Ranger users was made when visitors rented a GPS Ranger. The initial contact was usually made by the researcher. However, at times the visitor center staff would contact visitors. Initial contact often occurred between the hours of 9:00 am and 1:00 pm. The purpose of the initial contact was to inform visitors of the researcher's interests

in discussing their visit after they returned the GPS Ranger. After users returned with the GPS Rangers, they were approached again and asked if they had time to talk with the researcher. GPS Rangers were returned and interviews took place between the hours of 11:00 am and 5:00 pm. Because of the small size of the visitor center, most interviews were conducted on the covered porch of the visitor center. When weather did not permit outdoor interviews, the interview was moved indoors.

Interview Guide

Interviewing, according to Charmaz, is a directed conversation that enables an in-depth exploration of a particular experience (2006). In the hermeneutic approach the researcher takes on the role of “self as instrument” as progressed by Patterson, Watson, Williams, and Roggenbuck (1998). They maintain that both the researcher and interviewee play a role in defining the experiences of the interviewee (Patterson et al. 1998). This study used in-depth, semi-structured interviews to gather data on three components that help to frame the GPS Ranger visitor experience. An interview guide was used to ensure that various themes and meaning were explored with each interview participants. A copy of the interview guide can be found in Appendix C. In the interview process, there are essentially two parties, the interviewee(s) and the interviewer. The interviewer seeks responses to open-ended questions that provide insights into experiences interviewees have with a phenomenon. Using an interview guide allows the researcher to guide the interview in a way that encourages the exploration of new unexpected themes (Kvale, 1983). Because of the emergent and evolutionary process of semi-structured interviews, probing questions that are not included in the interview guide were often used to illicit additional meaning or to clarify participant’s statements.

The first component of the study focused on the CBNM visitor experience. The general focus of this component was to explore the reasons people came to CBNM, and the experiences they had. These broad goals were guided by only a few main questions but supported with a number of more focused probing and clarification questions. The second component explored the GPS Ranger use as it related to the overall visitor experience. This component helped define impacts the GPS Ranger has on the Cedar Breaks visitor experience. The final component of the analysis gathered information on how the GPS Ranger was used by the visitors and their general impressions of the device and content. In addition, some brief demographic data to aid in describing the sample population was gathered. The demographic data helped provide context for the analysis of the interviews. A table containing visitor demographics can be found in Appendix D.

Response Rate

During the study period, 27 individuals and groups fitting the study requirements used the GPS Ranger. None of the GPS Ranger users refused to participate in the interview. Data saturation occurred with 25 interviews. At 25 interviews the researcher began to notice a consistent repetition of themes, but continued interviewing to verify data saturation. Interviews lasted on average 15 minutes and ranged from just under seven minutes to 35 minutes.

Analysis

The interviews collected for this study were digitally recorded with a device similar to a micro-cassette recorder. Following the data collection period the researcher began the process of transcribing the 27 interviews verbatim.

Patterson and Williams highlight the fact that hermeneutic data analysis is centered on the development of an organizational system (2001). The process directs the researcher to interpret the meaning of visitor experience or other phenomenon under investigation. Through the use of the organizational system, dominant themes are identified and used to organize and interpret the data (Patterson et al., 1998).

According to Patterson et al., the process of identifying themes follows these steps. First, the researcher must define their “forstructure of understanding.” Recall that defining the “forstructure of understanding” is a way of describing pervious knowledge and experiences that the researcher has had that may impact the researcher’s viewpoint. Classically described as researcher bias, the researcher’s previous knowledge should be critically explored and catalogued. However, in agreement with the commitments of hermeneutics, they should not be ignored or bracketed. Thus defining the “forstructure of understanding” does not bracket or remove bias but instead gives readers of the research important background that may have guided the research. With that said this study identified the “forstructure of understanding” earlier in this chapter and did attempt to balance the researcher’s possible bias towards technology by seeking out both positive and negative user experiences with the GPS Ranger technology. The second step is to read the narrative several times in its entirety to develop an in-depth comprehension of its contents. The third step is to use the perspectives gained from reading the entire narrative to guide a deeper understanding of the individual cases. The last step applies insights generated by step three (individual)

back to the entire narrative. This is the “hermeneutic circle” as it is used to understanding the themes occurring on the idiographic (individual) level (Patterson, 1998). A similar process is then applied at the nomothetic level to identify important themes that are consistent across individuals.

To aid in the process described above the interviews were loaded into a qualitative data program, called QSR Nvivo 7.0. The computer program aids in the organization and development of themes within data, it is not used to automate data analysis.

Limitations

All research methods and approaches have limitations. This study relies on human memory, or recall, when interview participants describe events that happened in the past. While the events being studied all happened within a short time period of the interview, this is still a limitation of the study. Additionally, in American society, technology is seen as a tool that everyone should be able to use. The term “technologically illiterate” is often used to describe those who have problems using high tech devices. Therefore, the social desirability of being able to use technology may affect participants’ description of problems they had with the GPS Ranger.

As one reads the analysis section of the report it may be observed that the majority of interview comments in this document are from male participants. The researcher identified this issue early in the data collection process. The impacts of this trend are unknown and cannot be predicted. However, the cause is likely related to the way that visitors were required to pay for the GPS Rangers. Men were more likely to use their ID and credit card to rent the device and the same ID was needed when the GPS Ranger was returned. Thus, men were more likely to return the GPS Ranger and participate in the interview.

Sample size is usually not discussed as a limitation of qualitative studies. While the 27 individuals that participated in this research contributed to a powerful and rich exploration of experiences, it should be acknowledged that this is a very small percentage of July CBNM visitors (about 80,000 individuals). The participants represent some subset of all visitors and because this study did not seek to categorize the GPS Ranger users, it is difficult to describe where they fit within the spectrum of visitors.

Validity could also be considered a limitation. However, steps were taken during the data collection stage and analysis of the data to improve the validity of the results. Creswell recommends that qualitative research employ, at minimum, two validation strategies (2007). The primary validity check was the clarification of researcher bias or forstructure of understanding. External audits were additionally sought during the development of themes. During this process an individual not involved in the data collection independently read and coded interviews that the primary researcher had previously coded. The results of the auditor's reading were then compared to the researcher's to check for inconsistencies. A final validation check was the use of member checking at the data collection phase. Specifically, the interviewer would seek clarification on important points by using probing questions or by repeating statements back to the participant to ensure they were understood correctly.

CHAPTER FOUR: RESULTS/DISCUSSION

The results and discussion chapter is organized into exploring the three main components of data collection. In the first section, the Cedar Break National Monument (CBNM) visitor experience is explored. Section two looks more closely at experiences visitors had with the GPS Ranger. The final section explores the use of the GPS Ranger.

To understand the experiences visitors had at CBNM, a series of questions were asked of interview participants. Their responses were reviewed and coded to aid in the development of themes and sub-themes to describe expected and actual experiences interview participants discussed. Specifically, this first section answers the following questions:

1. Why did the participants visit Cedar Breaks?
2. What did visitors who rented the GPS Ranger expect to experience before visiting Cedar Breaks?
3. What experiences did participants have during their visit?

Section two will answer questions about experiences users had with the GPS Ranger. The questions explored in this section were:

1. Why do visitors choose to use the GPS Ranger?
2. What experiences do users describe having with the device?
3. Do visitors perceive their experience or behavior as being changed by using GPS Ranger?

Section three investigated the use of the GPS Ranger by visitors. This section differs in that it more explicitly focuses on issues or problems visitors reported having with the GPS Ranger. Additionally, it provided an exploration of how visitors used the device and answered the following questions:

1. How was the GPS Ranger used by visitors?
2. What issues did GPS Ranger users have with the device/technology?

Each section represents the range of responses that participants provided using verbatim quotes from interview transcriptions. The quoting and comments are used in such a manner to create a narrative. The narrative acts to tell the story of the GPS Ranger users. Typically, rather than presenting the reader with a list of responses to the above questions, quotes that best represent the trend were presented by the researcher. In addition to presenting the responses appropriate to each section, this chapter will also briefly discuss the importance of the interview participants' responses. Finally, in each section, the reader will be exposed to the general themes and insights the researcher found within the data. The themes (appearing in **bold**), also called categories, are "higher-level concepts under which lower-level concepts are grouped according to shared properties" (Corbin and Strauss, 2007, p. 159). The names of interview participants presented in this section have been changed but the genders have been maintained. Also, each participant's pseudonym is consistently used throughout the document. When reading interview comments note that conversation strings occur in blocks of text and blank lines denote different interviews.

Readers may also note that many of the quotes used in this document are positive. The researcher sought out negative experiences that users had with the technology by specifically asking about problems with the technology during the interview. This line of questioning did identify problems that users had, but users did not describe them in a negative light. There are other explanations that may help explain the overwhelmingly positive descriptions. First, visitors did actually have very positive experiences. The GPS Ranger technology has been implemented in other locations ensuring that most programming or design issues have been solved. Additionally, the GPS Ranger content was professionally produced and visitors often described it has high quality. A second factor that could have influenced people's responses was cognitive dissonance, or theory that the human mind

filters information that does not reinforce one's beliefs (Harmon-Jones and Mills, 1999). A final factor that could have impacted the users' descriptions of experiences is social desirability. Users may have felt as though the researcher wanted to hear positive description and thus minimized the negativity of some of their issues with the GPS Ranger.

Cedar Breaks National Monument Experience

Why do people visit Cedar Breaks?

In 2007, the National Park Service estimated 514,871 recreational visitors to CBNM (National Park Service Public Use Statistics Office, 2008). Travelers stop at CBNM for a variety of reasons. Based on the interview responses, GPS Ranger users can be divided into **pass-through** visitors and **destination** travelers. When asked about their stop, participants stated:

Sara: Well, it was on our way. We were at Bryce [Canyon National Park] and we were on our way through, sort of making a U-turn and tomorrow we'll head back up to Salt Lake City to catch our flight out and so it was on our way.

Another visitor commented:

Drew: Well, we're coming to the Shakespeare Festival over in Cedar City and we were driving by and we decided that we had some time and decided to visit. We've been here once many years ago.

The above quotes capture a significant portion of the interview participants "reasons for stopping." Specifically, Sara was visiting a nearby national park and decided to stop off at CBNM because it was nearby. She represents the typical **pass-through** visitor. Drew highlighted a different set of attractions to the region, but also falls into the **pass-through** category. He was on his way to the nearby town of Cedar City for the annual Shakespeare Festival and took the afternoon to visit CBNM. As part of the "Grand Circle," a collection of

southwest national parks and monuments, CBNM draws many visitors who listed Cedar Breaks as one of their many stops. Anne represents this type of visitor:

Anne: ...we came to Utah to see all the National Monuments that we could see in three weeks.

Similarly, Ed and Beth described their stop at Cedar Breaks as one of many stops in the region.

Ed: ...we have done the Grand Canyon so to speak, and we were at Zion, and wanted a change from the heat...and we are not sure where we are going from here.

Beth: But we have to make it back to Missouri by Sunday.

Ed: We might go to Capital reef.

Walter: We're just tourists from New York. You know, we'd never been here so we wanted to do some touring. [We are visiting] all the things, Zion, Bryce, everything.

It was not as common to hear about Cedar Breaks as a vacation **destination**.

However, there were some visitors who described CBNM as a **destination**. Cedar Breaks provides a good escape from the heat of much of the southwest because it is located at the top of a 10,000 foot plateau. The cool temperatures create opportunities for people to escape the heat, and it also makes for spectacular early summer wildflower displays. Doug had visited the site “four or five” times in the past from Arizona. When asked about why he came to Cedar Breaks, he responded:

Doug: Basically, because it's a great place, but I also wanted to get away from the heat.

While Doug drove over 400 miles from Arizona to spend a week at the park, long distance **destination** travelers were rare. The wildflowers and geologic features attract another type of **destination** traveler. Many visitors traveled from towns or nearby **destinations** on **side trips**. To Nick, the monument was the end point of a short side trip. Another visitor, Renae, stopped for very similar reasons. They described the reasons for stopping this way:

Nick: ...We're at the Shakespeare Festival and my dad has been around in the area a whole lot...we just decided that since we didn't have an afternoon matinee to go see, we thought, "we have the afternoon, let's go up to Cedar Breaks."

Renae: we came up last year and wanted to come back because the day that we were here, about the same time of year, it has howling wind, about 50 degrees with a 50 mile per hour wind. We thought, we were coming back down to Cedar City to see some plays and so we just wanted to come up and experience the park on a nicer day.

Adam: Just little quick trip up. We were going over to the Shakespearean Festival...

Stan and Eleanor described themselves as full-time travelers. When they were intercepted for this study, they were on their third visit to the park. They were spending time in Cedar City and later moving on to Bryce Canyon National Park. On their second visit to Cedar Breaks, they fit into the **destination** category. Meaning they were attracted by the scenery of CBNM. While on their second visit they saw the GPS Ranger in the visitor center, but due to bad weather conditions they were unable to rent the GPS Ranger. Several days later they returned to the site specifically to rent the GPS Ranger. They commented:

Eleanor: We've been here, about 20 years ago.

Stan: About 20 years ago, and we were here last week.

Eleanor: And it rained.

Stan: And I said, "that [GPS Ranger] looks like fun." And my wife, knowing that I am a gadget geek, said, "Let's go back and do it again" and I say "okay, if I have to." So we came up specifically to try that [the GPS Ranger] out.

Stan and Eleanor's story is atypical, but it demonstrates powerful interest in the device. Additionally, while the purpose of the day's visit was to use the GPS Ranger technology, their experiences at the park were not focused on technology. Instead, the experiences Stan and Eleanor expected to have on site and the actual experiences they described having were similar to other visitors' experiences.

What do visitors expect to see and do at CBNM?

Cedar Breaks offers visitors the chance to view significant geologic features and a unique ecosystem. The majority of the park is comprised of a large natural amphitheater. Along the rim of the amphitheater is a scenic drive that stops at several overlooks and accesses two short trails, a visitor center, and picnic area/campground. The high elevation permits a unique ecosystem to thrive in Cedar Breaks. These factors play an important role in providing visitors to Cedar Breaks with the opportunity to view an array of wildflowers unmatched in the region. The annual wildflower festival attracts visitors to the site by advertising botanist-lead hikes and viewing opportunities. CBNM also offers its own ranger-led interpretive walks and programs.

The most commonly described expectations focused around viewing the **setting** (geology, wildflowers, and wildlife). Other visitors came mainly to take part in **activities** such as hiking. Sometimes visitors mentioned both the **setting** and the **activity** categories. Visitors also described **learning** as something they expected to do while in CBNM. In the following paragraphs GPS Ranger users' comments will be explored starting with visitors who claimed to have no expectations, followed by expectations about the setting, activities and finally learning.

Some visitors arrived with very general expectations of the type of experience they wanted to have. For instance, Seth arrived at the site claiming to have no expectations. He said:

Seth: I didn't really have any expectations - on the map it is just a small blip. So it looked like something small, kind of out the way, that most people would not come to.

As he traveled between Zion and Bryce Canyon National Parks Daniel, from Norway, reported having no expectation about CBNM.

Daniel: We didn't expect anything. We saw the forest and we thought, "this looks boring" but then we came and saw that this [the amphitheater] is beautiful.

Arriving in a "blank slate" condition was uncommon. However, in the cases where it did occur, the interviewees were surprised at what the CBNM had to offer. It was more common for visitors to have some general knowledge and expectations of the area. Nick's expectations were similar to those of most other visitors.

Nick: Was expecting to see red rocks, as always, wasn't quite expecting to see the wildflowers which is very much a bonus point.

Walter: Just really the canyons and the geology and all that stuff. Just a little bit of wildlife.

Nick's and others knowledge of the area was limited. He knew something about the geology. However, he may have just alluded to the fact that red rock is common in Utah. Similar to Nick's description, it was common to hear people describe their expectations for CBNM's **setting** to be similar to Bryce Canyon National Park.

Ed: What were we expecting? (To Beth)

Beth: High altitude, hoodoos, somewhat like a mini-Bryce, but at very high altitudes.

Greg: I expected it to be somewhat like Bryce. You know, it reminds us of Bryce.

Their first comments focused on the **setting** of CBNM. Ed then quickly added the **activity** of hiking:

Ed: Some hiking... it is not that the formations are new - we just enjoy the country side.

Having previously visited CBNM, Stan and Eleanor's past experience played a role in determining their expectations for this visit.

Stan: Just the scenery.

Eleanor: Amazing scenery. We hoped we would see more animals, but we're here at the wrong time of the day for that though.

Stan: We wanted to try out the road, see how that was. It's pretty nice now. It's better than it used to be.

A family that had also been to the park in the past described the powerful winds that kept them from getting near the rim of the amphitheater and the setting attributes that attracted them to CBNM.

Renae: We wanted to see the flowers. And also to get a better look at the geology when we could get near the cliff edge without feeling like we were going to get blown over.

In the quote above, Renae's comments focus mostly on **setting** attributes such as the geology and wildflowers. The daughter added to the list of setting expectations and tied in the third category of **activities**.

Danna: I wanted to have a nice relaxing sort of half day hike, but I wanted to see a..., what are those things called?

Renae: The pikas. So a little bit of wildlife, a little bit of flora and fauna, just a nice easy hike. We didn't want anything strenuous.

Cedar Breaks is not a popular hiking destination. Most of the park is inaccessible to hikers due to the dangerously steep terrain and loose rock of the amphitheater. Hiking was only described as an expectation by three of the 27 interview participants. With most people stopping as part of a pass-through trip, visitors may not have expected to take the time to hike any of the cedar breaks trails even though most ended up doing so.

The theme of **learning** was not described as an expectation by many of the GPS Ranger users even though CBNM offers a range of learning opportunities to all visitors.

Ned: My wife hasn't spent as much time in the outdoors, she's been raising the family so she's more interested to find out more. So, just kind of educational.

Drew commented that having seen the geology in a past trip he expected to **learn** more about them.

Drew: Well, I just remember the beautiful vistas and the red formations and I wanted to know, you know, more about that. How it was formed...

Within the park there are four means through which visitors are exposed to informal learning opportunities. The visitor center contains a small collection of exhibits about the geology and is open to visitors from 8:00 a.m. to 5:00 p.m. At scheduled intervals throughout the day, park interpreters give talks on a variety of topics. There are no interpretive signs along the trails or at the viewpoints. However, the Alpine Pond Trail does have a brochure-guided nature trail. The final option is the GPS Ranger. All interview subjects used the GPS Ranger and even though most did not describe learning as an expectation of their visit, most later described learning as an activity they experienced at CBNM. Next, user experiences at Cedar Breaks will be explored.

What experiences do GPS Ranger users have in CBNM?

Putting learning aside, GPS Ranger users' expected experiences and realized experiences were generally very similar. Cognitive dissonance, the theory that the human mind filters information that does not reinforce one's beliefs, may explain some of the similarities between expected and realized experiences (Harmon-Jones and Mills, 1999). This is especially true given the method of data collection which only collected interview data at the end of the GPS Ranger users' visit. The most common experience themes were **wildflower-viewing**, **hiking** and **wildlife-viewing**. These themes were closely followed by a third theme, the **GPS Ranger**.

Typically, visitors were impressed by the wildflower display and landforms.

Ed: To me it [experience] is pretty much as I expected. I had heard about the wildflowers and it was better than what I had expected.

Beth: And some of the most outstanding bristlecone pines I had ever seen.

Beth: [And] The altitude still hit me.

Ed: The vistas out there. It is great to be able to look down out there and see that contrasting terrain from high alpine to desert ...and also the wildlife.

Nick: We just did hiking. We did Inspiration Point and we went up and did the lake trail... we drove the whole road...we saw the chipmunks, lots of wildflowers.

Doug: Mostly this time, just hiked around and watched the wildlife and the wildflowers are really great up here. I hiked out to the bristlecone.

Cedar Breaks' size and easy hiking trails help to improve the likelihood that visitors will see most of what the park has to offer. Linda had only been at Cedar Breaks a few hours and she had already been exposed to much of what the park had to offer.

Linda: ... I haven't really had a whole lot of time to do much. But I went hiking on the trails and used the system [GPS Ranger] and it was nice to know what kind of rodents and birds and plants I was seeing. It was nice to know why things were colored the way they were. I didn't really know why that was.

In Linda's description of her experiences she describes **hiking** and **wildlife-viewing**. She also described using the **GPS Ranger** to learn about the geology, wildlife and plants she saw on her hike. Because the GPS Ranger is intended to provide learning opportunities to visitors, many users reported learning from the GPS Ranger as part of their experience.

Danna: I was consumed in this [GPS Ranger]

Renae: She really enjoyed the GPS Ranger so I think that definitely added to her enjoyment. I think we definitely got what we were coming for. Just a nice hike, some good... decent views. It is a bit smokey, you can still see. And the flowers!

Later, Danna's parents described her experience with the GPS Ranger as "data mining." A family of seven described their experience with the GPS Ranger in a more common way.

Scott: Well, we just got here today and you know, it's raining. We visited all the turnout spots, watched the video[on the GPS Ranger], and so that's it, we've just been here a few hours.

In Scott's case, and most other GPS Ranger users' cases, the GPS Ranger was a small component of how they explained their experience. In contrast, Danna's experience at the park was the GPS Ranger.

Visitor Experience with the GPS Ranger

Why do visitors rent the GPS Ranger?

People rent the GPS ranger for two reasons. The first is to **learn** more about the area. The second and less common reason was curiosity about **technology**. Visitors generally arrived with only general expectations of what the site offered. However, GPS Ranger users tended to be curious about their new surroundings and used the GPS Ranger to help find information about the site. When asked why they rented the GPS Ranger Anne and Tucker described **gathering information** as something they normally do when they visit new places.

Anne: To see if we could get more about the geology and the plants.

Tucker: When we travel, one of our major impetuses is to try to learn something about the area, culture, history...

Anne: Geology...geography...

Tucker: So we thought this would be a really good opportunity. It's like taking an audio tour in a museum. You know, we do that in almost every museum we go to. So this was like that so that was an attraction. When I saw this, the first thing that occurred to me is oh, this is just like the audio tours!

Nathan and Renae chose to use the GPS Ranger for similar reasons. The GPS Ranger also allowed them to avoid groups. They had taken part in a ranger guided tour where another visitor "hijacked" the ranger.

Nathan: We like these....

Renae: We like stuff like that.

Nathan: We go to museums all the time and get the little...

Rena: We love audio tours and especially like the self guided component of it. Like, because I love information but I don't always love ranger guided tours. I love ranger campfire programs and little campfire programs. But I like to go at my own pace.

Nathan: Yeah, you get to go at your own pace instead of having to wait for a ranger talk and sometimes people take over the ranger talk.

Ned and Alice were interested in using the GPS Ranger because it helped them achieve their expectations for the trip.

Ned: Well, we like to couple education with our trips a lot. We usually go to the center and look at the movies and stuff like that, trail guides, and so that [GPS Ranger] was kind of what was available so we decided to try that.

Stan and Eleanor returned to the park specifically to try out the GPS Ranger. Stan originally described his love of new gadgets as the driving force behind returning to the park. However, probing questions revealed that technology was only one motivating factor.

Stan: Yeah, yeah. And we like National Parks, that's our big thing and we like information. But I'm one of these guys that has to stop and read every single sign and go on every single nature trail and I wanted to see what kind of information that you had and how the gadget worked.

The informal learning opportunities available at Cedar Breaks are limited. If ranger talks are not available, the GPS Ranger is the only available substitute for much of the park. For visitors on a tight schedule (passing-through), the GPS Ranger served as a **convenient** replacement to ranger-lead activities. Aaron, who was traveling between Cedar City and Las Vegas on business, rented the GPS Ranger for this reason.

Aaron: ...I always enjoy doing a ranger tour or learning more about an area. And I thought since there wasn't a ranger tour that was available, this would be a good option. And it was a chance to experiment with the technology.

Rob and Jen were also unwilling to wait around for a "live ranger". Additionally, they discussed the ability to escape the crowds of a tour group.

Rob: It looked kind of interesting. It's got more of the detail of how it was formed and what we were actually looking at.

Jen: And rather than just like a drive by tour, we actually get to kind of slow down and learn a little bit about it as well.

Rob: Yeah, plus we weren't going to hang around for a ranger...a live ranger or...

Jen: Or wait for a tour where you have a bunch of people. We just kind of wanted to explore...

Rob and Jen were not willing or were unable to wait around for a ranger. They described a time **constraint** that restricted their choices. They also described the **convenience** or flexibility of not being in a large group.

Additionally, Aaron illustrates another reason that some chose to use the GPS Ranger. They were curious about the technology. The GPS Ranger has a “**cool factor**” that was at least partially responsible for several rentals.

Beth: It was kinda cool.

Ed: We were curious. It was a toy. It is something that appeals to all ages, adults, middle aged child like me, and the real children in there (gestures at kids in the visitor center).

Another visitor, Adam was similarly attracted by the “**cool factor**.”

Adam: Try it out! Something new!

Adam: Also, I figured we could learn more about the park, which we definitely did.

Whether the visitor chose the GPS Ranger because it was something they **normally do**, it circumvented some **constraint**, or because it had a “**cool factor**,” there is a consistent over-arching theme that describes why visitors use the GPS Ranger. Curiosity for new information (learning) about the site and about the technology is found within each of the interview participants' responses.

How do visitors perceive the GPS Ranger changing their CBNM experience?

The curious visitor who rents the GPS Ranger can access over an hour of content. In doing so, visitors are exposed to informal learning opportunities that change their **experiences** and, for some GPS Ranger users, their **behavior**. As an example of the GPS Ranger's ability to change behavior, Eleanor and Stan visited the site specifically to use the GPS Ranger. This quote was used earlier to describe what had attracted them to Cedar Breaks, however, it also demonstrates changed behavior.

Stan: And I said, oh, that [GPS Ranger] looks like fun. And my wife, knowing that I am a gadget geek, said let's go back [to Cedar Breaks] and do it again and I say, "ok if I have to." So, we came up specifically to try that [GPS Ranger] out.

Their **behavior** was changed in other ways because of the GPS Ranger. For instance, as 5:00 pm neared, they were forced to return to the visitor center to avoid being charged a \$500 dollar deposit.

Stan:...our first inclination was to go in through the park and out the other road. But when we got that [GPS Ranger] we had to come back because as it turned out we had to return it.

All GPS Rangers had to be returned to the visitor center by 5:00pm the day rented or visitors risked being fined. If the park were larger, this could have become an inconvenience for visitors.

Finally, the GPS Ranger gave Eleanor and Stan a reason to return to the Cedar Breaks area and changed their **experience** by helping them to learn about the wildflowers.

Eleanor: It helped us identify flowers that we didn't know.... And we didn't have a book with us so that was very very helpful.

Stan: We found out about the road to the top [of Brianshead Peak] which we didn't get to do but...

Eleanor: Yeah, another time, we'll have to come back.

Stan: Yeah, we'll put it on our list.

Linda described the learning experience as surprising and convenient. Her comment below captures the timeliness of some of the GPS Ranger content.

Linda: Well, as more information came up I was more interested.... And the marmot was cool cause they came up right when I was looking at them [the marmots]. Because at first I thought they were just the fat squirrels but then it [the GPS Ranger] popped up about the squirrels and I was like, "that makes sense."

In respect to how she believed having the GPS Ranger changed her experience, she said,

Linda: I thought it was a really helpful little tool. Especially if there are no guided tours available. I think it is really helpful. It answered a lot of mental questions that I probably wouldn't have asked anybody.

Linda described the GPS as answering questions that she would not have asked anybody. Furthermore, much of the information presented by the GPS Ranger is unique to the GPS Ranger and not available in other mediums. While this was not consistently discussed by participants, it brings up an important ability of the GPS Ranger to remove barriers to learning. Barriers related to time restrictions and the barrier of being uncomfortable asking questions are no longer present for the visitor.

Others were curious about the information they might find in other areas of the park. Nick came just for a brief stop but ended up spending much of the afternoon at the park.

Nick: I definitely think it [the visit] was more in depth and more informative.

When reminded of an earlier statement when Nick said that he and his dad were only there for a short visit he went on to say,

Nick: Yeah, that kind of did encourage us. It was like oh, here's this option; let's go try it out on the trails and stuff.

Thus, for Nick the GPS Ranger provided him with a reason to stay at CBNM for longer than he originally intended. Ed compared the way his family normally reacts to finding an unknown plant or animal before the GPS Ranger to how they reacted with the GPS Ranger.

Ed: When you don't have this kind of thing available to you, you say "when we get home we have to look up that flower on the internet" and then you space it because you never do it. But here you have your "internet" resource, I know it is not internet, but you have your resource right there, it like "Ok, let's pause and see what this flower is."

The GPS Ranger provides nearly instantaneous access to many of the questions visitors often bring up while visiting CBNM. Ed's comment above resembles the comment made by Linda when she said that the GPS Ranger answered mental questions. Ed then discussed how his family actually hiked differently because they never knew when information would be displayed.

Ed: ... she is obsessed about reading every word when we go on hikes!

Beth: Ha!!! Thanks!!!

Ed: YOU ARE! But the nice thing was you know we could keep walking and listen to this stuff! Which is a great feature. It cuts down on the family frustration level.

Ed's answer to an earlier question adds to the clarity of how the GPS Ranger changed how they hiked as a group in CBNM.

Ed: Well, we just walked and when it triggered it was like "Oh, the noise! lets pause." I mean at first, because when we hike we generally spread out when we hike and kind of go a little bit at our own pace. And so I think that we were a little more aware about me calling out " Ho!, there is something coming up!" and everyone would gather around and I'd crank up the volume so everybody could hear it.

Curious by nature, these visitors found the GPS Ranger extremely useful and the information fulfilling. However, because they focus so much on learning, they **behaved** in a way that made hiking and driving potentially dangerous. Recall Danna's description of her experiences at CBNM. Some were so focused on the screen of the GPS ranger that they risked falling on uneven terrain.

Danna: I was consumed in this [GPS Ranger]

Her mother later commented:

Renaë: ... she was pretty obsessed with it. I was a little worried about her tripping on the trail.

Danna: I was looking down!

Renaë: I know but, it is just one of those things. You have to watch where you put your feet.

Additionally, others would concentrate on the information that the GPS ranger was providing so intensely that they would walk along dangerously steep cliffs without even knowing it. Ed and Beth pick up on this issue. Referring to a section of the Spectra Point Trail that winds along the rim of the amphitheater, Ed walked looking at the screen of the GPS Ranger. On the return trip he realized the danger he could have put himself in.

Beth: We did notice that it is not safe to necessarily look at the GPS as you hike.

Ed: No! This is a serious issue!! When we came back we realized that the first part of the walk is on pretty loose limestone stuff out there. We didn't realize that going out because I was personally focused on the machine rather than on the trail. And it worked ok here but on a more precarious trail it could be an issue!

Ed: There were times honestly, where I was more focused on the machine, enjoying it, than I was at actually looking at the stuff off to my right.

Another GPS Ranger user had similar **behaviors**.

Linda: It was funny, cause I was trying to watch it and pay attention I kept tripping. So I just listened to it.

The same effects were observed by drivers as they navigated from one side of the park to the other. They often commented that they were forced to divide their attention between the road and the information.

Aaron: It was a little distracting when I was driving. Because I would have liked to have had a place to pull over and also view what was on the screen during the narration.

Stan had a similar experience.

Stan: And it's kind of distracting when you're going down the road. I found out it makes me drive slower because I want to hear the stuff that is going on and I'm continually doing this[imitated a double take], you know, which I shouldn't be doing so I tended to... I think the pop up should pop up in parking areas because if you pull into a parking area and something pops up, that's a little bit better than when you're going down the road.

Finally, Ned described the distracting nature of the GPS Ranger as competing for his wife's attention.

Ned: It was interesting, my wife really likes education but she actually, it was her first time, so she was so busy looking [at Cedar Breaks] that it [the GPS Ranger] was actually distracting. So she said that she would have preferred watching something before or after and then just having audio that she could refer to.

Ned commented that his wife eventually gave up dividing her attention and listened only to the audio and checking the screen when she heard something interesting. The dangers inherent in not paying attention to the setting while moving are obvious. Even if the liability of injury falls on the users, the image of the GPS Ranger putting visitors at risk could cause the NPS's support of the device to be pulled. In an attempt to minimize this type of behavior, the first video that runs on the GPS Ranger warns against such behavior. It is obvious that this warning was not heeded by visitors. Likely, part of the problem was the placement of the video at a time when many users were excited about starting a hike using the GPS Ranger.

While the device did tend to captivate some individuals, most users' experiences were still focused around natural elements of the setting. Viewing the geology, wildlife and wildflowers were commonly discussed as major components of their experience. **Behavior** changes (i.e. returning to the site to hike, hiking differently, etc.) were described by many of the visitors who used the GPS Ranger. However, changes in **experiences**, specifically learning, were more consistently reported by the GPS Ranger users.

GPS Ranger Use

How did GPS Ranger users find content?

The GPS Ranger is built to automatically display content to visitors based on their location. However, by using menu options, all the media can be accessed and played independent of the location. Visitors do not have control of the automatically displayed content but they can choose what videos to watch using the screen-based menu. Nearly all visitors who rented the GPS Ranger used both methods to access content. A portion of the visitors labeled **searchers** eagerly went through every video to make sure that nothing was missed.

Jen: Once we got to the end, we went through the list and made sure there weren't any things that we kind of missed.

Stan: Oh, we listened to the things that popped up as we go down the road and the trail. We looked up a couple of flowers. And then while I was running about to get the car and so I could get my \$500, she sat and went through some of the other things.

Danna: Sometimes I let it pop-up and if I already saw it I would play it again if I didn't understand it.

Nathan: Mostly I think she went mining for it.

Danna: Yeah

The opposite of the **searchers** are the **observers**. Unlike the searchers, the observers relied on GPS to provide them with all the content they watched. For some, this meant that they only saw a few videos.

Walter: I didn't really use it much except for when it turned on it gave us a bit of an image. I used the GPS thing, you know, just to play with it, you know. But we had a map anyway, it's not that complicated.

Walter only used the passive pop-up method to view content.

Walter: Yeah [we relied on the pop-up method] exactly. It was good. We got two or

three good ones. We were interested about the spruce beetle attacking all the trees. We heard about that and about the peak that's actually outside the park...

Relying purely on the GPS to deliver content was rare and only two visitors reported only being **observers**.

What problems did users indicate with the GPS Ranger?

In general, most visitors were very happy with the GPS Ranger. Out of the 27 interview participants 17 considered renting the GPS Ranger on a return trip. Additionally, visitors described the quality of the content as “very good.”

Nick: The content? I thought it was very informative, very clear, easy to understand. It wasn't too involved in terms of, I would say, it was a good amount of detail, without being too much...

And also,

Ted: Quality was great. Well said and everything.

Nick and Ted both had very typical reactions to the GPS Ranger content. However, it was common to hear users describe situations where they thought content should be available when it was not. For instance, at the end of the Spectra Point Trail is a collection of bristlecone pines. The trees are actually an important feature of the park but there is no mention of them in the GPS Ranger.

Woman: There was one time where we were specifically looking for information of the bristlecone pine, and I was VERY surprised that there wasn't a segment.

The **lack of information** was an issue for others who rented the GPS Ranger. It was not so much of a problem that they disliked the GPS Ranger, but it was something that was described over and over by users.

Nick: We kind of got used to them [content popping up]. They felt a little sparse at times, and so ... on the trail as we started to get more and more comfortable with it ...we started craving more and more information.

Drew: ...We really liked the bristlecone pines. We had several questions about them. It seemed like, I didn't see the answer on the GPS Ranger.

Seth ... I was expecting a lot more. I really thought... even something about the water tower. Why the water tower is there. There is also a little house along the side of that trail. Nothing about that.

GPS Ranger users found many gaps in the content. Birds were not included in any of the content, which was quickly and consistently identified by interview participants.

Nathan: Um, saw some insects at the alpine pond and some fish but I couldn't find any information on the insects or the animals.

Danna: You really do need birds.

Rena: The birders of the world want birds!

Tucker: Yeah, that's the one thing I noticed that there is not enough, well, almost nothing on birds.

Anne: And there is a lot of interesting birds here for people that are in this area.

Tucker: The forest is alive with birds and it's so difficult to identify them. And since this is an audio as well as visual, maybe you could put songs of the birds on there?

That would be very attractive to people. Like to see the picture and hear the song, they couldn't maybe see it, but they could hear that song.

Anne: Because, you know, like for me, it would have been even more exciting if there had been more detail specific to Cedar Breaks, so you could really identify the flowers or really identify the birds.

Eleanor: Well, we witnessed hummingbird wars this afternoon. They were really after it. You might want to include some of the birds in the area because several people we met were talking about the birds they were seeing. I can't think of anything else.

Not all interview participants requested in depth-video content. Some wanted simple forms of information, like elevation.

Daniel: There should of been more altitude than just one point of altitude.

Stan: It would have been nice if there was a description of the trail. It should have said don't use the lower loop, use the upper one!

Of the 27 interviews, seven believed that there should be additional detail on the content that existed. Some acknowledged that for the average visitor, the level of detail was appropriate.

Adam: I thought the content was very good. Getting used to it for awhile, there could have been more content. A person that's here for a couple of hours like we are today, there's more than enough in there. But if you were going to stay longer, even more information... like for instance, on the flowers, there was one called the mountain death camas, but it didn't explain why it was called mountain death, so an explanation on some of those things would have been nice.

Drew: my own preference would be a little more depth in the flora and fauna and I don't know how hard it would be to...it would probably be pretty hard...to put some kind of search tool in.

While watching content, the GPS Ranger users were sometimes cautious of **disrupting** others around them. This was also a worry of some NPS staff members. A headphone jack was requested by the NPS to allow users to listen without disrupting others. However, most of the GPS Ranger user groups were composed of groups of 2 or more (See Appendix D for demographic data)

Andrea:...we go to the overlooks, there's a lot of wind so even when you have it on the highest volume it's hard to hear. And also, we found.., like we were disturbing other visitors. Sometimes they just wanted some peace and quiet as they looked out.

Jayne: Well, we had it up kind of loud so I kind of felt that when we were around people to turn the volume down because I don't know, I think some people just want quiet. I think. Nobody made a comment, but in my head I felt oh, we better turn the volume down.

Adam: ...we didn't have the volume all the way up because we didn't want to disturb people around us.

Lisa: There wasn't anyone around us.

Adam: Yeah, [worried about disturbing others] people come up here I assume to see the nature. I don't think they want to hear people in the background.

However, one visitor made the opposite argument.

Stan: It's a little bit problematic when you're on the trail because people like silence on trails although they have kids but you're sitting there and it's like you're watching a TV set. People probably look at you and think what are you doing that for? Watching television out here in the middle of nowhere? Earphones, well, I don't like earphones and it shouldn't have earphones.
Eleanor: Yeah. But it's not loud though.

Stan: Yeah, a little [worried about interrupting people].
Eleanor: Well, I don't know, when you're reading brochures, you read them out loud to each other.
Stan: It's different. People, you know, they just don't like to hear that [the GPS Ranger]. You hear kids screaming, that's fine, but you get this little recorder going...

It should be considered that it is socially desirable to not be disruptive and that visitors are responding more to the social desirability that they are to their actual opinions. The responses by the interview participants do not seem to suggest that visitors were merely responding in a way they thought would be socially correct. Regardless of if the interview subjects acted in the way they described, they demonstrated knowledge of the issue. Further, they described coping strategies, such as turning the volume down or waiting to play videos until no other visitors were nearby.

Interestingly, even problems that seem like they would be extremely disruptive to GPS Ranger users were not major issues for most users. Specifically, screens on most devices do not work well in bright or sunny locations due to **glare**. This is especially true for portable devices. The GPS Ranger is no exception. Many visitors noticed the problem.

Rob: A few times we couldn't see it with the sun shining on it.
Jen: Right, but that's something you're not going to be able to control. I mean, even digital cameras you can't see in the bright sun.
Rob: Yeah, and you can just take it into your car and repeat it so it's easy.

Sam: ...you can't see it as well in the light so that was...you know, we didn't watch it the whole time, sometimes we were just walking and listening...so that's kind of a drawback, the screen itself.

On very sunny days, the **glare** was more of an issue.

Ed: I enjoyed the content. I enjoyed the audio content, the visual content is very hard to see because of the glare. That to me was a major factor to me to the point I would have said, I am second guessing myself as I say this, I would have almost preferred an audio guide. With audio descriptions stuff, though it was nice to see pictures of the squirrel.

Ed went on to describe how he coped with the glare.

Ed: I stopped looking; the audio was far more informative for me at least.
Beth: Yeah, for me too.

Much of the informational content relied primarily on audio with the video acting as support.

Additionally, the subjects of the videos were usually visible in real life when the videos played. Ed also described earlier in the interview giving up watching the video after realizing that he was not carefully watching where he was walking.

Repeating content proved to be bothersome to many users. Content would repeat when they passed over a GPS coordinate they had already visited.

Walter: Well, we only did a total of two or three that we really listened to because I don't know, they were repetitive. So I went up the road and when I came back, it came on again. I wasn't quite sure it was working properly.

Walter:...we got back around towards the Chessman side on the highway when the bark beetle one came up 3 or 4 times. And then we were like, ok, turn that thing off.

Seth: I mean I just pressed stop. But you think "Oh, wow, another pop-up. Ahhhhh, it is the same thing I heard on the way out."

Linda: Oh, I just kept scrolling through and finding things to watch. And then when I got to that point I knew it was going to just give me the same information so I just put it in the pocket of my pack.

For some the repeating messages actually helped them learn more as a group.

Ed: On the way out I did [carried the GPS Ranger] and my son carried it the way back. And that worked out pretty well because it was starting to repeat messages on the way back so he was picking up on stuff that I hadn't mentioned.

Summary of Analysis

Cedar Breaks National Monument is a popular place to visit in Southwest Utah. For many visitors, CBNM is a convenient stopping point as visitors travel between other parks (**pass-through**). Cedar Breaks is also considered a **destination**. These travelers were often staying nearby for longer periods of time and traveled to Cedar Breaks as a side trip **destination**.

Both destination and pass-through visitors often visited CBNM knowing few details about the site. Instead they came with general knowledge of the **setting** (the amphitheater, wildflowers, or wildlife). They also came with expectations about **activities** they wished to take part in. For instance, some discussed hiking and **learning**.

The experiences that visitors did have are similar to those they described expecting to have. This could be an artifact of cognitive dissonance. However, the very general expectation that visitors described made achieving those expectations easy. Commonly, experiences were focused around **wildflower** viewing, **hiking**, and **wildlife viewing**. The **GPS Ranger** was also described as part of people's experiences. However, while the GPS Ranger was one of the few constants all interview participants were exposed to, the technology was inconsistently discussed as part of the Cedar Breaks experience.

The GPS Ranger was chosen by visitors because users were interested in **learning** or they were interested in **technology**. The GPS Ranger renters were driven by curiosity (the opportunity to learn) to explore both the GPS Ranger and CBNM. It was common to hear learning or **gathering information** discussed as something visitors normally do, or try to do, when they visit new places. Many of the visitors often take part in ranger presentations, read signs, and explore exhibits. The GPS Ranger is simply another way to get information. Additionally, visitors under time or weather related **constraints** who could not attend a live

ranger presentation were left with few **convenient** options other than the GPS Ranger to learn about CBNM. The GPS Ranger was also **convenient** because it allowed visitors to escape crowds sometimes associated with live ranger presentations. Finally, some rented the GPS Ranger because, as a new piece of technology, it had a “**cool factor.**” It was determined that these visitors’ **curiosity** was not just for the technology but also for information in general.

Visitors perceived the GPS Ranger as changing their **experience** at the park and also their **behavior**. One family reported hiking more as a group so they were nearby when the GPS Ranger began to display a video. Others found that the GPS Ranger encouraged them to hike when they originally did not intend to do so. The GPS Ranger also caused some potentially dangerous **behavior**. Some people, even after being exposed to a warning message, would walk/hike or even drive while trying to watch a video. Generally, GPS Ranger users described their **experience** as much more **educational** because of the GPS Ranger.

The GPS Ranger is designed to be very easy to use. It displays content automatically and if visitors are inclined to do so, they can access videos using the touchscreen. Visitors could be described as **searchers** or **observers** depending on how they received their information. **Searchers** used the touchscreen to seek out content that they wanted to watch. Generally, searchers would watch all the content they could find. **Observers** watched only the videos that were automatically displayed by the GPS Ranger. Pure observers were rare and generally people used both techniques to find content.

Visitors had positive learning experiences with the GPS Ranger, but it was not free of problems. While the content was generally considered good, many visitors wanted more content and some wanted more detail on the content they watched. The **lack of information**

on some topics, like birds and the bristlecone pine, was a problem for some. Some were hoping for information on their elevation as they hiked the trails and other information about the trails. Another problem was the perception that the GPS Ranger was **disruptive** to other park visitors. Often GPS Ranger users would attempt to turn the volume down or move to less crowded locations if content began to play when others were near. When viewing the screen on a sunny or bright day, **glare** was an issue. Many users discussed the **glare** and how they dealt with it. Some replayed videos when they found shaded areas while others gave up watching the screen and concentrated on the audio. A final issue that was discussed was **repeating** content. One user described the experience as a let-down when they realized that the content was not new. Others stored the GPS Ranger in a bag or pocket when they realized it was just going to play the same messages. In one group, the GPS Ranger was handed to another group member who helped the group learn things they had missed the first time the content played.

Conclusion

Cedar Breaks National Monument provides many visitors with the opportunity to learn about the site. GPS Ranger users are visitors who will often take part in as many learning opportunities as they can. When used by a visitor, the GPS Ranger can change the visitor's experiences at Cedar Breaks. Additionally, it may be responsible for changing some visitor's behaviors at CBNM. GPS Ranger users generally try to get as much information as they can out of the units as they feed their curiosity about the park and about the technology.

CHAPTER FIVE: CONCLUSION AND IMPLICATIONS

The conclusion section will reinforce the major findings for each of the three main components of the analysis. The first focuses on the Cedar Breaks visitor experience. Section two will focus on the experiences visitors had with the GPS Ranger. Section three will concentrate on the use of the GPS Ranger. The management and research implications will then be discussed followed by concluding remarks.

Conclusion

The Cedar Breaks National Monument (CBNM) Visitor Experience

Visitors who used the GPS Ranger generally stop at CBNM for one of two reasons. The analysis described the visitors as either pass-through visitors or destination visitors. Most Cedar Breaks visitors are pass-through and stop at Cedar Breaks as they travel between other nearby parks. Pass-through visitors are fitting CBNM into a larger set of plans, which partially explains why the park receives many short-duration visits. Other visitors were drawn from nearby destination, like Cedar City, on day trips to Cedar Breaks. Regardless of why they stopped at CBNM, they expected to be exposed to nature. This is important because in all but one case (out of 27), the expected experience did not focus on the use of technology, and only a few visitors described the acquisition of knowledge as something they expected to get out of their visit. Instead, the expected experiences concentrated on the more general topic of geology, wildlife and wildflowers. A 2007 study by Bullock and Lawson also found experiences were concentrated around scenery and natural elements of a park. Following the commonly described setting attributes, some visitors expected to hike. Hiking was described more as a relaxing way to explore the setting elements and not as an exercise.

Like the expectations, the experiences visitors described having at CBNM also focused on natural themes. However, following the discussion of geology and ecology, visitors' experiences with the GPS Ranger began to be expressed. Specifically, GPS Ranger users described learning from the GPS Ranger as part of their Cedar Breaks experience. Prior to visiting the monument visitors did not expect to use the GPS Ranger. This makes sense as the GPS Ranger is new and unknown to visitors. Furthermore, when asked about their experiences at the park, few talked specifically about the GPS Ranger. Instead, visitors would mention the GPS Ranger while discussing their learning experiences. Learning opportunities were achieved mainly through the use of the GPS Ranger. This may indicate that the technology is only subtly impacting visitor experiences. Thus, visitors are getting the benefits of the GPS Ranger (i.e., instant information about the natural environment) with few negative impacts from technology. Finally, the Cedar Breaks visitor experience cannot be described as a GPS Ranger experience. Specifically, GPS Ranger users described aspects of nature as their CBNM experience and did not describe technology related themes.

This is not to say technology did not impact the visitors. The literature review explored both documented and theorized negative impacts that technology creates (Borrie, 1998; Ewert and Shultis 1999; Freimund and Borrie, 1997; Holden, 2004; Wiley, 2005). Specifically, Wiley described GPS technology as potentially filtering activities by letting the GPS control visitor choices. This study did not uncover any filtering effects of the technology. However, recall that the GPS Ranger did change behaviors. Rather than filtering activities, visitor's experiences were potentially longer and included more activities than they expected they would do. A more detailed exploration on behavior changes caused by the GPS Ranger or other GPS technologies is needed before a more definite answer is available.

Wiley (2005) and Borrie (1998) theorized that technology removes much of the mystery of a place. Wiley was concerned with the ability of a GPS to immediately answer questions about a site, removing a visitor's motivation to return and explore. However, GPS Ranger users described the instant answers and information as something they wanted and something that made their experience better.

The GPS Ranger Experience

The GPS Ranger was not a significant component of most users' Cedar Breaks experience. However, in exploring the experiences visitors did have with the GPS Ranger, a number of important findings were uncovered.

The GPS Ranger was rented for two reasons. The most common reason was because visitors identified it as a way to learn about the geology and ecology. GPS Ranger users discussed taking advantage of any learning opportunities and actively sought all available sources when visiting a site. More specifically the GPS Ranger was used to augment and not replace any specific information source. Not only do visitors seek out information opportunities at parks, but also they do the same info seeking at places like museums. Furthermore, visitors related their experience with the GPS Ranger to experiences with similar technologies in museums. The second less common reason for renting the GPS Ranger was to use a new piece of technology. Essentially, they were curious how it worked and what it would do. However, their curiosity was not simply for the GPS Ranger, but it was also expressed for CBNM. Thus, reasons for renting are anchored in the prospect of learning.

As was discussed briefly above, GPS Ranger users often take advantage of all available interpretive information. Stewart, Hayward, Devlin, and Kirby's typology of interpretive users would classify this type of visitor as seekers; the most common user of

interpretive information (1998). When the researcher discussed the device with some park staff and visitors they would, upon hearing a description of the technology, ask if this was going to replace rangers. However, users of the GPS Ranger did not view the device as a replacement. It is important to remember that it was common to hear that the GPS Ranger was just another way, not the only way, that visitors got information. When the GPS Ranger did serve to replace the live ranger, it was because of convenience. The convenience of the GPS Ranger allowed visitors to use it independently of other groups and to use it on their schedule. The pace of live ranger tours was seen as out of their control while the GPS Ranger could be used at the visitors' own pace. In information behavior literature, more efficient methods of information delivery are preferred over other methods. More specifically Pirolli (2003, pg.165) commented, "People prefer information seeking strategies that provide more useful information per unit cost [monetary or other], and they tend to arrange their environments (physical or virtual) to optimize this rate of gain." The GPS Ranger minimized the cost in terms of social stress caused by crowds, time, and independence. Pirolli went on to say that people often select and prefer technology that is designed to improve peoples' returns on information gathering. That is exactly what the GPS Ranger and other location-based services do and one of the reasons that visitors enjoyed using them.

It could be surmised that a GPS Ranger is a cost effective replacement to live rangers. Because this study did not explore the reasons visitors did not use the GPS Ranger (leaving out a huge proportion of visitors), this would not be valid assumption. Non-users were not interviewed and their reactions to the technology cannot be predicted. Prior to jumping to the conclusion that this technology is a suitable replacement for rangers more studies need to be conducted. Furthermore, the GPS Ranger users actively seek out all sources of information including live rangers.

Delivery of information from the GPS Ranger visitors had affected both the visitors' experience and their behavior. Recall that Patterson et al. (1998) described experience as affected by the visitors' situated freedom. Patterson et al. defined situated freedom as structure in the environment that sets the boundaries for what visitors experience (1998). Renting the GPS Ranger changed the boundaries which, by using Patterson's logic, lead to different experiences. Changes in experience most often were identified as new learning opportunities. Without renting the GPS Ranger, the visitors would have had few chances to acquire new information as they explored CBNM and their experiences would have been measurably different.

In addition to the perceived changes in experience, visitors also discussed changes in behavior attributed to the GPS Ranger. Behavior changes included hiking as a group rather than spreading out and encouraging people to go on hikes in order to find more information. Also, it was shown that groups who used the GPS Ranger learned as a group while gathered around the GPS Ranger to watch a video. Previous research has shown that when learning is part of an interactive social experience, the group members develop a deeper, more extensive new understanding (Brody, Tomkiewicz, and Graves, 2002).

Not all behavioral changes were positive and some new behaviors were potentially dangerous. Hiking while looking at the GPS Ranger was discouraged in the first video that played for renters. However, several visitors reported hiking or driving while paying more attention to the GPS Ranger than to their surroundings. This shows that the content displayed on the screen is a very powerful draw for visitors' attentions. This either means that the early message against such behavior was ignored or it was not seen by all group members. Interestingly, studies of information behavior describe mass media type warning messages as less effective compared to more personal methods of communication (Pirolli, 2003). A more

effective way to warn visitors may be to tell them, face-to-face, when they rent the GPS Ranger.

The changes in experience and behavior were often related to the information that was exposed to visitors. Information on the GPS Ranger was accessed two ways. The most common method can be described as passive pop-ups. This method is the default delivery method of the GPS Ranger. It relies on the geographical coordinates to trigger content appropriate to that location. All visitors were exposed to pop-ups. The second method can be considered active searching. Active searching is done by accessing menus that display categories of content (videos) or all content. Users then select titles of videos that interest them. Nearly all of the 27 interview subjects used this method. This may show that the passive pop-ups do not sufficiently meet the information needs of visitors. In total, there were 50 video segments that were available to the GPS Ranger users which totaled 54 minutes in length. Only 18 of the pieces of content (28 minutes) were activated by GPS coordinates (passive pop-ups). The remainder needed prompting by the user to play. While one of the major benefits of the GPS ranger is its ability to trigger content automatically, visitors did not mind actively searching for other content.

The automatically delivered content did prove to be a source of annoyance for some visitors. Specifically, messages that repeated or information that the user already knew were considered disruptive. Information foraging theories have shown that when people are seeking new information, redundant information will have no value (Pirolli, 2003). And in this case, redundant information was a negative impact to visitors' experiences. Additionally, it was an interruption to their nature-centered experience, and it was an emotional letdown when the GPS Ranger users realized they had already seen the content. While documenting the use of a technology similar to the GPS Ranger, Hinze and Voisard also found that visitors

do not wish to receive repetitive messages unless they explicitly asked for it (2003).

Furthermore, they relate the issue to internet usage saying,

“If this person [a user of a GPS Ranger like device] already visited a place he or she does not want to be reminded of basic historical facts related to that place. He or she would rather like to get further information related to the place in question. This is similar to Internet usage, where successive clicks provided more and more specialized information.”(p.490)

The content visitors viewed was described as high quality. Additionally, they found the length of the content, which ranged from six seconds to three minutes and averaged one and a half minutes in length, to be appropriate. However, some visitors were interested in being able to access even more detail on some topics. One powerful and consistent theme discussed by visitors was the lack of information on a variety of topics like birds and bristlecone pines. The GPS Ranger users are, as they physically and visually explore the park, seeking information on nearly every question or topic that comes to mind. In information behavior literature, this type of activity is sometimes described as information foraging. In 1983, psychologist George Miller described humans as *informatores*, organisms hungry for information. That categorization fits GPS Ranger users as they eagerly watched and listened to new information while they explored the site. Some GPS Ranger users would get to the end of their visit, and take time looking back through all the videos to ensure that they did not miss any information. Also, some visitors (most directly demonstrated by one group) hiked both of CBNM's trails to find out what information was triggered in those areas.

As visitors explored CBNM and the GPS Ranger, they had few overwhelming issues with the technology. On occasion, the battery would become exhausted and the user would return to the visitor center to swap GPS Rangers. However, most visitors did not stay long enough at the site to completely exhaust the battery. Another more common issue was

viewing the screen on bright days. This was a problem many visitors were able to overcome by adapting their use of the device. Specifically, users would ignore the visual messages and concentrate on the audio portion of the content. Others would simply replay the video they wished to see when viewing conditions improved.

A final important finding was associated with perceived impacts that technology or the sounds of technology may have on other visitors. GPS Ranger users would often turn the volume down when they were near others and would also distance themselves from others when using the device. Headphones were discussed by some visitors as both a solution and a problem. Headphones would isolate the sound of the GPS Ranger from other nearby visitors, but it would also isolate the GPS Ranger user. Since visitors come to CBNM primarily for nature related reasons, they would likely be unwilling to give-up hearing the sounds of Cedar Breaks. Also, headphones would not work well for groups who rent one unit, which was the most common type of renter. Related to this issue was the use of non-natural sounds as background to the videos. Eliminating or minimizing the use of music may help to reduce the sense of disruptiveness that visitors described.

While it is not the researcher's intent to minimize the importance of these finding, it needs to be reinforced that this study collected and analyzed data from only a small portion of all CBNM visitors. In order to better understand who the GPS Ranger user is they need to be described in reference to other visitors. The data to reliably achieve this was not collected during this study. However, a study by Stewart, Hayward, Devlin and Kirby (see Table 1) described a group sharing many of the GPS Ranger user's information needs. They called this group "seekers" and found they made up 47% of visitors to Mount Cook National Park in New Zealand (Stewart, Hayward, Devlin, and Kirby, 1998). If this were the only factor describing the GPS Ranger users, rental rates should have been much higher than observed in

CBNM. Other likely factors that influence rental rates and describe the GPS Ranger users include length of stay and comfort with technology. This study did ask users about their use of technology (see Appendix D) and found technology use common with GPS Ranger users. To make it worthwhile to rent a GPS Ranger, visitors must be willing to spend time at Cedar Breaks. An unknown, but large, percentage of CBNM visitors stay for a short period of time (less than a half hour). In attempting to place the GPS Ranger user group into the population of CBNM visitors some potential research recommendation have been alluded to and will be further explored in a later section.

Management Implications

This section will discuss the implication of this study for managers of sites that use the GPS Ranger and of sites that may use it or a similar technology in the future. Visitors discussed a number of issues with the technology which have both technical and non-technical solutions. This section will explore the issues and solutions uncovered during the research period.

Visitors truly enjoyed their experience with the GPS Ranger. None of the issues observed by the researcher or discussed by the interview participants caused an overwhelmingly negative experience. However, GPS Ranger users did note that there is room for improvement. Specifically in the amount of information available, repeating messages, and problems with glare.

The GPS Ranger is a benefit to visitors especially at sites lacking other forms of information. The GPS Ranger is used to augment visitor information needs, not to supplant other methods such as interpretive exhibits or interpretive rangers. The GPS Ranger provides an excellent learning platform with a capacity to captivate a variety of visitors. More importantly, unlike information signs, the GPS Ranger was used by people who normally do

not stop to read and by those who read every word of every sign they see. While the interviews showed that as a group utilizing every form of information was common, it was usually one person from each group that diligently read every available message. The GPS Ranger could be very helpful in getting important messages to those groups or parts of a group who have no interest in reading signs. Also, Bullock and Lawson's (2007) study of park visitors demonstrated that when a means of communication is perceived as polite and unobtrusive, the management interventions improve a visitor's experience. Other than repeating messages, the GPS Ranger content was universally enjoyed. This could make the GPS Ranger an effective platform for regulatory-type messages.

Generally, the information needs by this type of user were great. The more they could find out about a site, the better their experience. It is unlikely that the first release of the GPS Ranger at any site will meet the informational needs of the visitors. However, the interview subjects were very willing and able to describe the content that they wanted to have. The GPS Ranger could actually be used to help collect this data. The users described a high level of comfort with the technology and would likely be able to use the touchscreen to input data needs at the end or during their trip. Another way to gather information about the needs of the visitor would be to use a simple comment form. Repetitive content should be avoided. Even though the controls to stop a video were simple to access for users, they described feeling "let-down" when they realized that the content had already been viewed. A solution could be to give the visitor some control on what content is displayed. The option should be displayed after the first video repeats instead of before a repeat occurs. Whatever the solution to repeats ends up being, keep in mind that some groups benefited from repeating messages.

GPS Ranger users described feeling uneasy about disrupting other visitors. Headphones were discussed by staff and by visitors as a potential solution to the disruptive

nature of non-natural sounds produced by the GPS Ranger. This may help in some circumstances, but headphones should not be mandatory. Visitors are not at the site primarily to watch videos. They are there to experience nature. Headphones would make it more difficult to experience nature and would make it more difficult for groups to share the device. Instead, a potential solution would be to change locations where the video/audio automatically plays. Specifically, at a popular viewpoint, set the GPS trigger point further back from the main viewpoint. Also, the use of background music in the videos should be minimized. While very subtle, the sounds are inconsistent with the natural surroundings of CBNM.

Videos that play on roads or trails can put users at risk. There may be simple solutions to this issue. Mass media type messages are often taken less seriously compared to personal messages (Pirolli, 2003). One solution would be to have the staff renting out the unit to specifically tell visitors to pull off the road to view messages and to not watch the screen while walking. Additionally, the warning message displayed at Cedar Breaks occurred during an introductory video. This may be an inappropriate time to display this message. New GPS Ranger users are more interested in what the device is doing rather than what it is telling them. For this reason, the warnings may be more appropriate at the trailhead or displayed when the visitor walks onto a parking lot. Like other content, warning messages should not repeat every time the user passes over a trigger-point. However, videos that do play on the trail could encourage hikers to stop and take a moment to not only safely watch the video, but also take in the views, examine the geology, or look for wildlife. Finally, managers should include a statement within the rental agreement that helps ensure the user is aware of the hazards of walking or driving while viewing the screen. The statement should be initialized by the visitor for liability purposes.

Sun is a problem for almost any backlit type display. It would be very difficult and prohibitively expensive to make the screen easily readable in all conditions. Not only did visitors notice that there were problems viewing the screen, but most also acknowledged that all screens have the same issue. The GPS Ranger users developed effective coping strategies to this problem. Mainly visitors would ignore the visual portion of videos and listen to the audio. This also was done by visitors who wanted to hike or drive while content was playing. For managers, when designing content for the GPS Ranger, use high contrast colors and large font to improve the readability in the sun. Another potential solution could be to select locations where GPS Ranger users can find shade (without moving off trail) to trigger content.

Managers are facing a new set of problems when it comes to technology in parks. The problems technology brings to parks are similar to those that have been successfully solved in the past. Nevertheless, it is very important to begin implementing solutions to this problem now rather than waiting to manage activities after technology becomes a major issue. Because the impacts of technology are still evolving a flexible and adaptable guideline should be implemented to help visitors make ethical choices that will improve their experiences and behaviors. Borrowing from the success of the "Leave No Trace" wilderness ethic, the "code of ethics" below could help manage the negative aspects of using technology in parks.

Technology can add to your enjoyment of the national parks, but please keep in mind this code of ethics when using your technology. For your safety and to help you better experience all that the park has to offer, bring only those devices that help you gather new information about the park. Sounds from devices may make it difficult to see and hear wildlife, dangers, or distract you from your task at hand. Also, the sounds or sight of some devices may bother other visitors. Tune your senses to the sights and sounds of nature and only use your technology when it helps you learn where to safely look and listen for the wonders of our parks.

- *Always have the volume down on your device to keep the sounds of nature present for both you and nearby visitors. If the volume needs to be increased, remove yourself from other visitors to listen.*
- *Turn the device to vibrate (cell phone) or low volume (GPS Ranger) so other visitors are not disturbed when you are "called."*
- *Whenever possible find places away from other visitors to use your device.*
- *Do not walk or drive while listening or looking at the device.*
- *When the device is not in use, always have it turned off.*
- *Keep the device hidden from other visitors. Some people are visiting the national park to get away from technology. Respect their wishes.*
- *Dispose of your dead batteries in appropriate trash or recycling receptacles. Batteries have corrosive materials that will harm the nearby flora and fauna if needlessly thrown in this natural environment.*

Keep in mind the example above is not intended to be a final version of a code of ethics and managers should modify it to best fit their situations. For example, in a park using the GPS Ranger, make a specific set of guidelines that apply to GPS Ranger users. Parks using other technologies like portable multimedia players or cell phones also need to employ some sort of technology use guidelines. Fine tuning the ethics guidelines will greatly improve the applicability of the document for technology users in parks.

Research Recommendations

This was an exploratory study on a new technology at a new site. Additional studies on the GPS Ranger or other technologies that provide visitors or users with location-based information can use this study as a starting point. In this section, potential implications for future research opportunities will be explored.

One of the most important findings of this study was that GPS Ranger users wanted to acquire as much information on CBNM as they could. In future studies, the information

foraging theory and other theories from information behavior should be explored and potentially used to guide research. George Miller's reference to humans as informavores applies well to the GPS Ranger users and should be further investigated in future research (Miller, 1983). Other information seeking theories may also be relevant.

An additional avenue of research is to work to identify the use of technology by national park visitors. This should be done for several reasons. First because the parks are beginning to use more technologies to provide interpretation, identifying what portion of visitors feel comfortable with using these technologies in parks would provide important guidance to the National Park Service. The NPS could begin collecting this information using the ongoing Visitor Service Project surveys. Furthermore, it would help to better categorize the GPS Ranger user. This research may be aided by implanting the theory of diffusion of innovation as discussed by Rodgers (2003). Diffusion of innovation has been a reliable predictor of technology adaptation and could help explain the current users of the GPS Ranger and help predict its future use.

Only within the last few years have technologies become light enough, powerful enough, and cheap enough for many visitors to bring with them to places like Cedar Breaks. Technologies like the GPS Ranger impact visitor experiences in unintended ways. This study showed that visitors were aware of these impacts. The increasing use of technology needs to be studied to learn how and why technologies are perceived as disruptive. Also, questionnaires currently used to help describe visitor preferences, park values and other characteristics should include more technology related items. One potential avenue of investigation is soundscape research and because many devices emit sounds the studies could be carried in locations other than CBNM.

The GPS Ranger should be evaluated for task compliance. This study showed that the GPS Ranger influenced how visitors spent their time in the park. Signs and other interpretive methods have been studied to understand how well people comprehend and follow messages or rules. Simple messages could encourage users to complete a task or follow a rule (hiking a trail, asking a ranger a question, staying on trail, etc.). The results could help determine the correct tone, length of messages, and their overall effectiveness. Additionally, some visitors described the rangers on the video as though they actually had met them and formed some personal connection to them. This could indicate that they may find the messages more personal and more trustworthy compared to other media.

A study of users of the GPS Ranger technology versus non-users would provide more definite results describing the impacts of the technology on users. Also, this study did not explore non user's feelings towards users of the GPS Ranger. Additionally, this type of study could be used to explore any impact from using the GPS Ranger on visitor length of stay. The GPS Ranger showed evidence of causing visitors to stay longer onsite than they originally planned. A study exploring length of stay would be useful to both tourism researchers and practitioners.

A final research recommendation is to use the device for collecting data. Currently, the device keeps a record of the content triggered by the GPS, length of use, and location information. This quantitative data was not used for this study. A screen capture program could be used by researchers to understand how users access information and use the device. Additionally, the device is capable of collecting basic quantitative survey data through its touchscreen interface. Each of these data collection methods would provide researchers with a greater depth of understanding and generalizeable results.

Summary of Findings

The data provided in Table 2 displays themes identified by the researcher. Research and managerial implications of this study are also displayed. Refer back to the appropriate chapter/section for additional information on themes and implications.

Table 2: Analysis themes, research recommendations (RI), and implications for managers (MI)

Visitors: <i>CBNM visitors can be separated into two travel types</i>	
Pass though	Cedar Breaks was a common place to stop as visitors traveled between major destinations.
Destination visitors	For some, CBNM is a destination. Usually these were visitors from nearby Cedar City. However, long distance destination travelers also made the trip.
Expectations: <i>Visitors come to CBNM with expectations about what they will see and do.</i>	
Setting (Geology/Ecology)	The natural elements of the setting, the amphitheater and wildlife were common expectations. Visitors rarely described specific elements of the setting and it was more common to hear very general expectations.
Activities (Hiking)	Cedar Breaks was expected to provide hiking opportunities to visitors.
Learning	Visitors to CBNM did expect to learn, however, this theme was not nearly as common as setting and activity.
GPS Ranger User Experience: <i>Visitors mainly experienced the natural elements of CBNM, however, some did discuss the GPS Ranger.</i>	
Wildflowers	The wildflowers of CBNM attract most of the nearby destination visitors. However, most other visitors also noticed the wildflowers.
Wildlife viewing	Visitors to CBNM often had the chance to see wildlife.
Hiking	Hiking provided many visitors with the chance to explore the site.

GPS Ranger (Learning)	While the GPS Ranger was one of the few consistent experiences that all groups in this study had, it did not consistently show up as a visitor experience. When it was discussed it was part of learning.
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Experience with the GPS Ranger: *Visitors were asked questions that encouraged them to talk about the GPS Ranger*

Learning	The most common reason that people rented the GPS Ranger was to learn about CBNM.	RI- Test and compare the GPS Renters to other interpretive techniques
Technology	Another reason that the GPS Ranger was rented was because visitors were curious about the technology.	
Constraints	Not having the time to wait around for a live ranger talk was a common factor in encouraging visitors to rent a GPS Ranger.	
Convenience	Other visitors discussed escaping the group setting of ranger talks and being able to explore at their own pace as an important benefit of the GPS Ranger.	
“Cool factor”	The technology theme was further developed as visitors describe the technology as cool.	
Information gatherers	It is important to remember that GPS Ranger users are information gatherers and seek out all available forms of interpretive information wherever they go.	RI- Apply information behavior theories to park visitors
Learning changed their experience	One of the most common benefits of the GPS Ranger that visitors believed they achieved was learning much more about the site.	RI- Compare experiences of users to nonusers
GPS Ranger changed their behavior	In both positive and negative ways, the GPS Ranger changed behavior. Some examples of positive benefits are increased length of stay and hiking and learning as a family group. Some negative behavioral changes include hiking or driving while watching the GPS Ranger.	RI- Explore the behavior changes in detail. Test enforcement type messages. MI- Warn people about driving and walking hazards differently.

GPS Ranger Use: *The GPS Ranger is used in different ways by visitors. There are also issues related to use that were commonly discussed.*

Searchers	Searchers were by far the most common type of GPS Ranger user. This group used the automatic delivery of content, but also spent time searching for videos based on interests.	RI- Study information behavior in Parks
Observers	Observers were rare. This group relied only on the GPS Ranger's automatic delivery of content.	
Lack of Information	Because most visitors were interested in gathering as much information as possible about CBNM, a topic that was not covered left users wanting more information. Some visitors wanted more detail on the topics that were covered.	MI- Collect comments from users on content they want to see.
Disruptive to others	Noises created by the GPS Ranger were perceived by many GPS Rangers users as disruptive to nearby visitors. Users developed coping strategies like pausing content and turning volume down when visitors were near.	RI- Explore soundscape impacts of technology. Develop ethical guidelines for technology use in parks. MI- Headphones are not a solution. Try changing the locations where videos play.
Glare	Visitors noticed that on bright days the screen was difficult to view. This was not a big source of complaints because many visitors reported the audio as more important than video in providing information.	
Repeating content	Content that automatically repeated when visitors walked or drove over the same coordinate was a problem for visitors.	MI- Provide visitors with more control over the type of content they will see. Change/add content to drive repeat use.

Concluding Remarks

The National Park Service's mission statement contains within it many guiding principles. The first paragraph of the primary mission statement specifically calls attention to the National Park Service's goal of education: "The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations" (National Park Service, 2008). They have long achieved this through simple reliable methods like brochures, kiosks, and park rangers.

Today's generation of visitors is using technology in more places than ever before. Furthermore, new technology is reliable, easy to use, flexible, and portable. The GPS Ranger is not the first technology that the NPS has used and it will not be their last. In fact, in the NPS mission statement, technology is directly addressed (National Park Service, 2008). The NPS has the specific goal of "incorporating research findings and new technologies to improve work practices, products, and services" (National Park Service, 2008). With this in mind, research needs to keep up with the NPS's adoption of new technologies to ensure that devices like the GPS Ranger help rather than hinder the NPS in meeting their primary mission statement.

Predicting the implementation of technology is difficult. However, the popularity of communication technologies like cell phones and the growing capabilities of these devices likely mean that the GPS Ranger will not be the only device providing visitors with information they want. Consumer-grade GPS units now ship with large memories, detailed maps, games, and many location-based services. Soon, even more GPS units will offer location-based services. Human ingenuity has made many devices technologically capable of displaying and even triggering (using built in GPS sensors) multimedia files to play.

Currently, the barriers that exist are mostly software related. However, another barrier is content, and currently content is very limited. With the success of technologies like the GPS Ranger, content will be created and the use of location based services will quickly grow to fill a wide market segment. Managers of protected areas need to recognize this not a passing fad and that the use of technology and all its impacts are happening now. Therefore managers need to proactively develop plans to manage impacts.

This study has worked to give a general understanding of the GPS Ranger user. In doing the research, users' motivations, goals, and expectations have been explored and presented in a very practical manner. Researchers, managers, and technology developers will be able to use the information gained by this study to better implement the device and understand this type of visitor. It is generally accepted that we are living in an information society where technology is used and in many cases needed to access massive amounts of data. Location-based services have recently begun to mature and are found in the GPS Ranger, cell phones, in-car navigation, and many other devices. This is just another way humans deal with the large amount of knowledge and information we have accumulated. This trend is likely to continue and we need to work to monitor and understand it.

Finally, as park visitors begin to face more technology, conflicts caused by the sounds or even sight of devices like the GPS Ranger may become common. Conflicts were not discovered in this study. However, there are indicators that a greater amount of use could create issues. Sites that are using technologies need to keep technology induced conflicts in mind. While, creating a solution for a problem that does not yet exist is difficult and perhaps wasteful, there is a successful system that could be adapted to help minimize the negative impacts of technology on visitor experience. Specifically, adapting the "Leave No Trace"

wilderness ethic may enable researchers, managers, and visitors to continue to utilize the benefits of technology and minimize the conflicts and impacts that it may create.

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APPENDIX A: GPS Ranger Image

The GPS Ranger, shown in the picture below with Cedar Breaks National Monument in the background, has a two and a half inch by four inch touchscreen display.



APPENDIX B: GPS Ranger Content Catalogue

Cedar Breaks National Monument GPS Ranger Content as of July 10th 2007

Number of Choices	Main Buttons (touchscreen)	Media
28	Main points of interests	Video
3	facility	Text
2	Park Events	Text
1	Map feature	Interactive Map

Main Points of Interest		
Topic	Title	Length (sec)
Geology	Grand Staircase	65
Geology	Brian Head	75
Geology	Hurricane Fault	82
Geology	Black Mountain	84
Geology	Clarín Formation	106
Geology	Deposition	128
Geology	Erosion	161
Human History	Visitor Center	48
Human History	Iron Mission	92
Human History	Great Park Lodges	152
Plants/Animals	Open Meadows	30
Plants/Animals	Sub Alpine Marshy Meadows	42
Plants/Animals	Spruce/Fir Forest	79
Plants/Animals	Rim of Cedar Brakes	81
Plants/Animals	Wilderness	97
Plants/Animals	Alpine pond	97
Plants/Animals	Plant Life	107
Plants/Animals	Bark Beetle	135
Total Minutes		28

	Additional Content	
Topic	Title	Length (sec)
Geology	Volcanic Activity	40
Geology	Hoodoos and Fins	63
Geology	Rock Cycle	91
Geology	Plate Tectonics	94
Human History	Sing Always	63
Human History	Paiute Lifestyles	68
Human History	Southern Paiutes	82
Human History	Sheep Herding	89
Human History	CCC	114
Human History	Utah Movies	189
Plants/Animals	Fir-Yellow Orange	6
Plants/Animals	Rim-Blue Purple	7
Plants/Animals	Rim- Red Pink	8
Plants/Animals	Moist-Red Pink	14
Plants/Animals	Marshy-Yellow Orange	15
Plants/Animals	Fir-White Green	16
Plants/Animals	Fir-Red Pink	17
Plants/Animals	Marshy-Red Pink	19
Plants/Animals	Rim- White Green	22
Plants/Animals	Moist- Blue Purple	22
Plants/Animals	Marshy-White Green	22
Plants/Animals	Moist- White Green	24
Plants/Animals	Rim- Yellow Orange	25
Plants/Animals	Moist- Yellow Orange	26
Plants/Animals	Marshy-Blue Purple	27
Plants/Animals	Fir-Blue Purple	32
Plants/Animals	Uinta Squirrel	39
Plants/Animals	Grey Fox	44
Plants/Animals	Yellow Bellied Marmot	50
Plants/Animals	Uinta Chipmunk	63
Plants/Animals	Park Mammals	77
Plants/Animals	Cedar Breaks in Winter	98
	Total Minutes	26

APPENDIX C: Interview Guide

Component: Cedar Breaks

1. Why have you come to Cedar Breaks?

- Have you ever been here before?
- How long will you be in CBNM?
- Is CB a destination or a stop along the way?

2. Can you tell me about your experiences at Cedar Breaks?

- What have you done while in the National Monument?
- Solitude, wildlife, nature, escape, independence, learn etc. (REPS)
- What have you seen? What made you take notice?

3. If your friends were coming to Cedar Breaks, what would you tell them about Cedar Breaks?

- What would you tell them to do, see or expect?

Component 2: GPS Ranger

4. Why did you choose to use the GPS Ranger?

5. How do you think that the GPS Ranger changed your experience at Cedar Breaks?

- What did you experience with the GPS Ranger that you believe you would have otherwise missed?

Component 3: GPS Ranger Use

6. Tell me about how you or your group used the GPS Ranger?

- Who carried it?
- Who was most interested in using it? Why?
- When content was available, (pops up) how did people in your group react?
- How did you find places where content was available?

7. What did you think about the content/information that was displayed?

- What content were you interested in?

8. What did you think of the GPS Ranger?

- Was the GPS Ranger easy to use?
- What did you like about the GPS Ranger?
- What didn't you like? Why?

9. Can you think of other place that you might find the GPS Ranger useful?

- Other parks?

10. Would you use the GPS Ranger again at this site if the information/content was changed/unchanged?

11. Did you notice people outside your group using the GPS Ranger?

- Did others notice you using the GPS Ranger?
- What did you do with it when you were not using it

12. Is there anything else you would like to share with me about the GPS Ranger and your park experience?

Demographics

- Residence
- What types of mobile electronics do you use?
- Estimated age by researcher
- How many people are in your group? Group Type?

APPENDIX D: Interview Participant Demographics

Pseudonyms	Group Size	Group Type	Residence	Estimated Ages	Electronics usage
Ed, Beth James, Unnamed	4	family	Missouri	47, 45, 16, 18	GPS, Cell phones, laptop
Nathan, Renae, Danna	3	family	Orem, UT	35, 30, 11	iPod, Cell phones, laptop
Aaron	1	Alone	Universe Place, WA	45	Cell phone, Computer
Katrine, Daniel	2	couple	Norway	25-30	Cell phone
Linda	1	alone	Wisconsin	22	iPod, Cell phone
Sam, Andrea	2	friends	Pleasant Grove, UT	30-35	Cell Phone
Unnamed	2	couple	Las Vegas & Germany	35-40	GPS, Cell phones
Scott, Unnamed	2	couple	Connecticut	56	Cell phone, laptop, in-car navigation system
Ted	1	alone	Milford, Utah	22	Cell Phone, GPS, Computers
Jen, Rob	2	couple	Memphis, TN	35-40	Laptop, Cell phones, Blackberry, iPod,
Ned, Alice	2	couple	Utah	55-60	Cell phones
Sara, Unnamed	2	couple	Rockport, PA	50-55	Radio
Unnamed	2	couple	?		
Walter, Unnamed	7	family	New York, NY	35-40 7-14	cell phones, PDA
Jayne, Greg	2	couple	Los Angeles, Ca	55-60	Cell phones
Adam, Lisa	2	couple	Las Vegas, NV	50-55	Cell Phone PDA
Nick, Unnamed	2	family	Salt Lake City, UT	23, 65	Cell Phones, GPS, Laptop
Stan, Eleanor	2	couple	Fort Laurence, FL	65	Cell Phone, GPS, Computers
Unnamed	2	couple	Henderson, NV	65	Cell phone
Unnamed	2	couple	Las Vegas, NV	35-40	GPS
Drew, Unnamed	2	couple	Los Alamos, NM	55-60	iPod, Cell Phone
Unnamed	2	couple	St. Louis, Missouri	45-50	Cell Phone , PDA
Unnamed	5	family	California		
Seth, Unnamed	2	Couple	Miami, Florida	35-40	Cell Phone, GPS
Doug	1	alone	Arizona	65	Cell phone, laptop,
Norman, Unnamed	4	family	Helena, MT	52,48,18,12	Cell Phone, iPod, Computers
Anne, Tucker	2	couple	Minnesota	40-45	