GEOCACHING, LEARNING, AND NATURE IN A LOCATION-AWARE SPORT

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Abstract

Geocaching, an outdoor recreation activity that uses mobile digital technology combined with online social networks to find outdoor hidden treasure, has gained a strong following of geocachers worldwide. This phenomenological study explored the lived experiences of geocachers as they described connections between themselves, fellow geocachers, informal learning, nature, and technology while engaged in the sport of geocaching. The descriptive phenomenology of Husserl and the methodology of Colaizzi provided the context and structure for this study. Geocachers while involved in geocaching activities participated in self-directed, informal, and incidental learning. Geocachers were motivated to participate in geocaching to experience nature, explore and discover, and to connect with other geocachers. The implications for this research will lead to a better understanding of how geocachers perceive their connections to learning, other geocachers, nature, and technology. Findings from this study are of interest to a range of educators, environmental communicators, and park and land managers.
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Chapter 1: Introduction

Background

This thesis research emerged from my interest in the relationship between people, digital mobile computer technology, and the natural environment; it is further driven by my vocation of adult education, my interest in informal learning, my avocation of outdoor recreation, and my interest in the lived experiences of people. It has been my observation that the popularity of mobile digital technology can facilitate a connection between people and nature.

The reach of digital technology is remarkable. Mobile communication devices such as cell phones are ubiquitous in modern industrialized society. The International Telecommunication Union (2011) estimates there are more than 5.9 billion mobile-cellular phone subscriptions worldwide. It has been my observation that with this readily available digital technology, users mediate their connection to the world through the device and, as a result, place a barrier between themselves and the natural world. Consistent with this observation is research literature, of several authors, supporting the notion that electronic technology such as televisions, computers, computer tablets, smartphones and similar devices create a disconnect between the user and the natural environment (Louv, 2008; Pergams & Zaradic, 2006; Singer, Singer, D’Agostino, & Delong, 2009).

In contrast, some applications of mobile digital technology can enable users to connect with the outdoor natural environment in unique and curious ways (Ihamäki & Tuomi, 2009). For instance, many of the currently available smartphones are global positioning system (GPS) enabled, rendering them GPS receivers that allow users to utilize them for wayfinding.
Wayfinding, expressed in a geographic sense, relates to one’s location temporally and spatially in order to navigate. In other words, wayfinding is the process of finding one’s way. Early methods of wayfinding involved the use of reference landmarks; easily identifiable objects such as tall trees and mountains which eventually gave way to trail marking, sign posting, and map making (Lynch, 1960). Further innovations have resulted in modern methods of wayfinding such as geo-location via the global positioning system (GPS). Using a GPS receiver we can locate our physical location on earth accurate to within a few metres (Cameron, 2011). The availability of geo-location technology to the general public has allowed for adoption of the technology for commercial wayfinding devices such as vehicle mounted and handheld GPS receivers. Along with the introduction of recreation-grade GPS receivers has been the development of the geo-location aware sport of geocaching. Geocaching forms the underlying context of this study.

Overview of geocaching.

Geo-locating is a method of determining one’s location relative to a geographic system such as the latitude and longitude of a map. The ability for a device and its user to be location-aware provides opportunities for connecting the user to places in meaningful ways. One example of the application of digital technology that seems to support a relationship between technology and place is the outdoor geo-location sport of geocaching. Geocaching is a real-world outdoor treasure hunt game that is mediated through mobile GPS-enabled devices and supported by an online global community that provides geographical information to assist geocachers to find geocaches (Groundspeak Inc., 2013a). In simple terms, geocachers are treasure hunters and geocaches represent the treasure sought.
Geocaching, as a recreational activity, came into being on May 1, 2000 shortly after President Clinton directed the U.S. Department of Defense to remove the intentional degradation of the GPS signals available to civilians (Sherman, 2004). With accurate GPS signals available to the general public, David J. Ulmer, an electronics and software engineer and inventor of the sport of geocaching, contrived to hide a cache and post the coordinates of its location to an online newsgroup for others to find (Cameron, 2011). Within a few days the original cache was found and, as a result, others began creating caches and posting coordinates; thus the sport of geocaching was born (Cameron, 2011). Geocaching has evolved since its beginning but the basic premise of the sport has remained unchanged; a geocacher develops and hides a geocache then publishes the GPS coordinates and description of the cache on a cache page on a geocaching website. Geocache seekers then download the GPS coordinates from a geocaching website to a mobile GPS receiver (GPSr) that helps guide them in searching for the geocache.

Informal learning.

Life experiences enable us to explore ourselves and our environment. It is from these types of explorations that we make meaning. MacKeracher (1996) suggests we are meaning-making organisms constructing our understanding of the world through organization of the experiences we perceive through our senses; learning is our attempt to make meaning of our experiences within our environment. In this study I investigated adult geocachers’ connection to informal learning while geocaching. Because of the multiplicity of definitions of informal learning within much of the research literature (cf. Eraut, 2000; Knowles, Holton, & Swanson, 2005; Livingstone, 1999; Malcolm, Hodkinson, & Colley, 2003; Schugurensky, 2000), I have chosen, for the purposes of the current study, the definition of informal learning that comes from the work of Schugurensky (2000), who suggests there are three forms of informal learning: (1)
self-directed learning, (2) incidental learning, (3) socialization or tacit learning. Schugurensky describes the first form of informal learning as *self-directed* and states:

self-directed learning refers to ‘learning projects’ undertaken by individuals (alone or as part of a group) without the assistance of an ‘educator’ (teacher, instructor, facilitator), but it can include the presence of a ‘resources person’ who does not regard himself as an educator. It is both intentional and conscious. It is intentional because the individual has the purpose of learning something even before the learning process begins, and it is conscious, in the sense that the individual is aware that she or he has learned something (p. 3).

Schugurensky (2000) designates the second form of informal learning as *incidental learning*, which he describes as unintentional but conscious learning. In other words, the learner does not intentionally set out to learn something from an experience but upon reflection becomes aware that learning has taken place. The final form in Schugurensky’s conception of informal learning is *socialization or tacit learning*, the type of learning that we engage in every day with no specific intent to learn and no awareness of that which is learned. However, Schugurensky states “it is pertinent to note that although learning through socialization is usually an unconscious process, we can become aware of that learning later on through a process of retrospective recognition, which could be internal and/or external” (p. 5). With these elements of informal learning in mind, it is Schugurensky’s definition of informal learning that I used to frame this study.

**Experiencing nature.**

Connecting to and interacting with nature are activities that are difficult notions to describe. For example, is walking in the forest connecting to nature or is it interacting with nature or neither? To quantify one’s connectedness to nature several connectedness to nature
measurement tools are available. One such scale is Mayer and Frantz's, (2004) connectedness to nature scale which assesses an individual’s connection to nature based upon a Likert item sum scale. However, for the purposes of this qualitative study participants were invited to describe, through discourse, their connectedness or interactions with nature.

**Research Opportunity**

The popularity of geocaching has led to its adoption as a learning activity in formal learning settings; as a result, research has focused on the use of geocaching as a framework for structured formal learning activities specific to a range of disciplines such as geography, mathematics, history and others (Christie, 2007; Sherman, 2004; Taylor, Kremer, Pebworth, & Werner, 2010). Accordingly, there is a significant and growing body of research related to formal learning through the application of geocaching in a variety of disciplines. In contrast, there is a gap within the research literature related to how geocachers perceive the connection between geocaching, informal learning, technology, and awareness of nature while engaged in geocaching activities.

**Research Questions**

In this exploratory study I examined, by means of an interpretivist/constructivist approach, the lived experiences of geocachers as they make meaning while engaging in the technology-mediated location-aware sport of geocaching. The interpretivist perspective employed for this study is articulated by the definition put forth by Hesse-Biber and Leavy (2011) who state, “the interpretive position assumes the social world is constantly being constructed through group interactions, and thus, social reality can be understood via the perspectives of social actors enmeshed in meaning-making activities” (p. 5). Research in the
interpretivist/constructivist paradigm in this study allows, as suggested by Mertens (2009), the concepts of importance to emerge as they have been constructed by the participants. Using this articulated theoretical approach I sought to answer my main research question: What are the lived experiences of geocachers and their perceptions of the connections they make between themselves, fellow geocachers, technology, informal learning and nature? In order to answer the main research question the following sub-questions were researched: (a) How do geocachers experience nature through the interactions between themselves, fellow geocachers, cache locations, online and GPS technology; (b) How do geocachers perceive their learning while engaged in geocaching activities such as hunting for caches, hiding caches, online discussion forums and face-to-face special geocaching events or group geocaching; (c) What significance do geocachers attach to nature related to geocaching activities?

Limitations and Delimitations

The purpose of this study is to explore the phenomenon of the lived experience of geocachers as they made connections between themselves, fellow geocachers, informal learning, nature, and technology while engaged in the sport of geocaching. Accordingly, this study was not designed to examine formal learning nor the relationship between geocachers and technology other than the technology required to participate in the sport of geocaching. An important delimitation of the study was the geographic distribution of the study participants which were all located in the western Canadian provinces of British Columbia and Alberta.

In an effort to gain a more authentic understanding of the experiences of the study participants, I participated in a range of geocaching activities throughout the study and documented the experiences in the form of cache log posts and self-reflection. This study was
bounded by its methodology which placed importance on the subjective experiences; as a result the interpretation of the data is that of the researcher and as such may bias the interpretation of the findings. To minimize bias I acknowledged my presuppositions and assumptions and endeavoured to keep them front of mind during the duration of the study.

An additional limitation related to the study was the sample selection. Due to a low response from the initial invitation to participate in the study, I resorted to snowball sampling in order to obtain a suitable complement of participants. As a result, previously established social relationships between some of the participants may have had an influence on the outcome of the study. Equally important is the limitation imposed by the small number of participants which excludes the findings from further generalization.

**Significance**

The sport of geocaching is relatively young, but despite its age it is remarkably popular in community and educational settings as demonstrated by its significant traction with child and youth educators as represented in the research literature by Christie (2007); Taylor, Kremer, Pebworth and Werner (2010) and others. Some research has been conducted into the involvement of adults in geocaching activities with the focus on demographics and participant motivation as represented by the work of Chavez, Schneider, and Powell (2004). More recently attention has been paid to informal learning and geocaching by Clough (2009) in her study of geo-learners. Nevertheless, there is a need for more research in this area.

The significance of the current study resides in its focus on the active voice of geocachers as they shared their experiences about informal learning and connecting with nature. The findings of this study will add to the body of knowledge about the connections geocachers make between
themselves, fellow geocachers, informal learning, nature, and technology while engaged in a technology mediated location-aware sport. This study and its findings will be useful to adult educators interested in self-directed, collaborative, and experiential learning activities. In addition, this study will be of interest to environmental educators looking to connect learners to nature through technology. Also, environmental communicators and land and park managers may find useful the social media related aspects revealed in the study.

**Researcher’s Perspective**

Approaching this study from the perspective of a novice geocacher, veteran outdoor enthusiast, and an adult educator, I endeavored to gain an understanding of the phenomenon of geocaching, informal learning, and awareness of nature through engagement in a range of geocaching activities. Geocaching activities in which I participated included, searching for and finding geocaches, logging my finds, participating in a geocaching online forum, and attending a geocaching event. Prior to conducting this study I had only a superficial connection to the sport of geocaching. I had participated in finding a few geocaches in my neighbourhood but had not participated in the full range of available geocaching activities, nor was I familiar the worldwide popularity of the sport. It is my belief that active participation in the phenomenon under investigation will allow me to better understand and describe the experiences of the study participants.

**Researcher’s assumptions.**

My interest in geocaching is the result of experiences with GPS technology and outdoor recreation. I am attracted to the sport of geocaching because it combines informal learning; online computer based information, social media, handheld mobile digital technology, and a
connection to and awareness of nature. Consequently, my initial experience with geocaching generated my interest in the lived experience of other geocachers.

It is essential while conducting a phenomenological study that the researcher identify, acknowledge, and state, from the outset, assumptions and biases related to the phenomenon under investigation. In phenomenological research the process of suspending beliefs and prior assumptions is referred to as bracketing (Holloway & Wheeler, 2010). Bracketing is also referred to as the *Epoché*; Moustakas (1994) cites that “Husserl called the freedom from suppositions the Epoché, a Greek word meaning to stay away from or abstain” (p. 85). Moustakas (1994) further describes the Epoché

“…as a preparation for deriving new knowledge but also as an experience in itself, a process of setting aside predilections, prejudices, predisposition, and allowing things, events, and people to enter anew into consciousness, and to look and see them again, as for the first time (p.85).

For the purposes of this study I use the terms bracketing and Epoché interchangeably to denote the suspension of beliefs and prior assumptions. The following beliefs and assumptions originate from my own experiences with geocaching, informal learning, and awareness of nature:

- Geocachers connect with nature while involved in the sport of geocaching.
- Geocachers learn new skills and knowledge while taking part in geocaching activities.
- Geocachers become involved in geocaching through an introduction to it by a person already active in the sport (a geocacher) and come to the sport from a technology background or an outdoor enthusiast background.
- Geocaching is a competitive activity with the primary objective of finding as many geocaches as possible and recording one’s score online in the form of geocache find tally.
• Geocaching is a solitary sport which pits the geocache seeker against the geocache hider (geocache hider is also referred to as the geocache owner, creator, or developer).

• The primary motivation for geocaching is finding geocaches.

• The outdoors serves as the venue for the activity of geocaching.

• Geocachers, when seeking a geocaches, primarily focus on the technology, the GPS receiver, rather than on the outdoors.

• Learning associated with the sport of geocaching is self-directed, informal and related to the primary objective of finding geocaches.

• Learning while geocaching is episodic and confined to individual geocaches rather than a continuum of learning related to activities outside of geocaching.

• Active participation in the phenomenon under investigation will allow the researcher to better understand and describe the experiences of the study participants.

Summary of the thesis

The thesis presented provides a comprehensive report of the study in five chapters. Chapters one, two, and three the introduction, literature review, and research methodology respectively, frame the research project providing context, background, and design. Chapter four offers the findings of the study. Chapter five provides a reflection on the findings in the form of a summary of the findings including an interpretation of the data and recommendations for further research.
Chapter 2: Literature Review

The function of the literature review was to determine the extent of research conducted with regard to the topic of this study in an attempt to determine the gaps in the current knowledge and thus provide justification of the necessity and importance of this phenomenological study. The focus of this literature review was on the experience of geocaching related to informal learning, and awareness of nature. Accordingly, the bulk of the literature examined represents the research and knowledge currently available, associated with geocaching activities as they relate to informal learning and awareness of nature. Furthermore, the goal of the literature review was to establish the relationship of this thesis to previous studies and locate its position in the body of research that has formed the corpus of knowledge in the area of geocaching, informal learning and awareness of nature.

The literature review primarily focused on electronic databases that included: JSTOR; Academic Search Premier; Sage Premier; ERIC Resources in Education; EBSCO Host; ELSEVIER; CBCA Education @ Proquest; Taylor & Francis Online; and Emerald Journals Online. Books as well as grey literature such as theses, working papers, and conference proceedings were also included in the literature review. The searches were limited to literature in the English language pertaining to geocaching, adult and informal learning, and awareness of nature.

Geocaching

Traditional geocaching, as described briefly in the introduction of this study, is an outdoor treasure hunt game that encourages participants, referred to as geocachers, to find physical treasures, referred to as geocaches or caches (Groundspeak Inc., 2013a). Taylor, Kremer,
Pebworth, and Werner (2010) describe geocaching as “…high-tech hide-and-seek using trinkets and treasure rather than people” (p. 7). The rules of the game are simple:

1. “If you take something from the geocache (or ‘cache’), leave something of equal or greater value.
2. Write about your find in the cache logbook.
3. Log your experience at www.geocaching.com” (Groundspeak Inc., 2013b,"What are the rules of geocaching,” para. 3).

Thorough descriptions of the principles and practices of the sport of geocaching are provided through popular books and how-to guides (see, Cameron, 2011; Groundspeak Inc., 2013a; Gillin & Gillin, 2010; Sherman, 2004).

Due to the brief history of geocaching, the literature available extends only to the year 2000 and much of the early literature is, as stated by O’Hara (2008), journalistic rather than academic in nature. However, with an increase in the popularity of geocaching over the past 13 years it has gained popularity as an area of academic interest. According to Neustaedter, Tang, & Judge, 2010), the first research study of geocaching practices, “The Social-Psychology of a Technology Driven Outdoor Trend: Geocaching in the USA” was conducted by Chavez et al. (2004). The Chavez et al. (2004) study was followed by other studies, some of which are pertinent to this study and are noted in the following review.

As an emerging recreational activity, geocaching does not yet have the profile of other more traditional outdoor activities such as camping, hiking, angling, etc. Nonetheless, geocaching currently has a following of greater than five million geocachers searching for more than two million geocaches worldwide (Groundspeak Inc., 2013a). The game’s popularity is due, in part, to its accessibility through the internet and its appeal to both technology and outdoor
enthusiasts, as well as others interested in outdoor exploration and discovery (Sherman, 2004). As a developing recreation, geocaching includes a surprising variety of location-aware activities ranging from searching for traditional geocaches to attending social gatherings referred to as geocaching events. Because the content and maintenance of geocaching is user driven, the game of geocaching is in a state of constant evolution (Neustaedter et al., 2010). Identified in the literature are more than 35 distinct types of geocaching activities available to geocachers (see, Cameron, 2011; Geological Society of America, 2011; Gillin & Gillin, 2010; Groundspeak Inc., 2013; Kelley, 2006; Sherman, 2004; Taylor et al., 2010). Ihmäki (2012) notes that geocaching is unique in its evolution and argues, “Geocaching is the only multiplayer mixed reality game in which players themselves create and extend the game within different social media and other contexts (such as education and tourism services)” (p. 134). Silva and Hjorth (2009) suggest “GEOCACHING is also one of the first available LBMGs [location-based mobile games]” (p. 615).

The unique aspects of the game of geocaching were first investigated by Chavez et al. (2004) who studied the characteristics and motivations of a community of 133 geocachers in the Minneapolis-St. Paul, Minnesota area. Data were collected using a 26-item survey in which responses were rated using a five-point Likert scale. The survey focused on five specific areas of interest: experience with geocaching, benefits sought while geocaching, general recreational activity, environmentally appropriate behaviors, and demographic information (Chavez et al., 2004). The findings of Chavez et al.’s (2004) study provided an early view into the world of geocaching associated with forest park and recreation management. As the sport of geocaching evolved, other researchers took interest in its workings. Kelley (2006) offers a qualitative inquiry into the social location-based activities of geocachers across the United States. A subsequent
study by O’Hara (2008), examined the behavior, motivations and practices of 14 geocachers from the UK in an effort to better understand the social context of the online geocaching community. For his study O’Hara (2008) recruited a participant group which reflected the gender bias breakdown of the study by Chavez et al. (2004) and employed a qualitative approach in which the study participants were asked to keep a diary of their geocaching-related activities. In addition, participants were invited to share photographs to aid in clarifying the context of their geocaching activities. Further data were collected via in-depth participant interviews. O’Hara’s findings provide a view into the social aspects of geocaching.

Bearing in mind the importance of the social aspects of geocaching for the gaming industry, Ihamäki (2012) carried out a study of the interactive communication channels used by geocachers. According to Ihamäki (2012) the structure and development of the game of geocaching appears to provide an analogue for testing new multiplayer mixed reality games with similar structure. Ihamäki (2012) states,

geocaching is a game made by the players, who use GPS technology in a new way, develop it continuously, and create more interactive communication channels and services; it can thus be seen as a pilot test area for game designers and developers. (p. 133)

For her geocaching study, Ihamäki (2012) employed a case study approach based upon an interpretive analysis method referred to as interaction analysis. Jordan and Henderson (1995) describe interaction analysis as:

…an interdisciplinary method for the empirical investigation of the interaction of human beings with each other and with objects in their environment. It investigates human activities, such as talk, nonverbal interaction, and the use of artifacts and technologies,
identifying routine practices and problems and the resources for their solution. Its roots lie in ethnography… (p. 39)

Ihamäki (2012) collected data from 21 geocachers of various ages and geocaching experience through an online survey and analyzed it through qualitative content analysis. The analysis was grounded upon specific categories of awareness developed by Vyas, van de Watering, Eliëns, and van der Veer, (2007) and focused on five categories of awareness: forms of awareness; activities of awareness; agents of awareness; places of awareness; and contents of awareness.

The findings from Ihamäki's (2012) study suggest that geocachers use a wide range of communication instruments for collaboration. Ihamäki (2012) states, “as social media has taken on a more important role in our everyday lives, it has also become an increasingly involved part of geocaching’s context, structure and social network” (p. 149). Further, Ihamäki argues, networked social games such as geocaching “…are a wholly new form of community, of social interaction, and of social phenomena” (p. 149). These new forms of community, social interaction, and social phenomena related to geocaching have, for the most part, been scarcely researched as demonstrated by the lack of research literature pertinent to this geocaching topic. As a result, many of the connections geocachers form between themselves and the world have been unexamined. Of significance in Ihamäki's (2012) study are findings that suggest a connection between geocaching and the embodied computing elements visible within three specific levels of interaction: “human-to-physical-world interaction, human-to-human interaction, and human-to-machine interaction” (p. 149). These findings suggest that the activities associated with geocaching are collaborative and social in nature.
The previously mentioned literature provides a general description of geocaching and outlines the studies of the social aspects of the phenomenon. The following section presents a selection of literature related to learning and geocaching.

**Geocaching and Learning**

The sport of geocaching is relatively young but despite its age it is remarkably popular in educational settings. Its popularity as an educational tool is demonstrated by its significant use by child and youth educators in formal educational settings. However, Christie (2007) states, “since GPS receivers are emerging technologies, and geocaching is an emerging educational strategy, there is little, if any, formal research on these topics” (p.3). The scholarly literature related to geocaching and learning which does exist is primarily found in practitioner journals aimed at primary and secondary school teachers and consists of descriptions of the principles and practices of geocaching and application of instructional geocaching methods (Mayben, 2010).

Limited literature about learning associated with geocaching activities exists and much of what does exist concerns the use of geocaching in formal educational situations with children and youth. Geocaching is recognized by the education community as a useful tool and for delivering curricular content as demonstrated by the significant number of published articles about procedural and theoretical approaches to integrating instructional geocaching into primary and secondary school curriculum. Anderson (2008) in her article, “Geocaching for Fun and Learning”, suggests that geocaching supports new ways of learning and promotes community connections. Christie (2007) offers, on her website, a GPS and geocaching guide for educators. Similarly, Lary (2004) shares her ideas for the application of GPS and geocaching in the classroom. Combining the physical attributes of geocaching with the educational benefits of
problem-based learning, Pelton, Pelton, and Moore, (2007) describe and promote the practice of Geotrekking as a vehicle for primary, secondary and tertiary education curricular delivery. Geotrekking is described by Pelton, Pelton, and Moore, (2008) as “a collection of geocaches (traditional, virtual, or online GE) that are designed to provide clues, resources and scaffolding to support learners as they work toward achieving learning goals” (p. 9). Specific to instructional geocaching, Jewett (2011) considers multiple literacies and endorses the use of geocaching as a way of engaging students’ particular literacies in curricular activities. In their book, Geocaching for Schools and Communities Taylor, Kremer, Pebworth and Werner, (2010) provide a detailed description of geocaching and offer comprehensive lesson plans for 41 geocaching learning experiences.

Supporting the notion of geocaching as a valuable instructional tool are two studies related to the instructional geocaching phenomenon. The first, Buck's (2009) study into how grade nine students’ attitudes and mathematical achievements would be affected by a mathematics-based GPS mapping project that incorporated solving algebra problems with the sport of geocaching. The second, Mayben's (2010) investigation into instructional geocaching activities associated with engagement and achievement of middle school social studies students.

The purpose of Mayben’s study was to investigate how the use of GPS through instructional geocaching activities can engage students and promote achievement in a middle school social studies classroom. Participants for the study were selected, using a convenience sample, from a population of seventh-grade social studies classes in a southeastern state middle school. Using an experimental design approach, Mayben sought to measure students’ achievement before and after an instructional geocaching activity. Further data were collected using a 16-item GPS student perception survey to gauge participants’ opinion about the
instructional geocaching activity. The findings from the study suggest “instructional geocaching has significant potential as a technology integration strategy for teachers” (Mayben, 2010, p. 89). In addition, Mayben states “this study found that significant achievement gains can be [sic] also be attained by students who participate in instructional geocaching activities” (p. 89).

The other significant study related to geocaching and student achievement is Buck’s (2009) study involving 75 students studying ninth-grade algebra. The study involved the integration of GPS technology into the mathematics curriculum and employed an experimental design approach which included pre- and post-tests to assess student achievement and two surveys to measure participant attitude and perception of the GPS activity. Buck’s interpretation of the findings suggests that GPS activities improved participant attitude toward mathematics but was not effective in increasing student achievement. These two studies represent the current state of instructional geocaching empirical research in North America.

Outside North America, researchers have examined the association between geocaching and learning. The most notable studies include: Ihamäki’s (2007) case study of the participants of a community college course and Clough’s (2009) study “Geolearners: Informal learning with mobile and social technologies”.

In Finland, Ihamäki, (2007) conducted a case study involving Paasikivi Institute of Turku media assistant students participating in a course titled “New Sport of Geocaching and Virtual Communities Involved in the Game”, Ihamäki states, “…New Sport of Geocaching and Virtual Communities Involved in the Game’ was among the first courses which used geocaching in education in Finland” (p.156). The aim of Ihamäki’s study was to explore the use and benefits of instructional geocaching to teach media technology. In her study Ihamäki concludes, “geocaching has an educational and beneficial role, especially as a great learning activity for students,
allowing them to improve their skills in English, critical thinking, journalism, photography, media technology and geography” (p. 157).

In contrast with formalized instructional geocaching activities, some educators suggest that particular forms of geocaching provide opportunities for informal learning. For example, Lewis (2006) contends, “…there are few opportunities for families to participate in self-directed informal education activities. One such activity, however, is Geocaching” (para. 2). The type of geocaches Lewis supports for informal learning opportunities are *Earthcaches*. Earthcaches are education-based virtual caches that feature a unique geologic formation or process. Earthcaches are developed through the Geological Society of America to engage geocachers in knowledge-gathering activities related to geology. In order to find and log an Earthcache the cache seeker must gather and apply geological information related to the cache site (Lewis, 2006). The informal learning aspects involved in Earthcaching figure prominently in a notable study associated with informal learning and geocaching; Clough's (2009) study “Geolearners: Informal Learning With Mobile and Social Technologies”.

The focus of Clough’s (2009) study was how mobile and social technologies influence the informal learning of geocachers in the context of an online community of practice. Clough recruited participants for the study through geocaching online forums and selected from the 659 respondents of the online survey, a group of five geocachers to further investigate through case-study. The group of five geocachers was selected for the case-study based upon their connection to each other and geocache locations by virtue of having developed and located geocaches common to the group (Clough, 2009).

The structure of the game of geocaching with its virtual and physical sites provides opportunities for geocachers to connect and support each other’s informal learning. This notion is
supported by the findings of Clough's (2009) study which, “…revealed a growing undercurrent of cooperative informal learning through distributed networks of connected individuals who made innovative use of both mobile and social technologies to create a persistent digital narrative of location which served as a community resource” (p. i). The scholarly literature related to learning and geocaching presented in this review is categorized as formal or informal. It is therefore necessary to substantiate the notion of formality of learning. The following section provides a review of the literature associated with formality of learning.

**Formality of Learning**

There is much debate within the literature regarding formality of learning, and according to Malcolm et al. (2003), “the problem is a complete lack of agreement in the literature about what informal, non-formal and formal learning are, or what the boundaries between them might be” (p. 313). Consequently, selecting a learning framework for this study is critical for describing the concept of informal learning.

The formality of learning concepts have evolved from theories of adult education and, more recently, from those of lifelong learning. In the research literature several authors identify three types of learning, formal, non-formal, and informal. (Eraut, 2000; Knowles, Holton, & Swanson, 1998; Livingstone, 2001; Malcolm et al., 2003; Schugurensky, 2000). Malcolm et al. (2003) suggest, in much of the literature, informal learning is often explained in terms of what it is not; for example, informal learning is all learning that is not classified as formal learning. Similarly, Livingstone,( 2002) states, “Informal learning includes anything we do outside of organized courses to gain significant knowledge, skill or understanding. It occurs either on our own or with other people” (p. 2). To clarify Livingstone’s concept of informal learning it is best
viewed in contrast to a definition of formal learning; for instance, a pragmatic definition of
formal learning that is recognized in policy-oriented literature within the European Commission
is expressed in the “Communication from the Commission,” (European Commission, 2001) and
states that formal learning is “learning typically provided by an education or training institution,
structured (in terms of learning objectives, learning time or learning support) and leading to
certification. Formal learning is intentional from the learner’s perspective” (p. 32). Consistent
with this notion, Romi and Schmida (2009) view formal learning from an education perspective
and suggest:

Formal education is, indeed, the traditional education in school, whose attributes are clear
educational constructs (class, teacher, a set – often enforced – curriculum, exams and
grades), legally mandated responsibility to participate (both for the students and their
parents as guardians), a strong emphasis (although this is undergoing change) on
cognitive achievements, and standardization of the goals students are supposed to
achieve, up to and including a high-school diploma (p. 260).

Informal learning exists as a diversity of conceptions as outlined by Colley, Hodkinson, and
Malcolm (2003) and for this reason there is a range of arguments on the subject. Some scholars
contend that informal learning, non-formal learning and formal learning are present in varying
degrees in most learning situations (Colley et al., 2003). After reviewing much of the literature
on formality of learning it is important to note how I might in the current study capture
participants’ experiences of informal learning. Livingstone (1999) contents, “to study informal
learning empirically, educators have to focus on those things that people can identify for
themselves as actual learning projects or deliberate learning activities beyond educational
institutions” (p.2). Livingstone’s contention is supported by the findings from not only his own
study but from Tough's (1971) research into the learning efforts of adults. The body of adult
education and adult learning literature provides ample studies and theories for review. The
following section provides a review of the research and knowledge literature relevant to the adult
and informal learning related to the current study.

**Adult Self-directed and Informal Learning**

The current study focuses on adults involved in geocaching and their engagement with
informal learning and nature. Accordingly, the review of the scholarly literature must include
adult learning and, by association, informal and self-directed learning. Adult learning has been
noted as being different than the learning of children (Knowles, 1970; McKenzie, 1979). This
notion is the basis of andragogy, a theory of adult learning put forward by Malcolm Knowles
(1970). Knowles predicates his theoretical model on six assumptions about adult learners
compared to the pedagogical model of the education and learning of children. The six categories
of assumptions are:

1. the learners’ need to know
2. the learners’ self-concept
3. the role of the learners’ experiences
4. readiness to learn
5. orientation to learning
6. motivation (Knowles et al., 1998).

However, the notion of andragogy as strictly an adult learning model is contested by other
scholars and theorists (see, Cross, 1981; Elias, 1979; Houle 1972). In fact, Knowles admits that
andragogy, as an educational practice, can be applied across the life stage continuum and states:
“I believe that andragogy means more than just helping adults learn; I believe that it means helping human beings learn, and that it therefore has implications for the education of children and youth” (Knowles, 1970, pp. 38-39). Important to the current study is the assumption, by Knowles, that adult learners exhibit varying degrees of self-direction in their learning efforts. The notion of self-directed learning is supported by other theorists and scholars (see, Brockett & Hiemstra, 1991; Brookfield, 1984; Candy, 1991; Johnstone & Rivera, 1965; Knowles et al., 1998; Tough, 1971). The importance of the association of self-directed learning with informal learning is recognized by Schugurensky (2000) who contends that self-directed learning is a component of informal learning. Self-directed learning, as described by (Candy, 1991) is a method for learning or a learner attribute and he states, “for many authors, self-direction is seen simply as a method of organizing instruction….For others, self-direction is not so much a method of teaching as a characteristic of learners” (pp. 6-7). It is self-directed learning as a learner characteristic and its association with informal learning that are pertinent to the current study.

Foundational studies of modern adult self-directed learning began with “the seminal study that launched this direction of movement was Cyril O. Houle’s The Inquiring Mind, published by the University of Wisconsin Press in 1961” (Knowles, 1970, p. 42). In his qualitative study of the motivations and activities of adult learners Houle concluded there were three categories of adult learners: goal oriented, activity-oriented, and learning oriented (Knowles). Of these three types the learning oriented learner has come to be recognized as the self-directed learner within subsequent works by Houle (1984) and by other authors such as Johnstone and Rivera, (1965), Tough (1971), and Knowles (1975).

Following the work of Houle (1961), researchers Johnstone and Rivera (1965) conducted a national survey of the effects of adult education on the lives of America adults. They reported
their findings in, *Volunteers for Learning: A Study of the Educational Pursuits of American Adults*. Notably, Johnstone and Rivera (1965) suggest “...self-instruction is probably the most overlooked avenue of activity in the whole field of adult education” (p. 37). The work of Houle (1961), and Johnstone and Rivera (1965) provided a direction for research within the field of adult education as demonstrated by further studies such as Tough's (1971) *The Adult’s Learning Projects*. In his study, Tough investigated the self-planned learning efforts of a diverse population of adult learners. Data for Tough’s study were collected through carefully structured interviews. Findings from Tough’s study suggest self-planned learning constitutes a large portion of adult learning projects. In fact, Tough notes, “approximately two-thirds (68%) of all learning projects are planned by the learner himself” (p. 87). Similarly, Penland, (1979) and Livingstone, (1999) reported comparable findings in their respective national surveys of American and Canadian adult learners. It is apparent from the work of scholars such as Houle (1961, 1984), Johnstone and Rivera (1965), Tough (1971), Knowles (1970, 1975), Penland (1979), and Livingstone (1999) that a large portion of the adult population of North America engages in self-directed and informal learning.

**Connection, Engagement, and Awareness of Nature**

Connecting informal learning, geocaching, and awareness of nature requires an understanding of what awareness of nature implies and why such awareness is important. Kellert and Wilson (1993) contend, awareness of the natural world, is an innate dimension of the human experience. This intrinsic connection to nature is supported by Kellert and Wilson’s *Biophilia Hypothesis* in which they argue “… is the innate emotional affiliation of humans to other living organisms” (p. 31). Consistent with the biophilia hypothesis is the premise that the non-human
environment has great significance for human psychological wellbeing for as a species we possess an ecological unconsciousness (Fisher, 2002; Roszak, Gomes, & Kanner, 1995). Accordingly, human wellbeing, both physical and psychological is tied to the wellbeing of the ecosphere. It is this notion of the necessity for humans to connect to nature that helps guide this study.

The notion of assessing one’s awareness of nature is complex and the idea that it can be quantified has been well documented. A variety of quantitative instruments such as measurement scales have been straightforwardly assessed against quality criteria such as validity and reliability and are valuable tools for quantifying such data. According to Hefler and Cervinka (2009) measuring one’s awareness of or connectedness to the natural environment has been approached using a range of methods including a variety of scales, for example, the new ecological paradigm (NEP) scale (Dunlap, Van Liere, Mertig, & Jones, 2000), the connectedness to nature scale (CNS) (Mayer & Frantz, 2004), the environmental identity (EID) scale (Clayton & Opotow, 2003), the nature relatedness (NR) scale (Nisbet, Zelenski, & Murphy, 2009), and the inclusion of nature in self (INS) scale (Schultz, 2001). In fact, Hefler and Cervinka (2009) have compiled an extensive inventory of scales which includes 16 discrete instruments.

However, one of the drawbacks to quantitative connectedness to nature instruments such as measurement scales is that they do not allow for collection and analysis of a respondent’s rich description in their own words in the way qualitative in-depth interviews are able to. Furthermore, according to Hefler, Zeidler, and Cervinka (2009), connectedness with nature has affective and spiritual dimensions as indicated by their research and the analysis of the items of the CNS, EID scale, and NR scale instruments. Because affective and spiritual dimensions are
not easily quantified, qualitative methods of data collection and analysis are more suitably applied.

**Geocaching and Awareness of Nature**

The game of geocaching is described as a real-world outdoor treasure hunt game, suggesting participation in the game introduces the geocacher to outdoor environment. In reference to geocaching, Ihamäki and Tuomi, (2009) state, “the whole world can be seen as a game area” (p. 21). Thus, a player ought to, while geocaching, be aware of the outdoor environment. Yet investigations into geocachers’ awareness of the natural are only marginally represented in scholarly literature.

Robison (2011) provides a description of the use of geocaching as a class activity with a group of undergraduates attending the University of Bradford. The goal of the geocaching activity was to encourage the students’ “awareness of sustainability and environmental improvement initiatives undertaken around the University campus” (Robison, 2011, p. 48). Though Robison does not suggest the execution and evaluation of the geocaching activity was an empirical study he does endorse geocaching as a way of getting students outside and engaged with technology. Furthermore, Robison states, “one of the main benefits of the geocaching trial was that it was able to make what was previously invisible to students (or unnoticed), visible” (p. 55). In other words, geocaching provides a lens for viewing the world and a vehicle for guiding geocachers to places.

The use of geocaching as a way of supporting awareness of the natural environment has little research literature to support its use. Two reported empirical studies form the body of knowledge related to geocaching and awareness of nature: Ihamäki's (2007) “Geocaching at the
Institute of Passikivi-New ways of Teaching GPS Technology & Basics of Orientation in Local Geography,” which was mentioned earlier in this literature review, and Zecha's, (2012) “Geocaching, a tool to support environmental education! - An explorative study”. Zecha employed a qualitative exploratory approach to the topic of using geocaching to support environmental education. Data were collected through semi-structured interviews from four participants who were selected for their expertise in geocaching and environmental education. Findings from Zecha’s study suggest geocaching routes in nature are not static and therefore flora and fauna change with the seasons which demand a fluid curriculum for environmental education lessons. Furthermore, students while seeking geocaches must observe the conventions of geocaching and stay on the main trails to avoid damaging the environment. Equally important findings indicate the most effective geocaching activity for creating an environmental awareness is having students develop their own geocaching route.

**Summary of Chapter 2**

Geocaching has a short history as a leisure activity and a shorter history as a tool for learning. Current use of geocaching as a learning tool is in formal education situations with children and youth. Despite the use of geocaching in formal education situations there is relatively little research to support its pedagogic value. Furthermore, when compared to the existing research of geocaching for child and youth education there is less research concerning adult learners.

In contrast to the research regarding geocaching and adult learners there is a substantial body of research related to adults and connectedness to nature. However, there is little documented research related to adult geocachers and the connections they have with nature while
participating in the sport of geocaching. Considering the extent of learning projects in which adults participate, including geocaching, there is a gap in the research related to geocaching, informal learning and connectedness to nature. The above literature review is not intended to be an exhaustive appraisal; instead its function is a starting point for this research project. It is from the foundation of the works addressed in this literature review that informed this qualitative exploratory study and supports the notion that the phenomenon of geocaching is worth further study. In the next chapter, I present the research methodology used to examine how veteran adult geocachers perceive their informal learning and connection to nature while participating in the sport of geocaching.
Chapter 3: Research Methodology

In this chapter I describe the purpose and design of my research project as well as the rationale for the study, participant selection, data collection and analysis procedures, and issues of trustworthiness.

A Qualitative Research Approach

Investigating the experiences of learners as they pursue what Tough (1971) refers to as “learning projects” provides an opportunity for the researcher to gain an insight into the learning activities of others. My desire to explore the aspects of informal learning and the connection to nature by geocachers drove my approach to inquiry; I sought rich descriptions of their geocaching experiences. In essence I endeavored to study the experiences of others as described by Spradley (1979):

I want to understand the world from your point of view. I want to know what you know in the way you know it. I want to understand the meaning of your experience, to walk in your shoes, to feel things as you feel them, to explain things as you explain them. Will you become my teacher and help me understand? (p. 34).

There are a number of qualitative research approaches available to a researcher including: action research, case study, ethnography, ethnomethodology, feminist research, grounded theory, life history, narrative inquiry, participant-observer study, and phenomenological study (Yin, 2011). From the available approaches I elected to use a phenomenological method to inform my study. I worked with the study participants to co-construct and co-author their experiences through the use of the qualitative method of inquiry referred to as descriptive phenomenology. A phenomenological perspective allowed me to identify the essence of the experiences of the
participants. My intention was to describe the essence of informal learning and connection to nature of a group of veteran geocachers active in the sport of geocaching.

**Introduction to the Method**

Phenomenology represents both a philosophy and research approach (Finlay, 2008). The philosophical notions of phenomenology harken back to Kant, and Hegel which in turn gave way to a twentieth century philosophy of phenomenology developed by Edmund Husserl following World War One (Dowling, 2007; Groenewald, 2004). The origins of the term phenomenology date back to Greek philosophy. Stewart and Mickunas (1990) provide a definition of the term phenomenology along with a succinct description of its use as a method of inquiry:

As good a place to begin as any is the meaning of the term phenomenology itself. It is derived from the two Greek words: phainomenon (an ‘appearance’) and logos (‘reason’ or ‘word,’ hence a ‘reasoned inquiry’). Phenomenology is indeed a reasoned inquiry which seeks to discover the inherent essences of appearances. But what is an appearance? The answer to this question leads to one of the major themes of phenomenology: an appearance is anything of which one is conscious. Anything at all which appears to consciousness is a legitimate area of philosophical investigation. (p. 3)

Emerging as a philosophy, phenomenological research is focused on the investigation of the description of the lived experience. As a research approach phenomenology exists as a number of variants which share core characteristics. Smith, (2011) states the *Encyclopedia of Phenomenology,* “features separate articles on some seven types of phenomenology” (para. 35). In particular, phenomenology seeks to describe “the meaning of the lived experiences for several individuals about a concept or the phenomenon” (Creswell, 1998, p. 51). Similarly, Moustakas
(1994) acknowledges, “For Hegel, phenomenology referred to knowledge as it appears to consciousness, the science of describing what one perceives, senses, and knows in one’s immediate awareness and experience” (p. 26). Essentially, phenomenology, as a research approach, is an effort to describe the lived experience of a person or persons through descriptive analysis and reflection.

According to Spiegelberg (1969) the Phenomenological Movement evolved in phases, through the work of psychologists and phenomenologists primarily in Germany and France. Spiegelberg notes the German phase of the Phenomenological Movement included scholars such as Brentano (1838-1917), Carl Stumpf (1848-1936), Edmund Husserl (1859-1938), Max Scheler (1874-1928), Martin Heidegger (1889-1976), and Nicolai Hartmann (1882-1950). Further, Speigelburg states the French phase included Gabriel Marcel (1889-1973), Jean-Paul Sartre (1905-1980), Maurice Merleau-Ponty (1908-1961), and Paul Ricoeur (1913–2005). Of these scholars, Husserl and Heidegger are credited with being the founder and transformer of phenomenology respectively and figure most prominently in its evolution (Spiegelberg, 1969).

What Spiegelberg (1969) refers to as the preparatory phase of the Phenomenological Movement began with Brentano. Brentano, a psychologist, philosopher and lecturer at the University of Würzburg, and a professor at the University of Vienna, sought a “universal evolution, or better, a fundamental reformation of philosophy” (Meiner, as cited in Spiegelberg 1969, p. 29). In essence, Brentano’s purpose was a scientific reformation of philosophy and to this end introduced to psychological phenomenon the notion of intentionality, the directedness of consciousness towards an object (Spiegelberg, 1969). Brentano’s interpretation of intentionality acknowledges that perceiving is an intentional act of directedness of consciousness towards a physical object (Moustakas, 1994). However, Brentano’s influence on the development of the
Phenomenological Movement did not end with his contribution of the conception of descriptive psychology but was extended through the work of two of his students, Stumpf the founder of experimental phenomenology and Husserl the founder of transcendental phenomenology. (Spiegelberg, 1969).

Husserl, a mathematician, was inspired by Brentano to pursue the study of philosophy, the discipline in which he spent his career developing the notions of descriptive phenomenology which he considered to be the science of pure phenomena (Moran, 2000; Spiegelberg, 1969). Husserl’s descriptive phenomenology, also known as transcendental phenomenology, is based in the philosophical discipline of epistemology and is “primarily interested in the question: What do we know as persons?” (Koivisto, Janhonen, & Väisänen, 2002, p. 260) Hence, Husserl’s descriptive phenomenological methodology is directed toward the descriptions and meanings embedded within human experience (phenomena). Moreover, Husserl claims that a phenomenon is comprised of what exists in conscious experience. Further, he argues, “that it is through consciousness a person is present to the world” (Koivisto et al., 2002). Brentano brought to phenomenology the notion of intentionality which Husserl adapted to his unique conception. According to Husserl, “intentionality refers to consciousness, to the internal experience of being conscious of something; thus the act of consciousness and the object of consciousness are intentionally related” (Husserl as cited in Moustakas, 1994, p. 28). Husserl’s departure from Brentano’s concept of intentionality exists in his belief that the mind can be directed toward an object whether it physically exists or not (Moustakas, 1994).

Husserl is celebrated as the founder of phenomenology, however it was one of his colleagues at the University of Freiburg, Heidegger, building upon Husserl’s work, developed a competing variant of phenomenology that is characterized as existential phenomenology
otherwise known as interpretive phenomenology or hermeneutic phenomenology (Spiegelberg, 1969). Heidegger’s phenomenology is the basis of interpretive or hermeneutic phenomenological inquiry and is “a qualitative research methodology used when the research question asks for meanings of phenomenon with the purpose of understanding the human experience” (Crist & Tanner, 2003, p. 202). Husserl’s and Heidegger’s phenomenology differ in their respective philosophical underpinnings; Husserl favors an epistemological (the study of knowledge) approach whereas Heidegger advances an ontological (the study of being) approach. The two prominent approaches of phenomenological research evident within education research include Husserl’s descriptive and Heidegger’s interpretive phenomenology (Østergaard, Dahlin, & Hugo, 2008; Koivisto et al., 2002; Van der Mescht, 2004). Because the current study is based upon Husserlian phenomenology a further appraisal of the underpinnings of Husserl’s phenomenological methodology is in order.

**Husserl’s phenomenology.**

Husserl’s descriptive phenomenological methodology is recognized by its core elements which are intentionality, essences, intuiting, epoché, and phenomenological reduction. Husserl’s concept of intentionality shares with Brentano’s the element of directedness of consciousness but differs in that the entity to which consciousness is directed can exist physically or not. Moustakas (1994) states, “although Brentano believed that when an individual perceptually experiences an object the object always exists, Husserl held to the position that the object may be imaginary and not exist at all” (p. 28). Moreover, Husserl argues,

> Intentionality refers to consciousness, to the internal experience of being conscious of something; thus the act of consciousness and the object of consciousness are intentionally related. Included in an understanding of consciousness are important background factors...
such as, stirrings of pleasure, early shapings of judgment, or incipient wishes. (Husserl as cited in Moustakas, 1994, p. 28).

The goal of descriptive phenomenological research is to identify the essences of a phenomenon and describe them through analysis and reflection. Essentials are identified as the core meanings or fundamental structures of a phenomenon (Dahlberg, 2010; Koivisto et al., 2002; Natanson, 1973). Further, Natanson (1973) writes, “Essences are unities of meaning intended by different individuals in the same acts or by the same individual in different acts” (p. 14). Accordingly, the intent of this study was to identify the essences of informal learning and connecting to nature of the participants while they engage in geocaching.

While essences represent the structure of a given phenomenon the researcher gains an understanding of the phenomenon through intuition. Moustakas (1994) writes, “Intuition is another key concept of transcendental [descriptive] phenomenology” (p. 32). Descriptive phenomenological intuiting is the process through which the researcher gains knowledge of the phenomenon from the descriptions offered by the study participants (Speziale & Carpenter, 2007). Thus intuition in Husserlian terms according to Moustakas (1994) “…is the beginning place in deriving knowledge of human experience, free of everyday sense impressions and the natural attitude” (p. 32). In other words, free from one’s presuppositions.

In phenomenological research the process of suspending beliefs and prior assumptions is referred to as bracketing (Holloway & Wheeler, 2010). Bracketing is also referred to as the Epoché; Moustakas (1994) writes “Husserl called the freedom from suppositions the Epoché, a Greek word meaning to stay away from or abstain” (p. 85). Moustakas (1994) further describes the Epoché.
...as a preparation for deriving new knowledge but also as an experience in itself, a process of setting aside predilections, prejudices, predisposition, and allowing things, events, and people to enter anew into consciousness, and to look and see them again, as for the first time (p.85).

Epoché or bracketing is deemed necessary prior to the process of phenomenological reduction, Harrison-Barbet (n.d.) writes,

In bracketing our experiences we suspend belief in the actual existence of intended objects — be they physical objects, persons, minds, propositions, or meanings….We are thus led back ('re-duced') to the intrinsic experiences themselves. This is what Husserl means when he says he wants to get "to the things themselves" (zu den Sachen selbst) — a 'thing' being an intuition... (para. 4).

The phenomenological reduction allows the researcher to once again return to the original consciousness of the phenomenon of interest (Speziale & Carpenter, 2007). Moustakas (1994) states, “ultimately through the Transcendental Reduction we derive a textural description of the meanings and essences of the phenomenon, the constituents that comprise the experience in consciousness, from the vantage point of an open self” (p. 34).
Rationale for Choosing the Method

One of the limitations to quantitative instruments such as measurement scales and frequency counts is that they do not allow for collection and analysis of a respondent’s description of the lived experience (Leedy & Ormrod, 2012). The focus of this study was to explore the lived experience of geocachers’ learning activities while they engaged in the outdoor sport of geocaching. Therefore a qualitative approach that enabled me to develop rich descriptions of participants’ experiences was appropriate. Furthermore, Chavez et al., (2004) suggest that future research into the sport of geocaching include qualitative studies that explore aspects such as “the technological connection to other life domains…” (pp. 11-12).

Supporting the choice of using a qualitative approach is the traditional use of qualitative research in “the social sciences and applied fields such as education, regional planning, nursing, social work, community development, and management” (Marshall & Rossman, 1999, p. 1). Bourke (2007) identifies Groenewald (2003), Reinsel (2001) from South Africa and Canada respectively along with Willis (1999) and Bednall (2006) from Australia as researchers who have applied a phenomenological approach to research in education. Accordingly, from my perspective as an adult educator, a qualitative approach is an appropriate method of inquiry for the research topic and purpose of the current study. In consideration of these notions, I have chosen a descriptive phenomenological approach for this study.
Methodology and Research Design

To explore the phenomenon of informal learning, as experienced by geocachers, requires a research strategy that allows for collection and analysis of data that contain rich descriptions of the phenomenon. The strategy for this study incorporated: the purposeful selection of participants based upon criterion sampling; data collection through in-depth interviews to gather rich descriptions of the phenomenon; data analysis which elucidates significant statements; and reduction of the statements into meanings of statements resulting in the emergence of themes of meaning (Creswell, 1998).

Sample Selection: Locating the Research Participants

A phenomenological study requires purposeful sampling of the target population who has had direct experiences related to the phenomenon being explored and according to (Patton, 2002) “purposeful sampling focuses on selecting information-rich cases whose study will illuminate the questions under study” (p. 230). Polkinghorne as well as Creswell suggest “a typical sample size is from 5 to 25 individuals, all of whom have had direct experience with the phenomenon being studied” (as cited in Leedy & Ormrod, 2012, p. 145). For this study I selected 11 participants that met the specified criteria.

Research participants were selected from the British Columbia Geocaching Association (BCGA) and the Calgary Area Cachers geocaching group. Initial contact was made through an online invitation to participate in the research project. A subsequent invitation was made, face to face with geocachers attending a geocaching event. Because I sought information-rich cases from which to gather data I used criterion-based sampling to select the research participants. The criteria used to select participants included geocachers who had:
- 50 or more cache finds;
- hidden at least a single cache;
- participated in online geocache discussion forums;
- participated in at least one geocache event or group geocache hunt;
- had a significant experience with nature while geocaching (significant as determined by the participant);
- directed their own learning project related to geocaching.

The initial invitation to participate in the study resulted in expression of interest from six participants. The final number of 11 participants was the result of snowball sampling through word of mouth from the initial participants to other geocachers. The invitation to participate can be found in Appendix 1. Demographic information was collected only to ensure participants met the stated criteria. For the complete demographic questionnaire see Appendix 4.

The Site of the Research

The sport of geocaching takes place in a hybrid world of virtual and physical spaces in which information is exchanged and caches are hidden and sought. Accordingly, the site for this research was both virtual and physical. In addition, geocaching virtual space exists in synchronous and asynchronous realms. The synchronous realm allowed me to connect with the study participants by telephone and through online video communication. In contrast, the research site also included an asynchronous realm in which communication between me and the participants took place in the form of email. In addition to communication between me and the participants the asynchronous geocaching realm included, online log entries, forum dialogue, and hand written entries in geocache log books. Thus, the research site was populated by an online
geocaching community which was represented by members of the British Columbia Geocaching Association and the Calgary Area Cachers geocaching group.

**Role of the Researcher**

The role of the researcher in descriptive phenomenology is to describe the phenomenon common to multiple individuals and to construct a composite of the experience (Creswell, 1998). As previously discussed in the introduction, Schugurensky (2000) suggests there are three forms of informal learning:

1. self-directed learning;
2. incidental learning;
3. socialization or tacit learning.

Using the descriptive phenomenological method I sought to discover the essence of the phenomenon of informal learning as the lived experience of geocachers who were actively engaged in the sport of geocaching and had identified geocaching as a means to connect with members of the geocaching community and the natural environment. From the descriptions of participants’ lived experiences I constructed meaning in the form of a composite description which emerged from the data collected. My role as researcher, within this study, alternately included researcher as instrument, participant (through self-reflective journaling), inquirer, interviewer, analyst, and writer. In the tradition of qualitative research the researcher is conceptualized as the research instrument; or as Lincoln and Guba (1985) contend, “the instrument of choice in naturalistic inquiry is the human…” (p. 236). To exemplify the concept of researcher as instrument Barrett, (2007) states:
In the field, the researcher conducts observations and interviews and gathers documents and artifacts that illuminate the phenomenon under study. Since the researcher’s perceptual acuity in observation and finely developed capacity for eliciting from respondents are paramount, the concept of the researcher as instrument is prevalent in qualitative literature (pp. 417-418).

Barrett (2007) further contends that once the data is gathered the researcher then becomes the instrument that shapes the raw data into evidence to support the research findings. For this phenomenology I relied on the research participants to take up the role of observers of the phenomenon as well as co-researchers to help shape and verify, through member checking, the evidence uncovered through the research process.

**Data Collection Procedures**

The data collected for this study consisted of transcribed recorded audio of in-depth interviews. I gathered data via in-depth semi-structured interviews with each participant. Interviews were conducted with the research participants via telephone, online audio/video technology (Skype) and, in one case, face to face. Participant interviews were recorded using a digital recording device. Before the data collection interviews were conducted the initial interview questions were piloted with two active geocachers. Based upon the feedback from the pilot, additional introductory questions were added. The additional interview questions were considered necessary to help introduce the participants to the context of the study. The complete interview script is provided in Appendix 3.
Data Analysis

Once collected and transcribed, I organized and coded the data for analysis. Patton (2002) provides a caveat for the data analyst, “qualitative analysis transforms data into findings. No formula exists for that transformation. Guidance, yes. But no recipe. Direction can and will be offered, but the final destination remains unique for each inquirer, known only when-and if-arrived at” (p. 432). Considering Patton’s advice the following steps for organizing and analyzing data were followed beginning with Creswell's (2003) six steps of qualitative data analysis which includes:

1. Organize and prepare data for analysis (transcribe and sort).
2. Read through all the data to obtain a general sense of the information.
3. Code the data.
4. Use the coded data to generate themes and descriptions.
5. Compose a narrative that incorporates themes and descriptions.
6. Create an interpretation of the data.

Creswell further recommends blending the six generic steps listed above with the specific steps of the particular research design employed.

Accordingly, for this study I employed Colaizzi’s (1978) seven steps of phenomenological analysis. The seven steps are as follows:

1. Read and re-read all of the participants verbatim transcripts of their experience of the phenomenon in order to become familiar with and to make sense out of them.
2. Review each description and extract from the phrases or statements which are significant to the phenomenon being studied.
3. From the significant statements formulate meaning in the terms of the participants own context.

4. Review the formulated meanings and arrange them into clusters of themes. These clusters of themes which will reveal patterns or emergent themes from the data.

5. Integrate the themes into an exhaustive description of each participant’s experience of the phenomenon.

6. Through the writing and rewriting of the exhaustive descriptions identify the fundamental structure for each.

7. Return to the participants and share the findings with them to obtain validation, and if necessary adapt any new information to attain congruence with participants’ lived experience (1978, pp. 59-61).

Figure 1 below provides a concise description of the data analysis procedure used for this study.
In order to acquire a sense of the participants’ descriptions of their lived experience I actively listened to each of the participant’s audio recordings and on three occasions and transcribed five of the 11 interviews. The other six interviews were transcribed by a professional transcriptionist. Following completion of the transcription process I cross-checked all of the transcriptions with each corresponding audio recording and read each of the transcripts several times. To track each significant statement each transcript was coded by numbering each line and identifying each participant’s transcript. For example, lines 1-10 of participant 1 were coded P1, L: 1-10 and lines 245-264 of participant 2 were coded, P2, L: 245-264 and so on.
Extraction of Significant Statements

Significant statements were identified as participants’ statements that related to the research questions or were emphasized, in some way, by the participant. For example, emphasis was indicated by a participant’s excited response to an interview question or a statement which was preceded with a moment of reflection before its delivery. Active listening was critical for identifying nuanced emphasis during each participant’s interview. From the participants’ transcripts I extracted and numerically coded significant statements pertaining to the phenomenon of the current study. Each significant statement was assigned a numerical code, 1, 2, 3, and so on. I selected and reviewed each extracted significant statement to ensure that they applied to the goals of the study. During the initial selection of significant statements I identified the content of several of the statements to be repetitive, as a result, only the most descriptive statements that characterized the goals of the study were included for analysis. To support the trustworthiness of this part of the study my supervisor and a peer debriefer reviewed the extracted significant statements.

Formation of Formulated Meanings from Significant Statements

Following extraction and coding of significant statements from each participant’s interview transcript, I took what Colaizzi (1978) refers to as the precarious leap. The precarious leap represents the process of formulating meanings from the participants’ significant statements. Each formulated meaning was then numerically coded in relation to its significant statement. Formulated meanings were coded as FM 1, FM 2, FM 3 and so on.
Creation of Cluster Themes and Formation of Emergent themes

Cluster themes were created by grouping formulated meanings of similar subject matter. Then each cluster of themes was coded with a descriptive thematic label. The cluster themes were then grouped based upon commonalities to form emergent themes. The combination of significant statements, formulated meanings, cluster themes and the resulting emergent themes provided a descriptive representation of the lived experience of the participant geocachers.

Strategies for Validating Findings

The trustworthiness of this study exists in its design and maintained through the efforts of the researcher to produce and maintain credibility and dependability. According to Lincoln and Guba (1985) credibility can be demonstrated and supported by the researcher’s prolonged and deep engagement in the exploration of the phenomenon under investigation. Therefore in an effort to develop and maintain deep and prolonged engagement with the phenomenon under investigation I engaged in the location-aware sport of geocaching and documented my experience of the phenomenon through reflective journaling. To manage researcher bias it was important to allow the voice of each participant to emerge from the data. Accordingly, I bracketed my personal biases, beliefs, and presumptions while conducting the data analysis. To provide transparency in the interpretation of data I recorded, in text, my biases, beliefs, and presumptions at the beginning of this report of the study. Journaling helped me to recognize some of the nuances of the phenomenon as I collected, transcribed, cross-checked, organized, coded, and analyzed the data. To further maintain trustworthiness of the study and to support its credibility, Lincoln and Guba (1985) suggest the practice of member checking, “whereby data, analytic categories, interpretations, and conclusions are tested with members of those stakeholding groups
from whom the data were originally collected…” (p. 314). The member check, “…is the most crucial technique for establishing credibility” (Lincoln & Guba, 1985, p. 314). As outlined previously in in the steps of data collection, management and analysis, member checking is an explicit component of data analysis and is referred to in step seven of Colaizzi’s (1978) phenomenological analysis as validation. Consequently, member checking was built into the research process. Participants were provided with the verbatim textual transcript of their interview followed by the significant statements, formulated meanings, and the exhaustive description of the phenomenon for validation.

Further efforts to support the trustworthiness of this study included the production of thick descriptions of the participants’ experiences of the phenomenon. Holloway and Wheeler (2010) describe thick description as “detailed portrayals of the participants’ experiences, going beyond a report of surface phenomena to their interpretations, uncovering feelings and the meanings of their actions” (p. 7). Provision of thick descriptions provide a path which readers of the study can follow and in doing so helps provide them with context of the phenomenon and according to Creswell (2003) “…give[s] the discussion an element of shared experiences” (p. 196). Thick descriptions of the phenomenon are the result of a combination of data collection and analysis and for this study resulted in an exhaustive description of the shared experience of geocaching.

As suggested by Creswell (2003), and Leedy and Ormrod (2012), I worked with a peer debriefer who reviewed my data analysis at two critical stages of the process. First she reviewed the early stages of my analysis and provided feedback as to the accuracy of my interpretations. Later she followed up with a review of the final stage after I had completed the analysis to ascertain whether or not I had drawn valid conclusions.
**Ethical Issues**

The anticipated ethical issues inherent in this study included issues of confidentiality of participants’ identity, storage and security of data, and the establishment of informed consent (see informed consent form Appendix 2). Participant anonymity was protected through the use of pseudonyms and data remained confidential. Data generated during the study was managed on a single computer and backed up and stored on two USB flash drives which were secured under lock and key in a file cabinet located in my office. Participants were briefed in regard to the matter of informed consent and the nature of their participation in the study. Each participant was informed that their participation was voluntary and they may, for any reason, withdraw from the study.

**Summary of Chapter 3**

In this chapter, I described the research methodology for carrying out this descriptive phenomenological study. I used criteria based sampling which combined purposeful and snowball sampling to select participants. Data were collected from the participants through in-depth, semi-structured interviews. The data analysis required the identification of significant statements from each transcript; followed by the creation of formulated meanings from the significant statements. The formulated meanings were then clustered, based on relatedness, to represent cluster themes. The cluster themes were then grouped based upon similarities resulting in the emergence of main themes. Trustworthiness of the study was supported by deep engagement with the data, member checking, and review by a peer debriefer.
Chapter 4: Findings

In this chapter, I outline the findings of my research. The purpose of this study was to provide an exhaustive description of the lived experience of how geocachers experience nature and participate in informal learning while engaging in geocaching activities. The main research questions of the study, which evolved from the research purpose, were: (a) How do geocachers experience nature through the interactions between themselves, fellow geocachers, cache locations, online and GPS technology; (b) How do geocachers perceive their learning while engaged in geocaching activities such as hunting for caches, hiding caches, online discussion forums and face-to-face special geocaching events or group geocaching; (c) What significance do geocachers attach to nature, related to geocaching activities?

Data for this study were analyzed according to Colaizzi's (1978) method. Accordingly, interviews were recorded and transcribed. I then listened to the recorded interviews, read and reread the transcripts multiple times to gain an understanding and a feeling for each of them. From each transcript I selected statements significant to the phenomenon.

From the significant statements I developed formulated meanings which I then organised into cluster themes that evolved into emergent themes. The results of my analysis were then developed into an exhaustive description of the lived experience. The findings, including the description of the lived experience, were returned to the study participants for validation and feedback. I have provided the findings of this study organized under the main themes in the order in which they emerged during the data analysis.
Extraction of significant statements

From the participants’ transcripts I extracted and coded 216 significant statements which I then reviewed to ensure each one applied to the objectives of the study. The initial selection of significant statements revealed 268 statements. However, many of the statements I determined to be repetitive, as a result, only the most rich and descriptive statements that characterized the goals of the study were included for analysis, thus reducing the number to 216. To support the trustworthiness of the study my supervisor, peer debriefer, and the participants involved in the study reviewed the extracted significant statements. Figure 2 below provides an example of extracted significant statements from a participant’s interview transcript. The highlighted and bolded portions of the participant’s interview transcript represent statements deemed significant to the study.

Figure 2: Example of how significant statements were identified and extracted from an interview transcript. (Participant transcript 1, lines 164-179).
Formation of formulated meanings from significant statements

Following extraction and coding of significant statements from each participant’s interview transcript, I took the precarious leap and formulated meanings from the participants’ significant statements. Each formulated meaning was then numerically coded in relation to its significant statement resulting in 216 formulated meanings. Every formulated meaning was the result of determining the meaning of each significant statement free from presuppositions and bias. Figure 3 below illustrates an example of the development of formulated meanings from significant statements and their corresponding codes.

<table>
<thead>
<tr>
<th>Significant Statement Code</th>
<th>Significant Statements</th>
<th>Formulated meanings</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>I think I got interested in all this technology because I wanted to build a technology cache. P1, L: 399-400</td>
<td>Applying new technology to geocaching. FM 9</td>
</tr>
<tr>
<td>10.</td>
<td>It’s in the out of doors and it’s very asynchronous, ‘cause people are doing this at different times, and logging at different times. But we’re all working on the same thing. P1, L: 460-461</td>
<td>A geocache presents a spatial and temporal datum for geocachers to visit, resulting in geocachers having similar experiences of a cache find but different realities separated by time. FM 10</td>
</tr>
<tr>
<td>11.</td>
<td>You know, when you’re trying to tie all those things together, that the shared success is definitely the connection between the other geocachers and myself and um obviously that is the sport of geocaching as well but to extend that into learning and awareness of nature would have to be the puzzle caches with questions, the solution comes from learning about nature. P1, L: 551-555</td>
<td>Nature themed puzzle caches require cache seekers to gather information about specific natural phenomena to solve the challenges present in the puzzle. Success is dependent upon gathering the pertinent information and solving the puzzle. FM 11</td>
</tr>
</tbody>
</table>

Figure 3: Development of formulated meanings from significant statements.
Cluster themes

Cluster themes were derived through the grouping or clustering of the formulated meanings that represented similar ideas related to the objectives of the reported study. Clustering of the formulated meanings resulted in the development of 31 cluster themes. Figure 4 below provides an example of how coded formulated meanings derived from corresponding significant statements were grouped together to form the cluster theme, awareness of nature.

<table>
<thead>
<tr>
<th>Coded formulated meanings</th>
<th>Cluster themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Coding format:</em> FM 30 represents the formulated meaning corresponding to significant statement 30. FM 196 represents the formulated meaning corresponding to significant statement 196 and so on.</td>
<td>Awareness of nature</td>
</tr>
<tr>
<td>Expressed empathy and demonstrating a concern for the natural environment through the efforts to aid a wild animal in distress. FM 30</td>
<td></td>
</tr>
<tr>
<td>Enjoying the journey and surroundings while seeking a geocache. FM 196</td>
<td></td>
</tr>
<tr>
<td>Geocaching provides an opportunity to experience, consider, and reflect on one’s relationship with nature. FM 201 Seeing creatures in their natural habitat is an awe-inspiring experience. FM 204 Developing an awareness of our impact on the natural environment. FM 206</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: Development of cluster themes
Emergent themes

Arising from the 31 cluster themes were seven emergent themes that form the foundation of the findings reported in the study. The emergent themes were:

- Using technology
- Interconnectedness
- Opportunities for informal learning
- Interdependence with nature
- Informal learning
- Drive for self-fulfillment
- Intuitive sensing

Each of the emergent themes were defined, discussed, and clarified with excerpts from participants’ transcripts. Figure 5 below provides a concise summary of the emergent themes and associated cluster themes.
Figure 5: Summary of the emergent themes and associated cluster themes
The themes that emerged during the data analysis gave shape to the lived experience of the study participants. Through the course of extracting significant statements, creating formulated meanings, and developing cluster and emergent themes the narratives of the participants revealed a representation of the lived experience. The following section provides a description of the emergent themes supported by the narratives of the participants.

**Using technology.**

Heidegger (1977) suggests technology is a human activity as well as a means to an end. It is Heidegger’s notion that I use to describe the theme *using technology.* In the reported study participants described occurrences of technological innovation applied to geocaching activities and the use of technology as a means of accomplishing geocaching tasks. The technology employed in the sport of geocaching includes: Global Positioning System receivers (GPSr), Smartphones, computers, tablets, and related electronic devices; the internet and related sites as well as specialized electronics such as *arduinos* and *radio frequency identification (RFID) units.* An “arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware [circuit board] and software[programming language]” (Arduino, n.d., para. 1). RFID “refers to any electronic device that uses radio waves to facilitate the communication of data for the purpose of identification…” (The RFID Network, 2011 October 5, para. 1).

The premise of geocaching is that it is a treasure hunt facilitated through the use of GPS and related technology. Participants spoke of the technology associated with geocaching with enthusiasm and viewed it as essential to the sport. Furthermore, participants embraced a range of geocaching related technology.

Participant 1 expressed his fondness of building and applying specialized technology to the sport of geocaching. His application of specialized technology found outside traditional
geocaching equipment is an example of Heidegger’s notion of technology as a human activity. In other words, the process of technology is present in the act of finding alternate uses for existing technology and applying it in new ways, in this case, to geocaching. Participant 1 stated:

*Where the technology comes in the GPS technology, location based technology I just have a love of technology and uh when I was backpacking in the outdoors I was one of the first people buy one of the old GPSr and say you know if I get lost uh I’m gonna be able to figure out where I am and this was the old, old military spec uh 12 satellite uh took 50,000 batteries uh you know it used to take 10 minutes to figure out where you were and you know you were lucky if it was half a mile accurate and you know the size [of a] small television set. Uh moving into modern, I’ve done a lot of sort of taking modern technology and bringing it into geocaching and that’s where my boxes in uhm so these are actually two caches that are already uhm in place in the world uhm and these are the backup units. So I always build two, in case one gets stolen or stops working and the first one is based on Radio Frequency Identification (RFID) and so the RFID technology is meant to be proximity aware. It’s used a lot of the time if you go to Esso and you have one of those pay tags on you just kind of wipe it in front of the gas thingy charges your credit card, it’s RFID based and this RFID based cache, RFID chips, these things [participant 1 places RFID chip on the table] so you find this cache and it’s it says it shows the coordinates on the front panel and you have to figure out where this chip is and when you swipe it it says okay you’ve found the first stage, now move to the second stage and uh um so as far as the specific technology goes, it’s been great, learning about modern day technology and trying to bring them back into the geocaching world. It’s just*
a swipe and it should update since you found stage 2. So it takes you on a little loop it’s amazing so… (Participant 1, L: 23-43).

The same participant described his attraction to technology which fueled his interest in the sport of geocaching:

Um so I’ve taken three days where I’m working from home ’cause he’s in there banging around and he starts talking to me about geocaching. I’m attracted by the technology, you know, here’s this electronic gizmo, it’s not cheap which makes it more attractive and uh it’s outdoor based and he starts telling me stuff that’s just incredible like I can’t believe it (Participant 1, L: 107-111).

Another participant described learning associated with technology through his description of how geocachers evaluate various forms of geocaching technology:

I think again and it’s been at events where you’ve got a question or I see a lot of people that they’ve had one GPSr and they they’re trying to decide on how do they upgrade, what do they upgrade to and you see a lot of people talking at events about showing what… what works on one GPSr versus another and make some suggestions on which one’s they like the best. So it’s sort of a learning thing on that thing, you know, is that technology advances, I know some people still think the iPhone or the whatever it is, Android are, it’s a detriment to geocaching but if you explain to them how it works and some people really use it all the time so it’s, everyone’s going to have their own views on what’s good and bad but if you hear them, you can make your informed decision and people seem to be pretty open to telling what they like or don’t like about various bits of technology for geocaching (Participant 3, L: 237-247).
The essence of the sport of geocaching supports the theme using technology. In fact, the sport is built on the idea that geocachers seek locations via location-aware devices. In actuality the primary pieces of equipment used to locate geocaches are GPS satellites that transmit signals and GPS receivers (GPSr) that translate the signals into coordinates. Without this technology geocaching would not exist.

Participant 11 described how she integrated the use of GPS technology for wayfinding with the activities associated with enjoying the natural environment around her. She used the GPSr as a means to an end; the end being enjoying nature while searching for and finding a geocache:

Does it interfere [with my connection to nature]? If I’m watching the GPSr, yes, but normally we, you know, get a direction, it’s a trail, the GPSr goes away while we’re walking on the trail until we come to a fork in the road and then I check the GPSr to see where, which direction to take. So we’re still out there, we’re still enjoying the woods, still smelling the smells, hearing the sounds, and um, the GPSr interferes only in that it, you know, like if I focus on it, I’m not focused on nature, but um, and after we’ve found all the caches on the trail, we enjoy the trail for itself on the way back to the car so it’s um, it doesn’t interfere, it doesn’t enhance it so much but it gets us there. A cache will take us places we’ve never been, the cache brings us to new spots which we enjoy while we’re there (Participant 11, L: 235-242).

Learning about and with technology was a common experience with all of the participants. For example, participant 7 described using software designed especially for geocaching as a means of organizing geocaching information:
I use it all the time now because it’s fantastic and it’s a way to organize what you’re going to do for the day. It’s Geocaching Swiss Army Knife and that’s why they call it GSAK. But it’s pretty cool and people run courses on how to use GSAK ‘cause it’s really a technical program and there’s lots of macros you can make and I get some of them but it’s not worth my time, because it takes so long to do any of that. Like making my own macros, I usually go searching in the forums and find the macro and use somebody else’s. (Participant 7, L: 350-355).

GPSrs are described by participants as being the primary tool for geocaching. In addition, geocaching applications for smartphones are becoming more common with geocachers. One advantage smartphones currently have is their wireless access to the internet. This access allows users, while still on the trail, to communicate and quickly post images of their geocaching activities to social media sites such as Facebook. Participant 10 described how she uses smartphone technology for sharing images of her geocaching experiences:

There’s quite a few. We were in the mountains you usually get it because my Facebook page, I don’t use it for networking as much anymore, usually it’s pictures of stuff I’ve come across when I’m geocaching. Again it goes back to the smartphone because I can take a picture and I can upload it right where I am (Participant 10, L:165-168).

Seven of the participants actively recorded images of their geocaching experiences using one or more of the following devices: camera enabled GPSr, smartphone, and/or camera. The description below provides an insight into how one geocacher shares her geocaching experience online:

Um, I like taking pictures. It’s a lot of fun and I post them on Facebook for my family back in the Kootenays and my friends I go out with, we just laugh all the time and it’s
really good exercise, like we’ve gone biking, hiking up mountains and the views at some caches are amazing, like people hide caches to share their world or their community so like we went to Saturna Island one day and there’s a geocache on top of this goat trail and it was the most amazing view I’ve ever seen in my life and I can’t believe I got to go see it and if I wasn’t geocaching I’d never would have been there. I’ve been to every Island in the Gulf Islands here, yeah [laugh]. I mean, how cool is that (Participant 7, L: 99-106)?

Locating oneself relative to a geocache is the essence of geocaching. Participant 10 discussed the advantages of combining technologies to maximize efficiency while seeking geocaches:

Map work. If I take my own time with my GPSr and a map I can usually plot my path through the mountain range with the least amount of ups and downs, you know what I mean? Where if I was rushed into it, I’ll follow the GPSr more, you know what I mean. Basically I’ve learned not to rely on one piece or tool but to rely on the tools I have available for me (Participant 10, L: 277-281).

The theme that emerged of using technology as an activity and a means to an end highlights the relationship participants have with technology. Participants of the current study described the adoption of outside technology for novel uses in geocaching activities. Outside technology is defined as technology not traditional associated with geocaching. New and innovative uses of existing technology underscore the connection geocachers have with technology and demonstrates the use of technology as an activity. Technology as an activity is represented by the birth and evolution of the sport of geocaching. The activity of technology is echoed in the current study by continued evolution and the adaptation of existing technology for new uses.
The use of technology as a means to an end was demonstrated by participants of the study through the use of GPS technology to find their way through the natural environment to locate geocaches. In addition they used online social media to share their geocaching experiences with their social network. The findings associated with the theme using technology began to answer the research question: how do geocachers experience nature through the interactions between themselves, fellow geocachers, cache locations, online and GPS technology.

**Interconnectedness.**

Meadows (2008) refers to interconnections as “the relationships that hold the elements [of a system] together” (p. 13). The emergent theme *interconnectedness*, for the purposes of this study, is defined as a state of being resulting from one’s relationships between self and other entities in the virtual and the physical world of geocaching. Aspects of interconnectedness revealed in the participant interviews included: learning communities, valuing people and places, geocache context, connecting with people and places while geocaching; and the complex social, virtual, and real-world elements inherent in the practise of geocaching.

Participants expressed details about connections that they had made while geocaching. The following quote from participant 1 described the relationship between the participant, the geocache logbook, and other geocachers:

*It’s in the out of doors and it’s very asynchronous, ‘cause people are doing this at different times, and logging at different times. But we’re all working on the same thing* (Participant 1, L: 460-461).

In the above passage, participant 1 referred to “we’re all working on the same thing” in relation to other geocachers who had been to the cache location at different times but had left a notation on the cache log book and posted a note to the cache creator’s cache page.
Participants perceived connections between themselves, other geocachers, and geocache locations. For example, participant 3 described a connection he felt between himself, the geocache owner, and the geocache location:

*I made a hike once up a ridgeline early in the spring in Calgary and this guy had hidden some caches up there and I think it snowed. And there’s a little break in the weather and I think I made it up there one day and it snowed again the day after that and a month later I was first to find on a couple of his caches up this ridge and I just, I found a real association with this guy. He, you know, I know him personally and we’ve seen him at a lot of the events and he’s a real, he’s a mountain guy and most of his caches and his hides are hidden out in the mountains and I felt that’s the sort of thing where I really feel a kinship with the [cache] owner knowing that whatever a month ago he was up this very ridge and had taken the time to hide the caches there so it was, it’s things like that when you can really imagine what the owner was doing and thinking and why he came here and hid those caches. So certainly if a, for a cache like that you start to think like them as to what they were experiencing when they were in the same spot* (Participant 3, L: 337-349).

Some participants, when seeking geocaches, described a kinship with the geocache owner and the geocache location. In the following passage from participant 4, he described a connection he experienced with the geocache owner and the geocache location:

*So when you’re talking about exploring nature or learning something about nature that can be done with others or it could have been done on my own. The important thing for me or the connection I have there is that it didn’t really matter how I discovered it or who I was with, it was just that I was given the opportunity by someone else to go and explore*
or go and see that part of the world through their eyes at that moment in time (Participant 4, L: 485-490).

Participant 1 described a particular puzzle-cache that he was seeking that had three interconnected elements within its structure: the participant, the geocache owner, and the physical environment in which the geocache was hidden. He explained that the solution to the puzzle was available only if the geocache seeker placed himself physically and mindfully into the environment in which the geocache was hidden:

Yeah, I think there are I mean there are a number of caches that traditional caches, puzzle caches, multi caches where the environment is involved in actually finding the physical cache. Uh the classic would be a multi-cache where you have to go to a sign for example and say, tell me the number of species of bird that are in this park and uhm, and subtract 75 from that to get the first digit of your coordinate and if you don’t get it right, you don’t find the cache so you are now looking at the sign. Whether you take the time to fully involve yourself in what 80 species of birds are in there or just coming up with the number probably is different for different people but I’ve learned some amazing things about some areas around work I didn’t even know even existed (Participant 1, L: 220-228)

Yet another aspect of interconnectedness, a connection with nature, is described by participant 9:

My connection with geocaching itself, I mean, I simply love it. I absolutely love it, I love every aspect about it, I love that it gets me out of the house, I love that it introduces me to new places, new people, new ways of thinking, new technology, I’ve never been so up to date on the newest technology but when we travel now we have a laptop that we take simply for traveling so that no matter where we go we can hook up to the WiFi and
download some new caches so that we never have to actually plan a trip. We can just pick a direction and go and that’s my favourite kind of trip is the unplanned ones. And with the environment, I mean like I said I’ve just I’m much more aware of it now, I’m much more, I’m probably more respectful, I don’t think I was ever disrespectful of nature, I think that I used to be very apathetic about it because it didn’t affect my daily life

( Participant 9, L: 579-589).

The participants described interconnections within the sport of geocaching. The narratives of the participants of the study describe interpersonal connections that allowed them to connect with and value other geocachers. Moreover, the participants expressed an appreciation for the connections between them and the unique places to which they are led by geocache creators. Interconnections amongst geocachers are reflected in a range of geocaching activities including: geocaching social events, formation of puzzle solving groups, group caching excursions, and discussion through geocaching forums. Equally important were the participants’ narrative expressing a connection to nature.

**Opportunities for informal learning.**

The emergent theme *opportunities for informal learning* is described as geocaching situations in which the geocacher has had an opportunity to learn new knowledge or skills. In the current study all of the participants described geocaching situations in which they found themselves learning new knowledge and skills. The range of learning opportunities were many and varied and included learning situations that resembled the following: incidental learning, peer-assisted learning, collaborative learning, puzzle-based learning, learning by doing, self-directed learning, trial and error learning, and just in time learning.
Schugurensky (2000) describes incidental learning as unintentional but conscious learning. In other words, the learner does not intentionally set out to learn something from an experience but upon reflection becomes aware that learning has taken place. An example of incidental learning is described by participant 5 in the transcript excerpt below. Participants spoke of their interest in photography associated with geocaching activities. In fact, seven participants involved in the current study stated that they practice photography while geocaching. Participant 5 stated that seeking geocaches resulted, perhaps unintentionally, in the development of a keen photographic eye. She stated that learning to be more observant is a by-product rather than the intent of seeking geocaches:

_Um, and I think that geocaching trains to you to be observant so that I notice things that I never noticed before, um, sort of training your eye to look for interesting things or unusual things or things that you may not have considered before. What I’ve noticed is that there are a lot of geocachers who’ve become photographers as a by-product or a side product to geocaching. I think that’s partially to do with um, these increased observational skills that they’re getting_ (Participant 5, L: 111-116).

Participant 1 described what he referred to as incidental learning, an occurrence of learning secondary to the primary objective of finding geocaches:

_Or you, you don’t even need to reflect. Like you, I need to read all this stuff to figure out where to find the geocache. I don’t know if you can recognize it’s happening, you don’t have to go back later. I don’t open up the geocache app to learn_ (Participant 1, L: 328-330).

Incidental learning as a result of repeatedly engaging in geocaching activities was described similarly by three participants. Each of the three participants described improvement of
their depth perception as a result of the primary goals of finding geocaches. Participant 4 provided a description of his experience learning by doing that resulted in acquisition of new skills:

*I’ve also noticed I’ve become a lot more spatial. I can judge distances a lot better and so have my kids. We’ll be walking down a trail and I’ll look at my GPSr and it will say it’s 250 metres down the trail and I’ll say to the kids okay it is 250 metres down the trail and we’ll put the GPSr in my pocket and keep walking and we’ll try to guess as to where 250 metres ends and we noticed that when we first started to do that kind of judgment we were anywhere from 100 to, on a good day, almost 50 metres from where we needed to be and we decided okay well close enough. Now we are getting to within 10 metres. 10 metres is a pretty normal average. I’m much more cognizant of distance and that has been primarily and completely informal and unintentional* (Participant 4, L: 277-285).

Peer assisted learning and collaborative learning share many similarities. According to Barkley, Cross, and Major (2005) collaborative learning and peer assisted learning are titles used to represent learning accomplished in pairs or small interactive groups. For the purposes of the current study, peer-assisted learning is defined as learning and teaching supported by face to face and/or online interactions between less experienced geocachers and more experienced peers. All 11 participants of the study described learning with peers as a method of learning common to the geocaching experience. Participant 9 expressed the nature of her learning with peers while pursuing geocaching activities:

*I would say probably most of what I know about geocaching I’ve learned from other geocachers. For example, if I see someone’s cache page that I think is really nicely done I won’t hesitate to contact them and ask them how they did it and get some tips and
tricks. If I find a geocache that’s really well done or really unique I’ll contact the geocacher and again ask questions and I never want to duplicate it but I want to incorporate that into what I do to make mine a better experience for people (Participant 9, L: 259-264).

Similar to peer-assisted learning, collaborative learning was recognized as being a kind of learning used by four participants of the current study. Barkley et al. (2005) describe collaborative learning as learning situations in which “all participants in the group must engage actively in working together towards the stated objectives” (p. 4). Collaborative learning for the purposes of this study is defined as learning that is the result of sharing information and knowledge between members of a group of learners who each contribute to learning from their unique perspectives.Participant 7 described an instance of collaborative learning amongst her geocaching friends:

Um, I’ve learned to have an open mind when I’m looking for geocaches ’cause you kinda just say they’re [geocaches] not gonna sit there covered in wood. It could be ones that’s just a pen laying on the ground that inside the pen there’s a log sheet so you have to just not think that they’re all gonna be the same ’cause everyone is different on how they hide caches. So you have to really think, okay, well let’s get someone else to look at this and that’s why five of us women together, like we all look for caches differently and we all specialize in things different[ly] and so as a big group we usually find everything

( Participant 7, L: 603-609).

Geocaching provides a variety of geocache types which offer learning challenges. One popular type of problem-based geocache is the puzzle cache. A puzzle cache requires the cache seeker to solve a puzzle before gaining access to the location of the geocache. All of the
participants of the current study described an experience with a puzzle cache. Participant 7 spoke of encounters with a number of nature-themed puzzle caches which provided her with opportunities to learn while solving puzzles. She described the experience in the following way:

Well some of them, you have to do the research online before you leave. Like we’ve got one in Washington [state] and you had to determine what noxious weeds were and what they did to the environment and in order to and when you answered the questions then you got the number that fit into the longitude and latitude. So you have to solve a lot of questions like there’s a lot of puzzle caches and I love doing them because you have to do a lot of research and then you figure it out and then you’re like, oh cool, and then you go find the geocache. So there’s lots of information. Like I’ve learned about ants, and birds, and mushrooms, and trees, and weeds, and, and those kinds of things. Like there’s lots of puzzle caches out there (Participant 7, L: 181-189).

Learning by doing was recognized by six participants of the study. Notably, participant 3 spoke of reflecting upon previous learning experiences and recognizing the influence they had on development of his geosense:

Yeah, I mean, it’s funny how I think back to caches we found early on and you’re and you definitely develop that geosense, as they say, and quite often you’ll get to a spot and you almost start to, rather than hunting and trying to get to the ground zero on your GPSr, you sort of get around there and you just stop and you look around and you do, as you get more experience, you just sit back and you think, where would I hide it, what looks out of place but what would be a natural spot here and quite often it is one tree that’s a bit bigger than another or a stump that is sort of out there on its own and it’s, or the pile of sticks that just doesn’t look quite natural or the rock pile that’s, you know, just a bit
too man-made so that’s, you know, for us that seems to happen quite a bit and I think that’s the sort of thing as you get more experience you start to, yeah you start to feel that sense of where it would be and what makes the most sense for the hide. So it is certainly quite a common occurrence I would say (Participant 3, L: 287-298).

Self-directed learning of geocachers is facilitated by the vast selection of geocaches available to seek. Geocachers direct their own learning by the geocaches they choose to seek. Each geocacher selects the type, location and difficulty of the geocache she wishes to seek. Inherent in the geocaching experience are learning episodes or instances of learning bounded by a period of time or completion of the intended goal. Instances of self-directed learning were described by 3 participants involved in the current study. Participant 4 described, in the following excerpt from the interview transcript, how he learned to geocache:

When I was first learning I was pretty independent. So when I was first, kind of, getting out my brother-in-law gave me a 20 minute here’s how the site works, here’s how you download a cache, this is what you do on your GPSr a kind of a quick and dirty introduction. I wasn’t really involved in the community at all, the geocaching community in Kelowna so I self-taught myself pretty much, I would say, 90% of what I learned, what I know in terms of the technology in terms of the nuances of geocaching (Participant 4, L: 322-327).

Trial and error learning as an approach to problem solving was described by participant 4 as a method of learning more about the attributes of his GPSr and geocaching software. Rather than following a rigidly structured approach to investigate the features of his GPSr and the GSAK software, he employed a trial and error tactic. He described this method below as “just messing around with it”: 
I would say that when I first started out because I wanted to get up to speed on information and kind of become knowledgeable about the information I actively sought out the knowledge in terms of how to use GSAK on how to use the GPSr, how the integration between the website and the various tools that I have work. As I became more comfortable with that information I think it became secondary for me in the sense that I might come across something while experimenting GSAK or I’ll be experimenting with my GPSr and I’ll discover something new. It’s not intentional at that point because I’m just messing around with it (Participant 4, L: 248-255).

Just in time learning is defined as obtaining information, knowledge, and skills just when and where needed. One participant expressed the need to acquire skills when needed:

If I know I have to learn the cipher, I’ll learn the cipher, if I know I need to learn HTML to put a page together, I learn it and put the page together (Participant 11, L: 289-290).

Learning and teaching appeared in the data as a learning process based upon a mentoring framework. Participant 3 describe learning and teaching in the following way:

Again, I think the events and things like that have been a huge plus for the sport and what individuals can bring to the table and teach to other people. I mean it’s some good, some bad but I think taking Calgary for example, I think they’ve recently done it here, but had an almost geocaching 101 event where people new to geocaching can go and more experienced people can teach them the ins and outs of finding and starting and building your own cache and things like that. So it’s kind of a, it’s kind of a neat experience because people are really there to help other people make sure that the sport stays fun and safe and it’s definitely been a close knit community (Participant 3, L: 214-221).
Implicit in this study is the notion that geocachers learn things during the practice of geocaching. Participant 11 spoke of learning while seeking a variety of geocaches:

*Oddly enough, the cache we’d found just before that had a compass travel bug in it so I had a compass in my hand and we used that and I have since learned that to project a waypoint with my GPSr and just compass work at all and map reading too. I mean I still take a paper map with me when we’re going anywhere. I don’t rely completely on the GPSr and um, compass work I’ve learned lots of that. Um, the tide tables, I had to teach myself that um, the puzzles take you everywhere; I mean I’ve learned some local history from the multi-caches. I’ve learned identifying birds, I’ve learned how to um, numbers in different languages, money systems from different places, just from trying to solve these puzzles that are out there, so yeah, lots of stuff* (Participant 11, L: 272-281).

**Interdependence with nature.**

The theme *interdependence with nature* is described, in the current study, as the dependence of geocachers on nature for geocaching venues, and physical and psychological wellbeing. Likewise, nature is dependent upon geocachers to preserve and protect it. Participants described their interdependence with nature in terms of the following elements: connection with nature, environmental awareness, being in nature, awareness of nature, appreciation of nature, and respect for nature.

All participants of the current study expressed a connection with nature while geocaching. Variously, the connections were described as affection for plants and animals, and appreciation of the vistas and venues offered through nature. Participant 2 described the importance of preserving green space in urban areas:
Well, it has certainly has exposed me, exposed me to areas that have been preserved in Calgary, like parks and areas that I never knew existed within the city, um, and how they can be sustained within, you know, just metres of a residential area and how it, you know, can look like you’re in the middle of nowhere but while still being in the city and the importance of keeping those areas um untouched um and still there um while the city expands and develops (Participant 2, L: 183-188).

Another participant spoke of how geocaching helps her maintain a connection with nature:

I don’t know if it has broadened it [connection to nature]. I’ve always had it. It [geocaching] helps me continue with that. I’m so enthralled to find a new path a new river or creek a waterfall or big tree or beach or rock outcropping. All that stuff (Participant 6, L: 502-504).

Participant 5 expressed the growing environmental awareness within the geocaching community in the following:

Well there’s the big topics about, you know, non-impact caching, how we’re stewards of the environment or stewards of nature and it’s our job to protect it. So it goes across making responsible hides and searching for geocaches responsibly. You know it only takes a couple of times, you go to look for a geocache that may be hidden off trail or in a sensitive area and see how it’s been torn up and trashed and figuring out that’s not the way I want to treat nature and I think there’s a growing awareness of that (Participant 5, L: 450-455).

With regard to being in nature, participants varied in their description of the experience. The state of being in nature as described by one participant resembled Heidegger’s (2010) notion of Dasein, a neologism which translates as being there or existence. Dasein means to be in
existence with. In other words, being aware of one’s being in world. Participant 6 describes being
in nature:

And trails, just me and my dog and a beautiful trail and the trees. I’ve always felt at home
in the middle of the forest. I feel at peace where other people are afraid of bears. I see a
bear and clap my hands and he runs away. I don’t worry about something like that. I get
in the zone and it’s almost like meditation for me while I’m out in the forest. (Participant
6, L: 125-128).

Similarly, participant 11 expressed being in nature as an interdependent experience:

Um, yeah I mean when I’m out there and just, especially in the woods, I always stop and
look around and take it in and feel like I’m part of it, you know, like standing in a
clearing looking up at the stars at night when you’re night caching, um, yeah, we’re all
part of this. And reaching into a rotten log on faith that you’re not going to get bitten by
something, you know, just, we’re part of this (Participant 11, L: 668-672).

Participant 4 described being in nature as an immersive experience reminiscent of
Csikszentmihalyi’s (1991) concept of flow, “the state in which people are so involved in an
activity that nothing else seems to matter; the experience itself is so enjoyable that people will do
it even at great cost, for the sheer sake of doing it” (p.4). The participant described the
experience in the following way:

Okay so there was a cache just southwest of Revelstoke and it was just off highway 1 and
we were driving along the highway and we’re coming from Kelowna and driving to
Calgary and the kids were getting a little antsy and sure enough I had my GPSr on and a
cache was kind of it looked like it was along the road of the highway. I said let’s just stop
stretch our legs and I get to the parking coordinates and I think this is going to be a run
of the mill kind of quick cache and the kids didn’t want to climb up the steep embankment to the cache and my wife didn’t really want to go so I took off to go up this embankment. It was only about 50 or 60 metres up the embankment and I go up and get into this landing area and I walk for about 50 metres more and the trees, they literally, it’s hard to explain, they literally opened up for me. When it opened up all I saw was this waterfall. This huge, huge, they call it One Second Falls. This waterfall that is literally 100 metres away from the highway buried in this bush. At that moment I sat down, found the cache, I sat down I signed the log and was just sitting there for about 5 or 10 minutes. The next thing I hear is my wife kind of calling from the road trying to find me. I walk back down and she is like, where have you been. I said, well there is this waterfall up there you have to come and see it. She said you know you have been up there for half an hour. I literally lost track of time watching this waterfall. Like I literally just kind of absorbed myself in the sounds of this waterfall and just watching the water hit the rocks kind of causing the rainbow effects. That was probably one of my closest experiences with nature actually getting absorbed in it. Other times I tend to be a view guy so I’ll climb up a hillside and it will just open up to an expansive view and at that moment in time I’ll just want to take it in. But the One Second Falls I probably will never ever forget that experience of being. I lost track of time I thought that I was literally there for maybe 5 minutes and my wife when I came back down said I’d been there for half an hour. That is probably the closest I’ve been to the natural environment (Participant 4, L: 120-144).

Interdependence with nature within the context of the current study includes the element of awareness of nature. Participant 7 spoke of her awareness of nature as follows:
Sometimes it’s, you know, it’s lookin’ at nature. I have one friend that we just geocache
to take pictures. We don’t really geocache to find a lot of geocaches ’cause we appreciate
the amazing views and things that we get to see. ’Cause when you’re geocaching you
don’t just look at a tree, you look at a tree and think wow this has been here for this long
and this is how, you know what I mean, it’s just so amazing. When before I’d go for a
walk in the forest before and say well this is pretty neat and now you look at it.

(Participant 7, L: 519-525).

Participants of the study described how geocaching provided opportunities to learn,
develop, or reinforce an appreciation for nature. Participant 4 articulated his appreciation of
nature in the following manner:

And that I guess is probably one of my fundamental reasons why I continue to do it
[geocache] is that it gives me an opportunity to learn about my environment. It has given
me a new appreciation for what we have and it has kind of shifted me more to thinking
along the lines of that we need to change practises that we have as a community as a
whole as well as entire mankind so that our kids can explore and benefit and see the
things I got to see. So that’s probably one of the fundamental things that I’ve learned is
that I have much more respect for what we have available to us. (Participant 4, L: 191-
197).

Along with awareness and appreciation of nature, participants spoke of the notion of
respect for nature. Participant 9 expressed the conception of respect for nature in the following
way:

If you find a tree that’s full of holes it’s probably a condo built by woodpeckers and we
know to leave it alone. I’ve seen more nests now than I ever noticed before because I’m
scanning bushes and trees and stuff like that. Kind of in a way to see where to place a geocache because if there’s not already one there, you want to place there. I think you’re always scanning for that perfect spot but also because you don’t want to disturb the wildlife there so you just pay more attention to your surroundings, especially on hard packed trails because there’s always lizards or snakes or whatever that are sunning themselves along the trails and I never want to be responsible for stepping on a snake or a lizard or anything like that, that’s just trying to get warm and digest something. I’ll stop and take pictures but I won’t harm their environment. I’m always kind of scanning the area before I go for the geocache as well just to make sure that I’m not disturbing somebody in their nest right. A rodent taking harbour in a hole has more right to be there than my hand reaching for the geocache so I think geosense really does come from the experience but also just being aware of where you are and what’s going on around you and just paying much more heightened attention than you ever would have before. I used to walk through the park with my music on and not really paying attention that’s really a way to miss a lot. And I find I don’t miss as much anymore because I leave the music at home and I’m really out there for the nature. I’d rather walk away from a cache than disturb something that has more right to be there (Participant 9, L: 544-562).

Participant 11 described the notion of respect for nature differently. She spoke about respect in terms of the power nature possesses and her respect for that power:

And so um, I have not a fear but a great respect for water and um, I know there are several caches that are on Shady Island. I am nervous of racing the tides because I grew up near the Bay of Fundy, that’s quite a tide! And yeah, and I know you can be stranded
and I really, really, really did not want to be stranded on Shady Island (Participant 11, L: 173-176).

**Informal learning.**

The emergent theme *informal learning* is loosely defined as any learning that takes place outside of formal learning situations. A more detailed definition of informal learning was previously described in chapter two of this study. The theme informal learning for the purposes of this study is information gathering, acquisition of knowledge, and transfer of learning within the practice of geocaching but outside of formal learning situations. All of the participants described instances of informal learning while engaged in geocaching activities. Participant 1 described part of the process of solving puzzle caches as being based upon the act of collecting information:

*There’s quite a number of puzzle caches out there that are based on not necessarily a big mystery but collecting information.* (Participant 1, L: 243-244).

Gathering information related to the puzzle cache is the initial step towards solving it. What one does with the body of information gathered determines whether or not she is able to solve the puzzle. Thus, mental manipulation and practical application of the gathered information leads to acquisition of knowledge. Participant 4 spoke about acquiring knowledge while geocaching with friends that share specific knowledge relevant to the geocache which he is seeking:

*There has been times where we’re on an Earthcache and maybe I’m with one of my geocaching friends and he or she will explain something about a geologic term where I wouldn’t have gotten that at all. They will explain how it was formed or what pressures*
Participants spoke of using skills and knowledge obtained from the practice of geocaching and transferring them from one situation to another. Participant 1 provided a description of transferring learning from one realm, computer programming, to another, the creation of a technology cache and explained it in the following manner:

*Gives you a feeling for actual new technology and as the cache owner and creator of that I obviously have to do a lot of work to figure out how to make the thing work. This isn’t related to my job at all, the development of these caches are completely geocaching dedicated so it wasn’t that I took my GPSr and learned a new technology, it was, I created, I gave back to the game, hobby or activity by learning a new technology and in fact learning new programming languages. Yes, so they’re RFIDuino based something called an Arduino which is just a little prototyping computer and uh it has its own programming language. Really, it was going off to Main electronics and buying this thing and going home and I know how to program but I’ve never seen this language before and I’m not really an electronics guy and so you know they’re saying you need this and pin-sticks go high and I’m like saying what does that mean? You know, I’m not a hardware guy really, in a general sense I know what it means. But I managed to put this together, it’s hard to quantify the amount of learning, the amount of effort, the physical box costs about $60 to build but to include time and the number of components I’ve burnt out along the way, it’s probably $15,000* (Participant 1, L: 266-280).
Drive for self-fulfillment.

The emergent theme drive for self-fulfillment is defined as the motivations that lead geocachers to pursue the sport of geocaching. There were two motivational elements revealed by participants: play and recreation, and exploration and discovery. Participant 5 expressed the desire to play as a motivation for geocaching:

Okay on the simplest level it’s just fun to go outside and play. I think people need that.

Also it’s challenging um, and it’s fun (Participant 5, L: 77-78).

Similarly, participant 1 spoke about geocaching as motivation to exercise:

Well at first I thought it would be a great exercise and I use the term very loosely. An opportunity to get outside walk around and it has been great for that (Participant 1, L: 166-167).

Exploration and discovery were identified by all but one of the study participants as being a motivating influence for engaging in geocaching. Participant 5 described her experience with exploration and discovery while geocaching as follows:

It’s one of the best ways to get to know an area. Um, and I use an example of when we travelled to San Francisco. And so we were figuring well we will do some geocaches and there were some amazing things I saw and learned. One of them I guess the most memorable was a geocache that took me halfway up a cliff face and you sit on a bench and you pullout this geocache which is a long piece of PVC pipe and it’s full of things. But the most unique thing about the cache is that it takes you to a place where a flock of wild parrots live. I never knew there was a flock of wild parrots in San Francisco and so
I was sitting there on the bench with the geocache in hand and there were parrots in the trees and flying around and it was really, really cool (Participant 5, L: 517-525).

**Intuitive sensing.**

The emergent theme *intuitive sensing* is defined as a way of knowing that is made up of two elements, intuition and sensing. Intuition provides the intuitor with a ‘sixth sense’ or a subconscious gut feeling about geocaching situations. Sensing is a way of knowing in which the sensor relies consciously or unconsciously on the five main senses: sight, smell, touch, taste and hearing. For the current study, intuitive sensing emerged as a theme from the cluster themes, geosense, self-awareness, and mindfulness.

Of the 11 participants of the current study, six of them described geosense as a skill developed through engagement in the sport of geocaching. Participant 6 spoke of developing her geosense in the following way:

> *It is called geosense. Another sense, the 6th sense called the geosense. I guess it’s from experience after about the first 1000 [cache finds] or so. You look for the lumber pile or you look for the rock that doesn’t look quite the same as all the rest of the rocks. The example I was thinking of when I read your question was I’ve found a cache that way without knowing that there was a cache there. A trail in Washington and I hadn’t loading my GPS; we didn’t realize we were going for this hike that day. We were going down this trail and you could see the little geotrails we call them, a little path off the main path. There was a big beautiful tree there and I said if there ever was a great place to put a cache this would be it. I followed around behind the big tree and sure enough, there was an ammo can a huge, big, wonderful cache and right where I thought that would be the perfect place for a cache on this trail and there it was. My husband said, how did, you*
know, I thought you didn't load any. I said I didn't, I just figured there should be one there and there was (Participant 6, L: 346-358).

In contrast with geocaching intuition, five participants of the study described geosense as a concrete awareness of well-developed observational skills based upon the five senses resulting from the experience of finding and hiding many caches. Participant 11 describes the acquisition of geosense in the following way:

It comes with practice I think. Like the first few times I went caching, I didn’t have a clue what I was doing. The more you see the more you gain that experience and you start to see places that would be good places for hides. You start to see how they’re camouflaged so you, the more you do the more of that sense you gain (P11, L: 514-517).

Similarly, participant 8 described being able to sense “geotrails” which are the traces previous geocachers have left behind as they searched for geocaches:

There’s signs that people have been there before you have been there. Well just their footprints, the ground worn out a bit or, or you can tell where a stump’s been rooted around and you know it’s one of those things that, I mean people aren’t invisible and people were there ahead of you have left traces of themselves, not garbage I don’t mean but they’ve walked through that area. You see that, a geocaching trail (P8, L: 417-421).

Participants spoke of gaining self-awareness related to geocaching. Participant 11 described the experience as the following quote suggests:

I’m also challenging myself and learning more about myself and what I’m capable of. Like I say, I’m recovering from surgeries, challenging myself, and learning that yes I can climb a tree again. I can scramble off this cliff. I can survive. It is kind of a learning thing and I’m learning about myself as well (P11, L: 630-634).
The notion of mindfulness is expressed, for the purposes of this study, as the condition of heightened awareness and a feeling of being in the present and open to new experiences and ideas. Participant 7 described the experience in the following way:

*Um, I’ve learned how to put myself outside of the box and look at things a little differently in order to solve puzzles or to find caches...* (Participant 7, L: 568-569).

Similarly, participant 3 spoke of being open minded and open to new ideas:

*Yeah, oh I think so. To me even if you meet some people at a geocaching event to me there’s a lot of informal learning going on about how different people might cache or, you know, how to make something easier or more user friendly or more fun sort of thing. Um I think it, informal learning, is kind of a daily experience as long as you open your mind to that possibility, that you’re not set in your ways and a I think we’ve certainly found that to be the case with caching and there’s just a lot of people that can teach you new things or new ideas on whether it is creating a puzzle for a geocache or solving one. I would say early on it was I was clueless on a lot of these, you know, ciphers and things like that, that people would use for puzzles, certainly I’ve gained a lot of knowledge on, you know, problem solving and stuff on that sort of* (Participant 3, L: 63-72).

**Summary**

**Exhaustive description of the lived experience of how geocachers experience nature and participate in informal learning while engaging in geocaching activities.**

Geocachers experience nature through a broad range of interactive experiences with fellow geocachers, geocache locations, virtual and physical sites, online, computer and GPS technology. An experienced geocacher displays an understanding of GPS and related technology
and its application to the sport of geocaching. Moreover, geocachers show a desire for directing their learning with regard to acquiring and refining geocaching skills and knowledge. Additionally, veteran geocachers have an acute awareness of nature and exhibit keen location awareness. Furthermore, veteran geocachers express respect, appreciation, and acknowledge a connection with the natural environment within the realm of geocaching.

Geocachers feel a sense of connection to geocache locations, fellow geocachers, and the natural environment. Interactions between fellow geocachers are represented by online, face-to-face, and geocache logbook communications. Experienced geocache hiders place geocaches to lead geocache seekers to places that represent aesthetic, historical, geological, and biological significance. In return, experienced geocachers acknowledge well thought out and well placed geocaches through the practice of showing appreciation in the form of online messages and the awarding of favorite points on the geocache hider’s cache page.

Geocaching is a sport which at its center is an interconnection between technology, people, and places. Consequently, to be a successful geocacher requires an understanding of technology, self, fellow geocachers, location-awareness, and problem solving. Equally important is the ability to apply the requisite geocaching knowledge and skills. Accordingly, geocachers pursue learning to become competent in the sport. Because geocaching is characterized variously as a peripheral hobby, activity, recreation, game or sport there are few formal educational opportunities available to adult geocachers. As a result, geocachers tend to perceive themselves as self-directed learners who engage in various forms of informal learning.

Learning opportunities are very much a part of the geocaching experience. Earthcaches, puzzle caches, themed caches, and traditional geocaches invite geocachers to gather information, make meaning and apply the acquired knowledge to solve problems and find caches. Ways in
which geocachers learn are many and varied for example, geocachers engage with peers to gather and share information and make meaning in what resembles peer-assisted learning situations. Furthermore, groups of geocachers working in puzzle solving groups which bear a resemblance to collaborative learning.

Because geocaching is an applied activity with few rules, geocachers are free to pursue the sport in a trial and error manner. At times the first attempt to locate a cache is unsuccessful and may require the cache seeker to try again and again. As a result, geocachers are familiar with trial and error learning methods and use them when approaching learning. Similar to trial and error learning is learning by doing. Geocachers exercise learning in this manner when hiding and successfully finding caches. Geocachers agree that the more geocaches one finds and hides, the easier it is to find more caches.

Not all learning situations are intentional; in some cases geocachers perceive learning as a byproduct of geocaching activities. Learning as a byproduct of geocaching is viewed by geocachers as incidental. In some cases incidental learning occurs without the geocachers’ direct awareness but results in acquisition of skills or knowledge. For example, geocachers appear to acquire keen observation skills, sometimes referred to as geosense without being aware of the skill acquisition.

Due to the ingenuity of geocache hiders, geocache seekers are required to engage in continuous learning in order to solve puzzles and locate caches. When confronted with new challenges geocachers acquire new knowledge as and when needed in a learning approach analogous to just in time learning.

Geocachers expressed an appreciation of nature as demonstrated by their respect for, awareness of, and connection with the natural environment in which they geocache. Appreciation
of nature is demonstrated by the gratitude they express for the beauty of particular cache locations through image sharing and online communication. Furthermore, geocachers express their respect for nature as demonstrated by attendance at special cache in trash out (CITO) geocaching events as well as their consideration for proper geocache placement and seeking methods. One of the initial motivations, stated by geocachers, was to exercise with a purpose; the purpose being to find geocaches. However, as geocachers gain experience they spend considerable time in the outdoors due to the locations of the caches they seek. Thus, an additional motivation arises from the excitement of the exploration and discovery of new and unique places. Due to the literal and metaphysical association with nature, geocachers perceive a connection with nature, and from that connection evolves respect for the natural world.

Findings from this research reveals geocachers are interconnected with nature, fellow geocachers, cache locations and technology. Furthermore, geocachers participate in a variety of learning approaches and perceive their learning to be self-directed and informal. They also see their learning, at times, as intentional and incidental. The participants of the current study see geocaching as an opportunity to interact with people, places and technology while participating in informal learning.
Chapter 5: Discussion and Conclusions

In this chapter, I summarize the current study; discuss my interpretation of the data, compare the findings to the relevant literature explored in the literature review, share the conclusions drawn from the information, and provide recommendations for future research. The goal of the reported study was to present a rich description of the lived experience of geocachers as they perceived their informal learning and connections with nature while engaged in geocaching activates. To accomplish this goal, I employed a descriptive phenomenological approach to investigate the lived experience of a group of experienced geocachers. From the data, I was able to identify and develop, using Colaizzi's (1978) method for data analysis, cluster themes from which emerged seven fundamental themes associated with how geocachers experience and attach significance to nature, and perceive their learning while engaged in geocaching activities. The results of the data analysis, in turn, led to a rich description of the lived experience of the phenomenon of geocachers’ informal learning and connections with nature as detailed in the previous chapter.

Discussion

The findings of this descriptive phenomenological study suggested that the lived experience of geocachers’ informal learning and connections with nature are distinct owing to the specific nature of the sport; a sport that employs digital technology to guide geocachers in and through the natural environment while challenging their ability to gather information, acquire skills and knowledge, and transfer their learning to the purpose of creating, hiding, and seeking geocaches. The distinctive nature of the sport of geocaching is echoed by Silva and Hjorth (2009) who suggest geocaching is one of the first location based mobile games. Ihmäki (2012) also
states geocaching is unique in its evolution. Similarly, Chavez et al. (2004) note that geocaching is a unique marriage of nature and technology. The unique qualities of the sport of geocaching have made it an information-rich subject for the current phenomenological study. My findings indicated that geocachers, while engaging in the sport of geocaching, appeared to experience nature and participated in informal learning through interactions between themselves, fellow geocachers, the outdoor environment, and online and GPS technology. In addition, my findings demonstrated that geocachers sought out a diverse range of geocaches and, in doing so, directed their own learning. Participants of the study described their experiences of geocaching in a wide variety of locations, including geocaching outside of the city or town, province, and country in which they resided. This perception of a large arena of play is consistent with Ihmäki and Tuomi’s (2009) contention that with the large number of geocaches available, the world becomes the field of play. The findings of the current study support the notion that geocachers are attentive to their surroundings while seeking nature-based geocaches which suggests an awareness of the natural surroundings. For example, geocachers chose to record aspects of their cache seeking adventures through photographic images. As noted by Ihmäki and Tuomi (2009) and supported by my findings, most of the participants used digital devices to record their surrounding while they search for geocaches. Many of the recorded images were described, by the participants, as being dramatic views or interesting aspects of nature. Participants said that they recorded images to share through social media or to keep them as reminders of their geocaching experiences.

**Using technology.**

Learning about and with technology was a common experience with all of the participants of the study. Participants indicated that they used online technology to gather information in order to solve problems inherent in puzzle based geocaches. Not only did individual geocachers
utilize online technology to gather information but they also used it to collaborate with other geocachers. Results from the current study demonstrated that geocachers learnt and taught peers and participated in collaborative learning groups to solve geocaching problems. These finding are consistent with Clough’s (2009) results that suggest there exists a “growing undercurrent of cooperative informal learning through distributed networks of connected individuals who have made innovated use of both mobile and social technologies…” (p. i). Participants of the current study reported using online technology to seek out information on how to create custom cache pages, decode encrypted puzzle caches, use geocaching equipment, and other skills associate with the sport of geocaching.

Many participants of the study recognized technology as a means to an end. The end was represented in the findings by the application of GPS and related technology to successfully locate geocaches. However, technology is not only used by geocachers to seek geocaches, technology can literally be the substance of a geocache. Technology caches have been created by those geocachers with the skill and desire to generate another level of complexity for the sport of geocaching. Technology caches can take a number of forms including: reverse caches, Wherigo caches, and chirp caches.

A reverse cache is a proximity aware, electronic geocache box. The box is accessible to geocachers through the normal channels of cache seeking. However, once the geocacher has found the reverse cache he or she must then follow the prompts provided on the reverse cache’s LED screen to find the location at which the box will open and reveal the cache contents (Participant 1, L: 405-421).

Wherigo caches combine the location-aware sport of geocaching with imaginative adventure fantasy gaming. Wherigo caches require the cache owner to create an adventure
fantasy and produce the software program, referred to as a cartridge (Groundspeak Inc., 2013c). The cartridge is then downloaded on to a GPSr to support the adventure fantasy aspect of the game (Participant 6, L: 306-329). The Wherigo cache seeker, using a GPSr, follows the game storyline and its prompts to find real world clues to play the game (Groundspeak Inc., 2013c).

Chirp caches are exclusive programmable electronic, wireless proximity aware beacons that can be programed to act as digital information guideposts to aid geocachers in locating nearby geocaches (Garmin Ltd., 2010).

The above examples of technology caches were described by participants of the current study. The findings suggest that bringing outside technology (technology not commonly used for geocaching) into the sport is the activity of technology; in other words, the active process of technical innovation applied to the sport of geocaching. Neustaedter et al. (2010) support the notion of technology as a process by their contention that geocaching is user driven and in a constant state of evolution. In addition, the idea that geocachers are active technological innovators is supported by Ihamäki's (2012) argument that, “geocaching is the only multiplayer mixed reality game in which players themselves create and extend the game within different media and other contexts (such as education and tourism)” (p. 134). The findings of the current study suggest using technology is visible, encouraged, and embraced within the geocaching community.

Interconnections.

Results of the current study indicate that geocachers perceive geocaches to exist within a context. The geocache context includes its location, social function, message, theme, type, and history. Participants indicated that they invested significant time and effort creating and placing geocaches. The process of cache creating involves determining the type of cache and where it is
to be located. The cache owner then hides the cache and creates an online cache page that provides the cache coordinates and a description of the cache. The newly created cache is then submitted for review and approval by a volunteer reviewer based upon the geocache creation and placement guidelines (Groundspeak Inc., 2013a). Once placed and published the cache owner is responsible for the future care and maintenance of the cache entity. Geocache context provides an interesting subject for further study regarding the community values associated with geocaching.

Results of the current study indicated the act of creating a geocache was perceived by participants as a collective experience that was based upon the notion that geocaching, as an activity, is supported by other geocachers. In other words, creating and placing a geocache is an act of faith in that a geocache is created with the conviction that other geocachers will seek it out. The rules of the sport dictate that the geocachers communicate the cache find to the greater geocaching community through the act of signing the cache logbook and signifying the find online through the geocaching website. The notion of geocaching as a collective experience is supported by Ihmäki’s (2012) argument that geocachers, collectively, create and expand the game.

Participants of the current study made reference to using Facebook for sharing photographs as well as for creating social groups related to geocaching activities. Ihmäki’s (2012) reported findings support the findings of the current study regarding interconnections and the use of social media as an integral part of geocaching practice. Ihmäki states that social media has become a significant part of the geocaching’s context and a new form of social interaction and community. In contrast, Chavez et al.’s (2004) findings do not suggest that geocachers exhibited strong social motivations for participating in the sport. However, Chavez et al.’s (2004) original study was based on data collected in 2003, a time when wireless networks and social
media were in their infancy. For example, Facebook wasn’t launched until February 4, 2004 (Hoffman, 2010). It seems that the evolution of social media within the sport of geocaching provides additional motivation for social interaction between geocachers and members of their social networks.

The temporal and spatial aspects of a geocache are perceived to be significant to geocachers as indicated in the findings. The time of placement of a geocache, in some cases, holds significance to geocachers. Participants of the reported study described online posts of geocaching events. Geocaching events are recognized as a distinct category of geocaches and are time sensitive given that the gathering, otherwise known as an event, is scheduled for a specific place and time. The location in which a geocache is placed is perceived by participants of the current study as having significance. Participants of the study spoke of finding geocaches in places that offered beautiful vistas representing unique locations in nature. Participants stated that they felt a connection with the geocache owner after locating a geocache in an extraordinary place. They felt that the geocache owner wanted to share with them the specific place.

In addition to time and place, the context of a geocache includes its message, theme, type, and history. Geocaches are identified by a code, a name, and a set of coordinates. The code is a random set of numbers and letters beginning with the prefix GC (Groundspeak Inc., 2011). The cache name is assigned by the individual who created the geocache. For many caches the cache name reflects the cache theme, for example, one participant of the study created farm animal themed caches that included a toy farm animal serving as the cache container then placed them near farmyards. The farmyard cache names reflected the theme and provided a clue to the location of each cache. All of the participants of the current study described themed caches that they have created and sought. Geocaches are also identified by type as mentioned in chapter two.
current literature identifies 35 distinct types of geocaches including Earthcaches, traditional caches, puzzle caches, and event caches. The history of a cache is documented in its logbook and by postings to its online log. Alternately, the geocache history can, in the case of a history themed cache, represent the history of the place in which the cache is located. My findings suggest that geocache context appears to be a significant element of geocaching and is not addressed in the current literature. Exploration of the social context of geocaching and what that context means to geocachers provides an opportunity for future research.

**Opportunities for informal learning.**

“Adult educators have increasingly realized that most adult learning begins because of a problem or responsibility, or at least a question or a puzzle, not because of a grand desire for a liberal education” (Tough, 1971, p. 72). All of the geocachers involved in the current study stated that they have participated in informal learning while pursuing the sport of geocaching. In addition, participants spoke of their learning activities while geocaching. They expressed their attempts to gather information, acquire knowledge and transfer their learning to their geocaching activities. The following section provides a discussion of my findings related to learning through geocaching.

Participants described their learning activities associated with two aspects of geocaching, seeking geocaches, and creating geocaches. In addition, it appears that participants bounded their learning activities into episodes associated with distinct geocaches. For example, one geocacher described a learning episode related to a geocache that required her to learn and decode Morse code in order to obtain the coordinates and find the related geocache (Participant 8, L: 279-287). The concept of learning episodes is well documented in adult learning literature by Johnstone and Rivera (1965), Tough (1971), Penland (1979), and Livingstone (1999). My findings related
to the characteristics of adult learners are supported by Tough's (1971) concept of distinct and deliberate learning episodes. For example, my findings indicated that participants’ learning episodes were deliberate, as demonstrated by their intentional selection of particular geocaching activities such as solving a puzzle cache or creating an Earthcache. As well, the participants’ learning episodes are distinct and bounded by the particular geocaching activity in which they choose to engage for a specific period of time.

Similar to Johnstone and Rivera's (1965) reported findings, my findings demonstrated that adult learners, in this case geocachers, participate in learning projects related to a hobby or leisure activity. Participants in the current study describe geocaching, variously, as hobby, sport, activity, or game.

Participants expressed that their learning associated with geocaching is informal, self-directed, and in many cases incidental. Schugurensky (2000) identifies incidental learning as a core type of informal learning. My findings revealed incidental learning was a by-product of the intended goal of geocachers’ learning activities. For example, three participants of the current study reported developing a keener sense of depth perception while geocaching. They suggested that by experimenting with guessing distances to geocache locations and reconciling the guess with the distance indicted on the GPSr they became more proficient at estimating distances.

Learning by doing, shares characteristics of incidental learning and is reflected through trial and error learning. Participants spoke of learning how to do something by doing that thing. For example, participant 7 spoke about becoming proficient with finding geocaches and stated “…the more things [geocaches] you find or hide, the more times you’ll find them [geocaches]” (Participant 7, L: 506-508). Other participants echoed the above statement and furthered the idea of learning by doing. For example, participants spoke about planning potential geocache hiding
spots for future geocaches and recalling geocaches they had previously found while seeking new geocaches.

The reported findings indicate that learning by doing, combined with trial and error learning, combined with reflection on previous cache finds and as well as looking for new locations to hide caches resembles Kolb's (1984) phases of experiential learning. Kolb labels his phases of experiential learning as follows: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Kolb’s cycle of experiential learning is reflected in the experiences of the participants of the current study in the following way. The geocacher seeks but does not find the intended geocache. The active experience of seeking a geocache is represented by Kolb’s experiential learning phase referred to as concrete experience. The geocacher then reflects on the experience of seeking the geocache, contemplating what worked well and what did not. Kolb refers to the reflective phase as reflective observation. The geocacher then considers how to improve her geocaching process based upon conclusions drawn from her reflections. Kolb refers to the activity of drawing conclusions based upon previous reflection as abstract conceptualization. The geocacher then returns to seeking the geocache in a trial and error fashion similar to what Kolb refers to as active experimentation. The participants’ attempts at learning by doing, combined with trial and error learning, appear to be a form of experiential learning.

**Interdependence with nature.**

Participants of the study spoke of being in nature, connecting with nature, appreciating nature, respecting nature, and environmental awareness. These themes were reflected in my findings. Geocachers involved in the current study described a connection with nature through their experience with Earthcaches as well as nature themed puzzle caches. Participants described
the process of solving Earthcaches and nature themed puzzle caches required interaction in some way with the natural environment to solve the problem and find the cache. Participant 11 revealed that geocaches that had led her to the woods or the beach were the kinds of caches she most appreciated, and when seeking them she felt connected to nature. The notion of connectedness to nature while geocaching reported in the current study is supported by findings reported by Chavez et al. (2004) that indicated 85 percent of the geocachers in their study reported that important or very important experiential components of geocaching were to enjoy the scenery of the woods, experience nature, and to be close to nature. Participants of the current study stated that geocaching provided opportunities to observe animals in their natural habitat. Further, they expressed that such instances are often memorable in their uniqueness and evoked a sense of connection to nature. In addition, participants expressed the desire to seek nature based geocaches and stated that they were conscious of their surroundings while utilizing GPS technology to lead them to cache locations. Due to the limited accuracy of current GPS receivers geocachers must rely on observation of the local surroundings to find geocaches. Moreover, many geocachers choose to record aspects of their cache seeking adventures through photographic images. The findings of the current study support the notion that observations of their surroundings while seeking nature-based geocaches leads to an awareness of the natural surroundings. Seven of the 11 study participants said that they recorded photographic images while geocaching to share with others through social media or keep them as reminders of their geocaching experiences. As noted by Ihamäki and Tuomi (2009) and supported by my findings, geocachers use digital devices to record their surrounding while searching for geocaches.

Participants of the study spoke of being aware of the environment and exhibited environmental awareness through careful consideration of the placement of geocaches that they
had created. Participants explained that poor geocache placement leads to the establishment of geotrails. Geotrails are subtle or not so subtle trails leading off from established corridors into what were once undisturbed natural areas. Geotrails are created when geocache seekers search of geocaches placed more than a step or two off an established main trail. Patubo (2010) argues that careless geocache placement results in geocache seekers wandering from established corridors resulting in negative environmental consequences. Participants of the study were keen to speak about their environmental awareness and expressed the desire to protect the environment. Some participants described their involvement with the geocaching environmental initiative referred to as Cache In Trash Out (CITO) events. Groundspeak Inc., (2013d) describes a CITO event as a gathering that brings geocachers together to participate in activities such as “litter clean-up, removal of invasive species, revegetation efforts or building trails” (para. 2). My findings related to interdependence with nature appear to indicate that participants were aware of nature and felt a connection to and appreciation for the natural environment. The sport of geocaching relies upon the belief that geocachers will place caches and will seek caches of other geocachers. Nature is connected to geocaching and geocachers as the arena of the sport. Moreover, participants recognize that the natural environment is more than just the area of the sport of geocaching.

**Drive for self-fulfillment.**

Participants of the current study spoke of their personal motivations for geocaching in terms of play and recreation, and exploration and discovery. All of the participants stated that they regarded geocaching as motivation for exercise and all but one participant spoke of exploration and discovery as a motivation to geocache. My findings indicate that geocaching partially fulfills participants’ need to recreate, play, explore, and discover, and supports similar findings by Chavez et al., (2004) and O’Hara (2008). Exploration and discovery were described
by participants as being a motivation for geocaching and stated that geocaching has led them to many places that they were previously unaware.

**Intuitive sensing.**

Participants of the current study expressed a sense of mindfulness in their thinking while approaching geocaching challenges. They described being more open to new ideas and different perspectives. Participants also spoke about being more aware of one’s surroundings, more conscious of self-reflection, being immersed and present in the moment. The sense of mindfulness combined with self-awareness and intuitive sensing seemed to echo a framework for what Langer (1997) describes as mindful learning.

Some participants of the study described the acquisition of a type of geocaching intuition that is referred to, by the geocaching population, as the geosense. Whereas, other participants expressed the notion that geosenses are nothing more than the honing, through practice, of one’s five primary senses: sight, smell, touch, taste, and hearing. The division of interpretations of intuition versus sensing is support by Hogarth’s (2008) description of developing expertise. He states,

> The fact many activities are exercised in an intuitive manner does not, of course, mean that they were originally acquired in this way. This applies to many physical skills such as driving an automobile. Here the skills (e.g., changing gears) are so practiced and overlearned that the person can no longer explain how they are achieved. What started explicitly becomes automated-and thus intuitive-over time. (pp. 94-95)

Hogarth (2008) and others provide arguments for both sides of the intuition versus sensing debate.
Self-awareness was a finding that stood out as a cluster theme. One participant described her journey to becoming aware of her inner strength as she tested and exceeded self-imposed limits. She appeared to reflect on each physical and mental achievement through her efforts associated with geocaching. I bring up this cluster theme as a point of discussion, not because it appeared to be a common theme for all of the participants, instead it was so strikingly visible within the data of a single participant it seemed significant to the study. The other participants spoke of challenging themselves through geocaching activities but approached the subject in their narratives in a less reflective manner. Participant 11 spoke of overcoming challenges through the process of becoming a geocacher rather than an individual who geocaches. Chavez et al. (2004) suggest in their report of geocaching motivations that challenging oneself appears to be a strong motivation for individuals to participate in geocaching activities. Participant 11 appeared to have internalized overcoming geocaching challenges resulting in acquisition of self-knowledge.

**Application and recommendations.**

As a tool for learning, geocaching has potential to provide problem based learning opportunities for a range of disciplines in formal and informal learning situations. By taking advantage of geocache context, individuals and organizations can communicate a variety of messages. The findings of this study have application to informal learning practices. Geocaching is essentially problem-based learning and requires participants engaged in the sport to gather information, and learn new skills and knowledge to successfully locate geocaches. Because geocaches can be created as themed puzzles geocaching has the potential as an environmental communication tool. Messaged themed puzzles could be used to deliver environmental messages within the context of the geocache. For example, Earthcache GC37P79 Kalamazoo river oil spill
Earthcache (Groundspeak Inc., 2013e) combines learning about geology with delivery of an environmental message.

In addition, there is potential for using geocaching for team building exercises or for collaborative learning activities. For instance, group geocaching provides opportunities for individuals to come together to share their individual skills, knowledge, perspectives, and experiences with others while seeking geocaches. Furthermore, geocaching can be used to introduce people to digital technology, social media, and nature in a recreational setting. As a learning tool geocaching can be used for self-guided tours of outdoor sites. For example, development of nature based puzzle caches could lead geocachers to areas of significant flora and fauna.

**Conclusion**

This study investigated the geocaching experiences of 11 adult geocachers located in the Canadian western provinces of British Columbia and Alberta. The application of a descriptive phenomenological study proved useful for developing an understanding of the lived experience of this group of adult geocachers. The unique aspects of the sport of geocaching provide opportunities for geocachers to experience nature. This study confirms that the participants experienced nature through activities associated with geocaching. The activities that provide geocachers the opportunity to experience nature are geocache seeking, and geocache creation and placement. This is consistent with available literature confirming that motivations for geocaching include experiencing nature and being close to nature. The study participants singled out Earthcaches as offering the most significant chance to experience nature due to the unique design of the cache. Earthcaches are designed to include a geological feature as the cache. In addition,
Earthcaches require the geocacher to gather information and demonstrate knowledge about the geologic feature in order to log the cache find.

All of the participants of the study stated that they participated in informal learning associated with geocaching. The examination of the lived experience of adult geocachers confirmed that they participated in informal learning associated with the sport of geocaching. Further, their learning was self-directed and in some instances incidental. Tacit learning was not explicitly described by the participants nor confirmed as being present in their learning activities.

New knowledge revealed by this study was that geocachers attach significance to nature. The significance geocachers attach to nature is demonstrated by their participation in Cache in Trash out events. In addition, participants expressed the need to protect and preserve natural spaces to ensure the arena of play for geocaching exists into the future.

The knowledge generated through the descriptive phenomenological study further informs the understanding of how adult geocachers perceive their learning related to the sport of geocaching. Furthermore, this study provides insight into the significance geocachers attach to nature.

Need for future research.

Due to the rich experiences provided by the sport of geocaching it has potential for community involvement, team building; self-directed, formal, and informal learning. Manipulating geocache context may hold promise for communication of a range of messages. Certainly, nature-based caches provide opportunity for environmental messages. Geocaching provides a structure for increasing participation in recreational activities. There is more potential for research into the use of geocaching with adult learners. The possibilities for outdoor digital gaming need to be explored. There is a need for investigation of the environmental impacts of
geocaching on natural spaces. Future studies could examine the psychological aspects of obsessive or addictive elements of the sport. Examination of the social norms which develop within the sport could provide some interesting insight into psychosocial behavior. Perhaps a content analysis of nature themed caches could inform environmental educators and communicators.

**Final thoughts**

At the heart of the sport of geocaching is the curiosity of its practitioners and their willingness to explore and discover. The rapid evolution of geocaching has been driven by its players who, in turn, have driven technical innovation within the sport. Geocaching is as much about social networking as it is about seeking geocaches as demonstrated by the popularity of geocaching events and its presence worldwide. Despite its relatively young age, geocaching has quickly evolved into a multifaceted sport which has the potential to connect people to people and to places through the use of technology. Geocaching is not only a sport and social activity it is also a learning activity that offers tremendous potential for attracting a diverse group of learners.
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Appendices

Appendix 1: Recruitment letter

Letter of Invitation

November 30, 2012

Dear Geocacher,

I would like to invite you to be part of a research project that I am conducting, the objective of which is to investigate the connections between geocachers, informal learning and nature. This project is part of the requirement for a Master’s Degree in Environmental Education and Communication, at Royal Roads University. My name is Patrick John Burns and my credentials with Royal Roads University can be established by contacting Dr. Liza Ireland at

In addition to submitting my final report to Royal Roads University in partial fulfillment for a Master’s Degree in Environmental Education and Communication, I may also be sharing my research findings, as documented in my thesis, with my colleagues in the form of workshops, presentations, papers or articles.

You are invited to share, through interviews, your experiences of geocaching, awareness of the natural environment, and learning related to your participation in the sport of geocaching. Interview data will be collected via digital audio recording and hand-written field notes. Your time commitment for this project is estimated to include a 45 – 60 minute interview plus review of the data generated from the interview (estimate for review 30 minutes). Total time investment is estimated to be 1.25 – 1.5 hours.

Offered to the 10 participants who are selected for the study and who complete the data collection interviews, a chance to win a Global Positioning System receiver (GPSr) suitable for geocaching. The approximate value of the GPSr is $150.00 CDN. The probability of winning is 1 in 10. Participants interested in a chance to win must correctly complete a skill testing question (as required under federal law) to be eligible. Participants will be assigned a number (1-10) upon entering the study. The winning number will be determined by random number generation via the use of a random integer generator available on the website random.org. The winner will be notified by email and arrangements will be made for delivery of the prize.

You are a prospective participant because you appear to be an active adult geocacher and meet the criteria described below. The criteria which I will use to select participants will include geocachers who are 18 years of age and older and have:

- 50 or more cache finds
hidden at least a single cache
participated in online geocache discussion forums
participated in at least one geocache event or group geocache hunt
had a significant experience with nature while geocaching (significant as determined by the participant)
directed your own learning project related to geocaching (in other words, learned a skill or gained knowledge while participating in geocaching activities)

You are not compelled to participate in this research project. If you do choose to participate, you are free to withdraw at any time without prejudice. Similarly, if you choose not to participate in this research project, this information will also be maintained in confidence.

If you would like to participate in my research project or have any questions regarding the project and its outcomes please contact me at:

Name: Patrick John Burns
Email: [REDACTED]
Telephone: [REDACTED]

Sincerely,

PJ Burns
Appendix 2: Informed consent form

Informed Consent Form

Date: November 30, 2012

Study Name: Awareness of nature in a location-aware sport: Geocaching, learning, and nature

Researcher: Patrick John Burns (Candidate - Master of Arts in Environmental Education and Communication at Royal Roads University)

Email: [redacted]
Address: [redacted]
Telephone: [redacted]

Supervisor: Dr. Alice Macpherson
Email: [redacted]
Address: 2M8
Telephone: [redacted]

Program Head: Dr. Liza Ireland
Email: [redacted]
Address: [redacted]

Invitation to Participate: My name is Patrick John Burns and my credentials with Royal Roads University can be established by contacting Dr. Liza Ireland at [redacted]. I would like to invite you to be part of a research project that I am conducting. This project is part of the requirement for a Master’s Degree in Environmental Education and Communication, at Royal Roads University.

Inducement to Participate: Offered to the 10 participants who are selected for the study and who complete the data collection interviews, a chance to win a Global Positioning System receiver (GPSr) suitable for geocaching. The approximate value of the GPSr is $150.00 CDN. The probability of winning is 1 in 10. Participants interested in a chance to win must correctly complete a skill testing question (as required under federal law) to be eligible.

Participants will be assigned a number (1-10) upon entering the study. The winning number will be determined by random number generation via the use of a random integer generator available on the website random.org. The winner will be notified by email and arrangements will be made for delivery of the prize.

Purpose of the Research: The purpose of this research is to gain an understanding of how geocachers participate in informal learning in online, face-to-face and in situ geocaching
activities, connect with nature, and value their participation in the sport of geocaching. Resulting data will be used to inform the principal researcher’s learning and provide supporting data for the writing of a Master of Arts thesis. Data may also be used for creating presentations, workshops, papers or articles related to geocaching and learning. Findings of this study may be useful for environmental educators, adult educators, recreation coordinators, and self-directed learners.

**What You Will Be Asked to do in the Research:** You are invited to share, through interviews, your experiences of geocaching, awareness of the natural environment, and learning related to your participation in the sport of geocaching. Interview data will be collected via digital audio recording and hand-written field notes. Your time commitment for this project is estimated to include a 45 – 60 minute interview plus review of the reduced data generated from the interview (estimate for review 30 minutes). Total time investment is estimated to be 1.25 – 1.5 hours.

**Risks and Discomforts:** I do not foresee any risks or discomfort from your participation in the research. During the research interviews I will ask about your experiences with learning, awareness of nature, and interaction with the geocaching community related to your participation in the sport of geocaching.

**Benefits of the Research and Benefits to You:** The benefits of this research to you may not be of significance beyond reflection upon your own experiences related to the sport of geocaching. However the implications for this research may lead to a better understanding of how geocachers participate in informal learning in online, face-to-face and in situ geocaching activities to connect with nature. Findings of this study may be useful for environmental educators, adult educators, recreation coordinators, and self-directed learners.

**Voluntary Participation:** Your participation in the study is completely voluntary and you may choose to stop participating at any time.

**Withdrawal from the Study:** You can stop participating in the study at any time, for any reason, if you so decide. In the event you withdraw from the study, you may choose to have all associated data collected destroyed or allow it to be used in the study.

**Confidentiality:** Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Your anonymity will be protected through the use of a pseudonym. The raw data linked to your identity will be accessible by the researcher only. All information supplied by participants during the research will be held in confidence. Data will be collected via digital audio recording and handwritten field notes. To ensure security of the data, it will be managed and stored on a single computer and password protected. Data will also be backed up and stored on two USB flash drives which will be secured, along with hardcopies of research notes, journals and consent letters, under lock and key in a file cabinet in the researcher’s office. The research data will be stored for five years following publication of the thesis after which time it will be deleted from the computer and the backup copies on the two
USB flash drives and hardcopies of research notes, journals and consent letters will be mechanically destroyed.

**Availability of results:**
The results of the study will be published in my Master of Arts thesis and will be made available to you, in digital format, upon request.

**Questions About the Research?** If you have questions about the research in general or about your role in the study, please feel free to contact Patrick John Burns either by telephone at [ ], or by e-mail [ ] or by Skype [ ]. Should you need to verify the authenticity of the research project please feel free to contact my thesis supervisor Dr. Alice Macpherson at [ ], or by telephone at [ ] or my program head Dr. Liza Ireland at [ ]

**Legal Rights and Signatures:**

I______________________, consent to participate in Awareness of nature in a location-aware sport: Geocaching, learning, and nature conducted by Patrick John Burns. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Participant</td>
<td></td>
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<table>
<thead>
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<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Principal Investigator (Researcher)</td>
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</table>
Appendix 3: Interview guide

Preamble Script

The purpose of this study is to investigate how active geocachers experience nature and learning while participating in the location-aware sport of geocaching. This thesis research emerged from my interest in the relationship between people, digital mobile computer technology, and the natural environment; it is further driven by my vocation of adult education, my interest in informal learning, my avocation of outdoor recreation, and my interest in the lived experiences of people.

I would like to thank you for volunteering to participate in this study and assure you that your anonymity will be protected through the use of pseudonyms and all data linked to your identity will remain confidential. As principle investigator only I will have access to the raw data linked to your identity.

Interview Outline

1. Please describe for me your history with the natural environment. In other words, what has been your life experience with outdoor activities?

2. Please describe for me your history with technology, specifically the technology one would use in the sport of geocaching (computers, GPSr, Smart phones, etc.).

3. Please describe for me your history with informal learning [“Informal learning includes anything we do outside of organized courses to gain significant knowledge, skill or understanding. It occurs either on our own or with other people” (Livingstone, 1999, p. 2).]

4. Please describe for me how you became involved in the sport of geocaching?
5. What are your motivations for geocaching? In other words, why do you geocache and what importance does it have in your life?

6. Please describe in as much detail as possible geocaching experiences in which you felt a strong connection with the natural environment?

7. Please describe in as much detail as possible geocaching activities in which you believe you learned something (a skill or knowledge).

8. Follow up related to question 4. In the situation(s) you described did you intentionally set out to learn something or was your learning incidental, a byproduct rather than the goal of the activity?

9. Please describe how other geocachers have enhanced your learning related to the following areas: (a) geocaching activities, (b) the natural environment (nature), (c) the technology involved in the sport of geocaching?

10. How would you describe your engagement in the social aspects of geocaching?

11. Please describe for me a geocaching experience in which your intuition, hunch, or feeling enabled you to find a geocache. For example, once you arrived at the geocache coordinates you knew the most likely location of the hide and experienced no trouble finding the cache. Describe, to the best of your ability, how you believe you obtained this knowledge or skill.

12. Please describe any connections you can draw between yourself:
   - other geocachers
   - the sport of geocaching
   - learning
   - awareness of nature
Appendix 4 Participant criteria verification questions

Criteria Verification Questions

Instructions for use of this electronic form
To use the checkbox feature on this form double click on the check box and a menu will appear. Under default value there are two selections Not checked and Checked, click on Checked to indicate your selection and click on OK. An X will appear in the box selected. To use the date select tool click on the text Click here to enter a date and use the arrows to reveal and scroll through the calendar. Select the date by clicking on the appropriate date and it will appear in the box. To enter text in the textboxes click on the box and type your response. Save the document and return it by attaching it to a return email.

1. Demographic questions

   a. Age Range
      □ 19 to 24
      □ 25 to 34
      □ 35 to 44
      □ 45 to 54
      □ 55 to 64
      □ 65 and older

   b. How would you describe the surroundings in which you live?
      □ Urban (city)
      □ Suburban
      □ Rural

   c. How long have you been geocaching? Click here to enter a date.

   d. How many caches have you found?

   e. How many geocaches do you own?

   f. What is your geocaching username?