

Understanding Geocaching Practices and Motivations

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ABSTRACT

Geocaching is a location-based activity that has been practiced for a number of years. As a sustained and established activity it represents an important opportunity for understanding everyday practices and motivations that can build up around a location-based activity. We present findings from a field study of everyday geocaching behaviour. In contrast to previous work, we take a broad perspective on the activity focussing beyond the in situ consumption of these experiences. We look, too, at the practices and motivations surrounding participants' creation of these experiences. Further, we examine these behaviours within the social context of the on-line community that provides a significant basis for many of these behaviours. We use the findings to discuss broader implications for location-based experiences.

Author Keywords

Geocache, location-based computing, GPS (Global Positioning System), diary study, interviews.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Geocaching is the practice of hiding a container in a particular location, then publishing the latitude and longitude coordinates of the location on a geocaching web site [e.g. 7] for other "geocachers" to find using a GPS device. In essence it is a kind of a GPS-enabled treasure hunt. Ever since the first geocache was hidden in 2000, the hobby has grown considerably and now there are several hundred thousand caches hidden worldwide [7, 13, 21, 22].

Within the domain of location-based computing, geocaching represents an interesting and important object of study. As a technology-enabled location-based activity, it has various attributes that make it significant to understand both in itself but also to inform our more general understanding of location-based computing practices. First, it is a location-based experience that has established and sustained itself over several years. This allows us a perspective on a location-based experience that is difficult to get from limited time and place field trials of technology prototypes that, for

good practical reasons, have typified much user research on location-based applications. As authors such as [5, 19, 20] would argue, these limited field trial studies are not designed to explore the emergent everyday practices with technologies, the factors that shape these practices, and the social meaning they acquire as they as they become integrated into people's everyday lives. A study of geocaching affords us the opportunity to get this longer term perspective on practices with a location-based experience.

Second, with geocaching, people participate not just through the *consumption* of location-based experiences but also through the *creation* of these experiences for others. User participation in the creation of location-based experiences is an established vision within UbiComp [e.g. 10, 11, 14, 23] but again has not been significantly explored as an ongoing everyday practice. An understanding of user creation practices and motivations, through the lens of geocaching, then, is informative to this broader UbiComp agenda – in particular, in light of the emerging crop of toolkits and applications designed to give consumers the ability to author and publish their own location-based experiences [6, 8, 9, 10, 14].

Third, geocaching is of interest because it is comprised of both location-based elements and on-line elements. Understanding the diverse relationship between in situ and on-line behaviours is an important area of interest for UbiComp. Indeed, it has begun to be explored through several other interesting pieces of work [e.g. 1, 2, 16]. But our understanding of this area is in its infancy and there is need to map out other aspects of this relationship. Geocaching provides a new lens through which to explore another instantiation of the relationship between in situ and the on-line. Again significant in developing our understanding here is that geocaching is an established and ongoing practice with a large on-line community.

With this in mind, then, we present a study of geocaching practices and the social/contextual factors shaping them as they are enacted and given meaning in everyday life.

WHAT IS GEOCACHING?

As we have mentioned geocaching is a technology-enabled treasure-hunt but it is worth elaborating further on this basic description and key variants of the game to better understand the findings. A typical cache consists of a small waterproof container which can be hidden anywhere in the world. The latitude and longitude coordinates are noted and then published on a web site. The predominant website is geocaching.com [7]. A cache will contain a "log book" (to be signed and dated by those finding the cache) and

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potentially “treasure” depending on the size of the cache (sizes range from film canister “microcaches” to large ammunition boxes). Such “treasure” is generally low in value, consisting of novelty trinkets, small toys, coins and travel bugs (see later for description). Participants exchange this treasure – if they take something from the cache they must leave something of similar value. The basic caches are known as Traditional Caches, but some variants on this basic theme are worth noting. One variant is a Multi Cache in which participants go to several caches to get enough information to work out coordinates to a final cache containing the log book and treasure. A second variant is the Puzzle Cache where participants solve a puzzle to work out the coordinates of a cache. On the web site, each cache has its own dedicated web page. As well as the coordinates, this web page contains contextual information about the cache and the site, maps of starting points, a puzzle to work out the coordinates, and useful tips or things to look out for. Each cache has a 2-digit rating of difficulty: one digit rating difficulty of terrain; a second rating difficulty of the puzzle (a 5-5 is the most difficult). Logs for the cache and any related photos can also be posted on a cache’s web page.

PREVIOUS WORK ON GEOCACHING

Over the years, a lot has been written about geocaching. Much of this writing is short or journalistic in nature, providing a brief overview of the activity and commenting on various interesting anecdotal curiosities. There are also useful guide articles and books to the activity which provide more detail about the ins and outs of geocaching and how to take part [e.g. 17, 21, 22, 24]. Other writings focus on things such as forestry management concerns associated with the activity or the potential of geocaching for educational purposes [12, 24]. However such articles do not say much about how people partake in this activity on an everyday basis and an understanding of practice and motivation that can be informative for design.

In terms of formal study of the area, it is surprisingly hard to find published research on the topic. Perhaps the most significant and well known study is that done by Chavez and Schneider [3, 4]. This research was based around a questionnaire administered to practicing geocachers. As well as demographic breakdown of geocachers and quantification of average number of caches found and made, the study also begins to provide a quantitative characterisation of underlying motivations. These include for example, relaxation, being close to nature, and doing something with family. While these provide a useful starting point for our understanding there is very little in the way of rich qualitative detail. As such, the research does not really shed light on the details of geocaching in a way that could be informative to design. The study authors themselves make a call for future complementary research to explore more in-depth qualitative aspects of geocaching. We start to get more qualitative insights into practices through the work of Margot Kelley [13]. In her book, she presents various geocaching anecdotes that illustrate certain attributes of the activity and then offers a commentary that brings it all together. As well as some insight into practice, one of the

notable contributions of the book is to highlight the importance of the geocaching community (and associated issues such as trust and reciprocity) as opposed to just the activity itself. This social context within which the activity takes place turns out to be an important basis for understanding behaviour and motivations and is something that we return to in our analysis. Ultimately though, the concerns of her book are not with technology design and understanding, so practices are not viewed through an analytic lens that informs our concerns here. Consequently, additional research needs to be done within this context.

In much of the writing on geocaching, too, there is a tendency to focus only on the in situ consumption aspects of the experience that relate to searching for a cache. In terms of understanding everyday practices and motivations such a focus is too narrow. It ignores other points of participation in the activity such as the creation and publishing of caches by people and participation in the on-line community (Kelley [13] is an exception here and does break away from this focus to an extent in her discussion of on-line community). This is not simply a question of identifying the additional factors and motivations associated with these additional aspects. Rather, these different aspects of the experience are intimately bound up with each other. On-line participation shapes the in situ experience and vice versa. Likewise, participation in the creation of caches shapes motivations for on-line participation. In contrast to previous work, then, we take a more holistic view of the activity, combining both creation and consumption elements, as well as on-line and in situ aspects of the experience.

THE STUDY

Participants

We recruited 14 geocachers from the UK. Of these ten were male and 4 female (this gender bias is consistent with the breakdown in the study by Chavez and Schneider [3, 4]), with an age range from 20s to 60s. Some additional perspective on young children geocachers were provided by participants who were parents and grandparents and had been geocaching with their children. Participants covered a range of geocaching experience, some being very early to the activity with less than ten finds and others with many years experience and several hundred finds to their name. In selecting participants, the aim was not to create the basis for statistical comparisons across different types of users and experience levels (which would not be appropriate with such a sample size). Rather, in an exploratory study like this, the aim was to provide an opportunity for issues particular to different types of user to be raised in the study. Participants were given £40.00 vouchers for partaking in the study.

Method

The method was based around a diary study augmented by in-depth interviews. Participants were asked to keep a diary of their geocaching-related activities over a three week period. The events to record were not simply about going on a cache itself but pertained also to the broader set of activities surrounding it. This included any on-line logging posting comments, posting photos, research around a

particular cache, trip planning, making and publishing a cache etc. For each episode, they were asked to record the nature of the activity, when and where the behaviour took place, and any artefacts involved. Where practical we also asked participants to take photos of the episode location to provide further context for understanding the behaviour.

Interviews were carried out with participants both before and after the 3 week period. A preliminary interview before the trial period introduced participants to the study and established background context about the participants (age, lifestyle, work life, family life and level of geocaching experience). The primary interview was conducted as soon as possible after the diary period and was based around the recorded events. This interview lasted between 60 and 90 minutes. During this interview, participants provided more detailed descriptions of each episode, the context surrounding them and any underlying motivations.

FINDINGS

In this section we start with a brief overview of participation behaviour among participants before turning our attention to some of the underlying social values and motivations that shape behaviour. There was a huge range among the participants in terms of how often they went on a geocaching trip. For the casual cachers, it was something they would do every few months, typically during school holiday times. For the more keen geocachers, it was something that would go on a trip most weekends and in the evenings where possible. But they would also interleave geocaching with other aspects of their lives, opportunistically fitting it in where they could. That is, there were times when geocaching was not the primary reason for being in a place but that it was sometimes slotted in opportunistically around other activities. A good example here is of a cacher who was visiting a friend to watch a soccer match. He and his partner drove over to the friend's house and parked the car outside the friend's house. Instead of going in the house he left his partner in the car and nipped across the road to a park where he knew a cache was. He spent 10 minutes looking for the cache and then returned to the car to get his partner before going in the house.

"We were going round to a friends house to watch the England Israel game and there happens to be one in the Park next to his house – so we parked up the car – I leapt out and ran across to the park to see if I could find it."

Int: "What did the friend think?"

"I don't think he was aware of it – they would find it a little peculiar... The main thought going through my head was that I was going to miss kick off and that my wife was in the car waiting for me – I said if we had time I would pop in on the way – I think she thinks it was one of my sad hobbies – she doesn't get particularly enthused about it... It was probably a 10 minute round trip from leaving the car to getting back to the car."

A number of participants would try and get out during lunch breaks at work to find local caches. Others would combine it with journeys, stopping off on the way to somewhere else in order to find a cache. The more experienced and enthusiastic cachers were also reactive in their behaviour responding, for example, to the publication of new caches.

But there were additional touch points to the activity that allowed participants to maintain participation through on-line engagement with the web site and through new cache creation and research. For the inexperienced cachers, much of this "in between" behaviour was based around finding of a particular cache to do or to log a find and so was relatively infrequent. However for more enthusiastic cachers, these in-between participation points provided an ongoing nurturing of their interest. This monitoring activity happened daily or every few days through routine visits to the geocaching.com web site and through regular email alerts. Through the web site and its tracking facilities, these cachers monitored the arrival of new caches and new log entries for their own caches and built up an awareness of the cache landscape in their local area, around their home, their work, or other places where they visited on a regular basis.

"I just do half an hour to quickly go through – just to see what is happening locally – any new ones I put into my Garmin so that they are all on there – so that if we happen to come here I can look at it to see what is local to here – I wouldn't necessarily come from Shirehampton to here just to find that one across the road – it's been there some time and it's not that important to me but because we are here why not do it."

"I am conscious of where they all are in Cheltenham. So if ever I am passing them I will probably have a nose around"

This monitoring behaviour is important in enabling their more opportunistic geocaching, and, as we shall see later the basis for some of the motivations based around collecting and friendly rivalry among fellow cachers.

Motivations for Caching

Social Walking

One of the primary motivations for doing a geocache was because it created an opportunity to get out and walk. In this respect it is important to think about the activity not simply as a destination or a find. Rather, an integral part of the experience is the getting there. An important question then is why people simply didn't just go on a walk. What is significant is how caching was used by people to give a walk a sense of purpose. This sense of purpose helped motivate participants to walk and engage in physical activity and without which they would be less inclined to go.

"Helen and I aren't keen walkers. It's the only way to get us out is to put a geocache at the end. It's a good way of getting people who don't like to walk much to get out and do a walk."

"I doubt I would stop at the bottom of the hill and think – oh I'll go for a walk up there. It's not likely but when you think there is a cache up there I would do it. My incentive is that cache at the top of the hill."

This lack of motivation to walk was particularly notable among children. Several parents commented how they wanted to get their children out of their rooms and away from the computer but that it was difficult to do this simply by suggesting going for a walk for no purpose. Indeed such suggestions by parents would often be met with moans from the children and a rather reluctant inclination to the walk. Caching provided a reason that walking in itself did not.

"It's another goal though – if I am taking the children on another dog walk they will be complaining about the fact that they have to

go on a dog walk. It's nice to get them out and stretch their legs. They like walking but if you are trying to get them out of their darkened bedroom where they have got World of Warcraft to play on – so in order to entice them out is was just another thing – another aim of the trip – not just to go for a blind walk but to actually go and find a geocache – so.” SA

Getting the kids out was a real practical concern for parents and the motivations for getting them to participate were varied. Parents were keen for their children to get out and experience nature, engage in some form of exercise and even to explicitly provide the children with alternative options to activities based purely on consumption. For another parent, geocaching with the children was a way for her to engage in an activity which helped her lose weight looking after the children. For others, it was a way simply to spend time with the children. More broadly, while geocaching at times was an isolated activity, in the main participants regarded it as a way to spend time with partners, family and friends.

In light of this mixture of motivations there are several notable characteristics of the activity and technology use. First is the level of immersion demanded by the technology. Relative to some location-based experiences, the use of the GPS devices here is actually relatively backgrounded. That is, the GPS is only referred to by people when necessary for navigation purposes. It is also notable from the perspective of allowing nature to be enjoyed rather than dominated by an overly immersive experience. It does not demand the continuous attention of individuals enabling ongoing social interaction of the group (in contrast to more immersive location-based experiences such as audio tours can do). As a consequence, the technology and activity design here enable the ongoing social interaction among the group that is such an important factor in the enjoyment of the activity. It also means that a single device is easily shared among a group.

An additional aspect of supporting this social behaviour was the *differentiated* level of participation afforded by the activity. That is, different members of a social group could contribute to different degrees yet still be part of the social occasion, making the activity very flexible in terms of participation and social inclusivity. For example, one participant described how the family would go out geocaching. His wife was not particularly bothered about geocaching per se but she enjoyed the fact that they would be going out for a walk as a family. Her involvement then was relatively peripheral except she would occasionally get involved if there were any puzzles to do in order to find the coordinates. Likewise, participants talked how they would go out geocaching with friends who were not into geocaching but they would come along to “hang out”. Other aspects of this differentiated participation were apparent with children where parents would make an effort to explicitly involve them, typically letting the children do the final part of the search once they were in the vicinity of the cache.

“Usually when you get to a place you let one of the kids find the box, open it, look through it, find the coins and write in the log [book].”

Discovering and Exploring Places

A key motivation underlying participation was its use as a way of discovering new places to go. In this respect, it was not so much the finding of a cache that was primary but where it led to as a consequence of doing this treasure hunt.

“And also the opportunity to go to new places – ‘cause they are generally in places of quite natural beauty and interest. Things that you would normally pass by. There are so many places I have driven by and never stopped and then you stop and you still can’t see anything until you go hunting for the cache and you realise there is a fantastic little haven of natural beauty somewhere – so we’ve found loads of really great places... That’s the reason I do it – new places – because we go out with the dog we are always looking for new places to go. The same place gets boring.”

What is significant here is that caches are not placed in random hiding places but rather are located in places of natural beauty or significance. By virtue of looking for these caches, participants discovered these interesting or beautiful places that otherwise they simply would not know about. Geocaching as an activity then was being used by people as a form of social recommendation about places – a way to explore and discover. For some, this discovery was a passive process in the sense that participants find new places by virtue of doing geocaching. But we also saw how some participants were more active in their use of the activity in the discovery and exploration of a place. For example, one participant who travelled regularly with work used caching to find out about the area he was staying rather than just remaining in a hotel. Others used it on holiday to help find places that were perhaps more off the beaten track and dependent on the local knowledge of the person placing the cache. But it was more than just a social recommendation. There were times too when the caching provided people with a structure to their exploration. For example, with certain caches participants were directed to look at particular features in the environment for clues in order to find the final GPS coordinates for a cache. This encouraged them to look at places in different ways than if they were not caching.

This discovery process also applied to the local area where people live where one might expect them to have good local knowledge. But such local knowledge is often built upon particular routines of their everyday life. In this sense there are the same places that you go to regularly out of habit and out of function. Geocaching helped people break out of a routine way of experiencing their local environment to discover places they never knew existed.

“That is the main thing we have found in Reading – we’ve lived in Reading for about 4 years now but every time we find a new wood or a new park – I never knew this park and lakes existed up by Woodley – and its actually a lovely place to go for a picnic or to the lake or whatever – I didn’t know what was up there.” PD

In addition, one participant commented how he had stopped thinking about his local area as a beautiful place to live – to him it was functional and his experience was shaped by his

routines and those around him. As an example he would walk a particular path everyday to take his children to school. At that particular time of day it was busy and there was lots of traffic noise and so he had stopped appreciating it. But when he read comments left by some geocachers about a cache local to him, remarking what a beautiful and tranquil area it was, it made him reflect on it and look at his local area in a different way.

Collecting

As an activity, geocaching was more than just the sum of the individual caching experiences. For many of the participants, there was a “collecting” ethos that was a significant part of the experience. The geocaching web site keeps a record of all the different caches a particular cacher or caching team have done. Their “collection” of cache finds as a whole was a demonstrable record of what they have achieved. Building this up was an important and ongoing driver for continued participation. Participants mentioned that they would not want to give this up visible sense of achievement. In this respect we cannot look for motivational and behavioural factors simply within the context of an isolated geocache experience. The significance and meaning of the next cache is dependent upon the context of what they have already collected and achieved.

While in some senses this motivation might be regarded as rather trivial it had important behavioural consequences. As with other kinds of collecting behaviour [15, 18], participants set particular goals to achieve. For example:

“We set our own goal to try and do every cache within the first page where you log in – the places where you live. These are all the caches – by gradually extending radius – we try and do every single cache on that page. That changes as caches, either new ones are inserted or old ones are suspended. I think Alex set that. We did manage to do it last year but we are behind now again.”

What is important here was not simply that people set these goals but that these goals became an extra incentive and driver to continued and more frequent participation. As we can see from the following quotes these goals created a sense of urgency to get out there and do more caching. Completing the goals created a sense of achievement

“We have been aiming to get to our 100th in a year of caching – which meant rather a lot in March... 'cause we had fallen behind... It was an achievable goal. We were fairly close to it. Let's see if we can get the 100 in – and it forces you. If you becomes a bit lethargic and can't be bothered, if you have a goal like that you think well maybe 3 or 4 this weekend and I'll be alright.”

“For me it's a bit like a mine field. It's like minesweeping. I like to clear the 5Km area around me of all geocaches and that's my weird way of doing it. If someone releases a new one within 5 km I have to go out and do it straight away.”

Others would celebrate particular milestones such as 50th, 100th, 200th etc. and would do something special for these:

“People seem to mark their 100th 200th etc for whatever it is. They say I think I'll pick a good one for my 100th. One that looks like a real challenge.”

This particular motivation of collecting was important

because there were times when the experience became about the numbers. It was quite typical for people to do multiple caches in a day and some of the keen participants would be disappointed with less than 10 finds on a caching daytrip.

Profile and statistics

Part of the value of these collecting practices within geocaching comes from being immersed within the social context of the geocaching community. As discussed in the social psychology literature on collecting, a person's collection becomes bound up with doing identity work [15]. Consequently, there was value not simply in these collecting achievements per se but how they came to be represented to others. With this in mind, it is important to consider the ways this was enabled through the on-line environment and how this inextricably tied the location-based experience with accompanying on-line behaviour.

Basic logging capabilities are available to all members of the geocaching.com web site. These essentially document all the caches that a user finds and owns, differentiating them according to cache type. For some of the participants in the study, these basic capabilities were a sufficient representation of their activities and did not require any investment of effort to achieve this value. For others, though, the presentation of their profile was an important concern for them. These participants would exploit additional capabilities of premium membership and other third party software to introduce further statistical representations of their activity into their profiles. For example, they would include maps of counties they had cached in, number of “5-5” rated caches (for terrain difficulty and puzzle difficulty), days since last find, rate of finds. Some participants also posted photographs of their caching activities on their profile. As identity resources, these became another source of engagement for the participants.

In some senses these profiles had important functional value. Participants used them on a regular basis to interpret comments posted in the cache logs. Consider, for example, “Did not find” was a common comment within the cache logs. From a prospective cacher's perspective it was important to be able to interpret these DNF comments to make a judgment about whether to go to a particular cache or not. Participants used information in the profiles to assess the level of experience of a comment author to know whether it was serious or not. Or they would use it to glean any clues about a cache owner that might help them solve clues to a particular puzzle cache.

“If someone goes to a cache and says they can't find it or says its lost then you – and I want to do that one because it is one my route – you look at their profile and if it says 500 caches found its pretty certain its not there. If they have only found 10 you think they are not into it and it's a bit harder to find that others. That's the reason I look at their profile. Or to see what their job is – if they have a puzzle cache you look at their job to see what inspired them to work out that blasted puzzle.”

But many participants also inspected these profiles for less functional purposes, simply out of curiosity.

“Generally I find it fascinating to see. It’s nosiness really. The fact that you can click on their profile, see where they live and see how many they have done. I clicked on it because they have collected the item. I will click on it if they own an item or if it’s their cache. I guess because I only know one other person who does this it is intriguing to know who else does this.”

First to find: competition and urgency

We discussed earlier how the numbers game was an important driver for continued participation in geocaching activity. But there were other aspects of the activity which created compulsion and urgency among participants to get out there and search for a geocache. Again, such behavioural drivers lay outside the immediate bounds of the in situ cache experience itself. They arose because these experiences were performed within the context of the on-line community. The most notable example discussed by participants was the practice of being “First-to-Find” a newly published cache and the particular kudos associated with this.

“A lot of people, their kudos is to be the first to find one. So when one is published you almost certainly know that it is going to be found within hours.”

When discussing this phenomenon with the participants, it was notable how the same two names cropped up again and again, namely Valiant Knight and Captain Gore-Tex. But what was interesting is how the dominance of these two cachers among the community actually generated a sense of friendly rivalry among the rest of the community. For most people, it was not a practical possibility to regularly compete on first to finds. However it is something they wanted to do when the possibility of a “first-to-find” came up and was something that practically achievable for them. This would generate a huge drive to get out there and beat Valiant Knight or Captain Gore-Tex to the find.

“Or a new one pops up. That is the other thing that will draw you out – an email saying new. As soon as that is published, first-to-find, lets get out there. It is a race then. There are some that is their goal in life: Valiant Knight and Gore-Tex. That is their thing, time and time again... So part of you just wants to beat them. Our first first-to-find was an absolute beauty. I had been in London working all day. I was on the train coming back and Fran said do you fancy doing a cache 7 o’clock at night – and I said no not really and he said well there is one out there that Gore-Tex has logged as can’t find and its near to Yatton station. So I got into the station at 8 o’clock and you drove there – and this is the madness of it – two cars at Yatton station. It’s dark and wet. I’ve done a 12 hour day and haven’t eaten tea and I’m rummaging around in the hedgerow looking for a little film canister so that we can get first-to-find but it was more a case of so that we can be Captain Gore-Tex – and we took high delight in writing a log saying ‘I don’t know what you are talking about mate it’s there’ - it’s all in fun and jest.”

“When we first-to-find. The email went off as we were going out to a school play and it was on the Downs a few hundred yards from the front door. I couldn’t let Gore-Tex beat me to that one and then we went out. That was the closest to the geekiness I had got to going out to find the geocache with a torch. It was dark. It was 8.15 in the winter.”

To make a detour while on the way to a school play in the middle of a dark winter’s evening is recognised by the

participant as slightly irrational and geeky. This particular participant was not an especially obsessive geocacher. But what is illustrated is just the level of compulsion that this friendly competition among the community can generate in terms of driving participation.

This desire also drove the emergence of related behaviours among participants such as increased monitoring of the site for new caches, subscription to email alerts for newly published caches and even the use of web enabled handhelds to obtain up to date information in the moment.

“Valiant Knight and Captain Gore-tex are a nightmare. He is like a First to Find junkie and this why I started the alerts off – will I get there before the Valiant Knight gets there.”

Challenge: individual and social aspects

For many participants, one of the key driving factors for ongoing participation was that geocaching provided a number of sources of challenge.

“I mean it’s a terrific challenge to be able to find it. I suppose that is it – it’s a challenge. I don’t like to be beaten. The longest we have spent looking is about an hour and a half and I don’t like to give up until I have found it.”

This is in line with the claims made in [18] about the location-based technologies providing value not simply by making it easy to get information at the right place and time but also by making it difficult. As we can see from the above quote, there was a sense that participants did not want to be beaten and will spend what on the face of it seems rather an irrational amount of time trying to locate the cache. But this gives a sense of the commitment to the challenge and level of motivation. Others spoke of how they would reluctantly give up on a particular occasion, but would often revisit the site again in an attempt to try again.

For the Puzzle Caches there was also the additional challenge of solving problems to discover the particular coordinates for the cache. What was significant about these puzzles was they required a large amount of time investment to solve them and much of this work occurs away from the cache site. Because of this distribution of the experience away from the actual cache location, participants would sometimes email the cache owners to confirm that they had correctly solved the puzzle before embarking on a long journey to actually find the cache. This extension of the experience beyond the cache site was also an important part of how people maintained participation in the activity even when not convenient to be out and about. For example, when weather conditions were not suitable for the outdoor aspects of a location-based experience.

“We tend to spend more time with puzzle caches in the winter because you can sit round a table in the pub or at home and you can solve the puzzle caches nearby and go and do them on a nice day.”

“The problem solving took me a lot longer. Three weeks it took me. Every few hours going in and having a look and a few weeks later going in and having a look trying to work it out. A couple of lunchtimes sat in the office with a couple of colleagues to see if I can help you, that sort of thing. We did 5 over Christmas that were based on anagrams. You had to solve the anagrams before working out the coordinates and I had the whole family over

Christmas doing anagrams trying to work out these damns things – so you can get people to help you.”

While these challenges are in some sense about personal achievement it is important to consider social elements underlying them in terms of opportunities for social action but also in terms of reputation among the community. As we see from the quote above, solving these puzzles was at times a collective effort in which participants solved them with friends, family or work colleagues.

The final stage of the cache search too became an opportunity for social occasioning. We discussed aspects of this in relation to children performing the final search when caching with their parents. Rather than efficiency concerns here, parents used the search to set a challenge for their children. These search opportunities were also appropriated by cachers for a form of localised play, introducing a competition among the local group for who will find it first.

The other aspect of problem solving and challenge where there was an underlying social element concerns reputation among the broader community. Participants were driven to choose particular puzzles or caches that were hard because this gave them credibility among the community

“I like the ones that are hard to find because there is a bit more of a reputation to be gained from doing a hard one.”

There was great satisfaction to be had by participants finding a cache for which previous cachers had reported a succession of “Did Not Finds”. This starts to explain why, as was discussed above, many cachers did not like to give up their search. The reporting of a “Did Not Find” within the social context of the community was a public admission of defeat. In this respect the on-line activity with its social underpinning was intimately bound up with behaviours that take place in situ at the cache site itself.

Travel Bugs and Coins

In this section we discuss key artefacts within geocaching, namely “travel bugs” and “geo-coins” (collectively known as “travellers”) and the behaviours and social motivations that occur with and through them. These are physical artefacts with unique IDs, which get moved from cache to cache by participants who log them in and out of caches using the geocaching website. The very simplicity of the idea of moving from cache to cache allowed them to be appropriated for a variety of creative purposes. Participants created “missions” for these travellers such as “travel as far north as possible”, “travel to as many countries as possible”, “get to Sydney Opera House as quickly as possible.” Participants also attached small objects of significance (e.g. fluffy toys etc) and these become incorporated into the missions.

“We have also released our own bug. Alex gave it the mission of getting to Sydney opera house which is did in 10 days. Quite amazing isn’t it. Picture of the family who took it there with it and now it’s stuck slightly north of Sydney.”

There are a number of important issues to draw out here. First is that these missions invited a collective participation. By putting a traveller out there, participants invite others to contribute to the mission. Collective responsibility and trust

are important here. By picking up a traveller a participant accepted responsibility to help. This created an expectation to move the traveller on. This was significant because there was a moral obligation and social pressure to move it on creating a sense of urgency to go and do another cache. This contributed to a cycle of continued participation.

“Sometimes you feel a bit pressurised because once you have got one you have to move and put it somewhere and hopefully whatever its target is and if you haven’t been out for a couple of weeks and you are holding onto it and someone is expecting you to move it on you think well we had better go out.”

Creating missions was also an opportunity for social engagement and play among the immediate social groups such as family and caching friends. Several participants described how they designed travel bug missions to create competitions between themselves.

“Ah well I was having a race with my mates TB – he started his in Birmingham and I started mine in Bristol and the idea was that the first to get to each others caches – so we raced mine from Bristol to Birmingham and his from Birmingham to Bristol- they both went at the same time. Mine ended up somewhere bizarre and then down to Cornwall to a cache that was so difficult to do people only did it once every 6 months so mine spent 6 months down in Cornwall in a cache that I actually went down to find so that I could bring it back and start it again – but I actually couldn’t find it so it was a pointless trip for me and eventually mine made its way to Birmingham.”

Again what is significant about this behaviour is the way that playful appropriation of the artefacts became a basis for a greater participation frequency. The competitive spirit created encouraged specific trips to engage in this location-based activity so as to beat his friend.

People also created dependencies between different travellers which again became another way of creating urges to go out and cache. In one example, one geocacher had released four travel coins in different caches around the South West region of the UK. The aim of the mission attached to the coins was to combine all 4 coins together to get the location clue and to take a photo of them all together.

“That is another thing that might inspire us to go out – the goal is to take a photo of these things together – we had one and then went to look at its goal – that’s when we found that you had to get the other half of it and take a photograph. So we put it on our watch list so that if it got put anywhere and lo and behold it got put up at Weston house which is about 10 miles – and we’d been out caching all day and we’d had an awful day. It was Jan 1st or something – not great weather. So we got back here and saw the email and it was about 9 o’clock and off we went to find it in the dark with security lights and everything.”

Of note in this quote is the on-line tracking behaviour that occurred around these artefacts. Participants would go to the geocaching web site to see where particular coins were and which caches they were logged into. When the coins were in a convenient cache they would go out to collect it. Again this shows the important relationship between the on-line behaviours and the location specific aspects of the activity.

Such tracking of “travellers” was also of significance to

those who actually released the travel bugs in the first place. Several participants spoke of their simple fascination with the physical movement of these artefacts around the world, how far they go and just how quickly they get moved around by the collective action of the other geocachers. “I find that interesting to see how they travel. I am surprised some of these things move so far.”

While the experience of this location tracking is performed in the on-line world, what is important here is the physical movement of the object around the world by other people. While it is easy to imagine the implementation of a virtual equivalent, this would not have the same meaning as the tracking of the physical movement of an artefact.

Making a cache

Unlike many other location-based activities, participation in geocaching was not simply about the consumption of experiences designed by others. An equally significant way in which participants engaged with this activity was in the creation and publication of their own geocaches for others to consume. This side of the geocaching experience is relatively under explored compared with the consumption experiences. However, our research indicates that for many participants, the creation of these caches was an integral part of their experience of geocaching. Making a cache was not something people did straight away when entering the hobby but typically took place after being involved for a period of time. Through doing caches of others, participants built up experience of what makes a good or interesting cache and acquired the confidence to create and publish their own. Making a cache was also more effortful than simply doing one and so required more commitment to the hobby. Only once participants established they wanted a longer term commitment to the activity did they begin to engage in creating of their own caches.

The motivations for creation were varied. One of the key reasons cited by participants was the desire to give something back to the community and hobby that had given them pleasure. In this sense it was an act of reciprocation, a social act that ensured a continued growth of the cache corpus by and for the community. The community therefore is very much self sustaining in a way that can be contrasted with those communities dependent on third party content such as certain other gaming communities.

A second motivation for creating a cache was the desire to share with others a place of significance or natural beauty (mirroring the earlier motivation for doing caches to find out about new places).

“There is one over in Wales by the side of a reservoir – the scenery is stunning - on a sunny day lake like today the scenery is so beautiful that people ought to know about this so I set this cache up over there. This reservoir is so beautiful that I thought well I’ve got to take people there.”

There was great satisfaction to be had in the knowledge of helping others find these places that people would otherwise not know about. Reading logs of visitors expressing their appreciation was an important part of this experience since it makes visible the effects on others that the cache had.

“So Carolyn did quite a bit of research to see where she wanted to put it... She got a lot of compliments for that part of the cache. It’s gratifying to know you have helped others. Like you’ve experienced someone else’s cache has taken you to parts of the country that is nice. To then experience that someone else has had the same pleasant experience but doing one of your caches that’s nice.”

Of significance here is more than just the ability to inform others of the place. One could present this information in another forum such as, for example, a personal web site. But what making and publishing a cache did was provide creators with a socially meaningful and accountable way of “tagging” a place as being one of interest. When publishing a cache on the geocache.com web site, the cache web page includes contextual information about the cache. This provided an opportunity for cache creators to inform others. Some of this was used simply to provide historical or geographical context about the place but it also created an opportunity for the creators to express some more personal information about the place of personal significance to them. For example, “this is the place we first met”, or “the bench you see is where we used to sit when we were courting”. In another example, a participant used this as an opportunity to dedicate a cache to his partner and her achievements in relation to the place where he had placed the cache.

“I felt proud of Pauline for walking up the hill because it was steep and I called it Pauline’s Peak. My partner Pauline suffers from a leg condition which means she has to walk with the aid of a stick. This is the highest hill she has ever walked up and therefore I have named this cache after her splendid achievement!”

Another motivation for making a cache was that it provided a mental challenge to the creator. Creating traditional caches was relatively straightforward, but the challenge of creating puzzle caches was particularly stimulating for the creators.

“I suppose also the mental challenge of creating it. I enjoy thinking up a new idea.”

Participants would spend a considerable amount of effort in creating these puzzles. Thinking up a new angle on a theme was important. But there was also effort in identifying a location that was both suitable as a hiding place, an interesting final destination, had features in the environment for use within the puzzle and also a specific location which had location coordinates that would work well within the framework of the puzzle idea they had set up. This puzzle construction would take place over the course of weeks or months and involved iterative in situ visits, research work at home and the creation of any necessary support materials. For some participants, this process was an ongoing activity, either through keeping a mental note of seed ideas and locations as they came across them or more formally keeping a notebook of ideas and relevant content for the construction of these puzzle caches.

But the motivations here too were partly social in that much of it is about setting a mental challenge to others. The effort and mental challenge of creating the cache only made sense in the context of other people’s efforts to do it.

“It was a strange sensation - you have this split thing within you when you set a difficult one – half of you wants someone to find it

to prove its doable and half of you doesn't want somebody to find it – you want logs to come in saying this is an absolute so and so – what are those Winscombe Wanderers like? But you want a bit of both really.”

As we can see from the above quote, it was important that the puzzles are demonstrably doable by others as well as being challenging to others – this demonstration was only realised through the efforts of other cachers trying to solve the puzzle. Much of the feedback about this was played out in the logs and it was these responses by the community that generated pleasure (and on occasions disappointment – “*It was a disappointment that they found it so quickly*”) for the creator and played such an important role in motivating the creation of these caches.

“I try to think up new angles all the time – only so that people will go wow that was a good idea and you will go yes that’s cool – that’s probably why I put my own caches out.”

“For a while Pam was doing just “Found it thanks” [a typical short response in the logs] – very short logs when she first found it. But now that she has set some of the own she is realising what pleasure you get from seeing other people’s logs... ‘Found it Thanks for the Cache’ is pretty boring – that’s not what the person who set it is looking for – they are looking for ‘Cor we suffered with this and we fell in the stream and here is a picture of us getting wet – it makes people seem real then.’

This social context within which these caches were put also led to another important consideration for cache creators, namely that of reputation. Several participants spoke of the importance of reputation and how you get known for the style and quality of the caches you create. Participation through creation of caches, (as in consuming the treasure hunts themselves), is an ongoing thing. The rewards and motivations are shaped through this social participation over time and is a concern that influenced the efforts people continued to put into creation (and ongoing maintenance) of their caches. There was always social accountability associated with creating and publishing these things.

As well as the motivators which drive creation behaviour there were also factors (over and above the creation effort) that limited it such that the number of caches created was typically orders of magnitude less than the number caches consumed by an individual. One such factor was the concern for ongoing maintenance of the cache. The practicalities of maintenance of different caches effectively created an upper limit on how many caches a person is prepared to create. But it also impacted on the positions where people put them. There was a need for relative convenience to ensure ongoing maintenance was practical. People tended to publish caches in places local to them for this reason or at least in places where they visited on a frequent and regular basis. As cache owners they do not want to be responsible for other’s frustrations of travelling to a location only to find the cache no longer exists or some elements not working effectively.

“The other one we have done is a multi cache but that is quite hard to maintain because we have hidden things in places which are the nest places to hide them. They keep rolling out or get lost in the mud or eaten by squirrels or... they are micros to find the first set of coordinates which lead to a traditional cache. We haven’t had trouble with the traditional one, it’s the micros that go missing and

then you feel bad when a family has gone out for the day and they haven’t actually found the cache because one of the micros has been eaten by a squirrel – so you have to go out and fix it pretty quickly.”

DISCUSSION

Through the study presented in this paper we have taken a look at geocaching as an everyday practice, highlighting the social motivations and behaviours accompanying it. In contrast to previous work in the area, the study has taken a more holistic view of the activity that has highlighted interestingly new characteristics of the activity and what it enables from a social perspective. This understanding of geocaching as everyday practice is of interest not just itself but also provides some useful new perspectives for thinking about location-based and geo-enabled experiences more generally. We reflect on some of those here.

First, while geocaching is defined in terms of the treasure hunt and the find, this is actually the end point in a much larger part of the consumption experience. For many people, geocaching was an opportunity for social occasion, a walk with family or friends. There are several features of geocaching that facilitated this. First, it provided purpose and motivation to a walk that was important in getting people involved in the social activity – in particular younger children. Second, the technology aspect of the location-based experience was actually *backgrounded* for large parts of the social occasion being brought out intermittently when necessary. In this sense it neither dominated nor hindered the possibilities for social interaction. Finally, it supported differentiated participation by different members of a social group. Not everyone needed the key technology to take part in the group activity. And members of a social group could participate as much or as little as possible in the location-based aspect of the geocaching experience while still being part of the group (e.g. just going for a walk with the group).

A second thing the research has shown is the significance of considering it as an ongoing practice that builds up over time. In understanding geocaching and other similar location-based experiences, it is overly simplistic to look for explanations of behaviour just within the characteristics of an individual discrete experience. In geocaching practices, much of the meaning, motivation and behaviour associated with it was shaped as much by what a geocacher has achieved to date (in terms of caches completed, travel bugs accessed etc) as it was by the characteristics of the next cache. One cannot understand the impulses and urges to get out and do another cache without considering it as an ongoing achievement. This is an important perspective for thinking about other location-based experiences.

A third issue concerns the creation and consumption. For many geocachers, both these aspects of the activity were a significant part of the experience, though there was an asymmetry in terms of effort involved and experience required. Creating the experience for someone else is more demanding in terms of time and mental effort than consuming those experiences created by others. While allowing other people to create location-based experiences or annotate space is not new per se, there has not been any

real systematic study of the motivations and factors that influence it as an everyday practice as we have seen in this study. The study has highlighted some of these motivations. It has also shown how a dedicated forum for “publishing” these creations can be an important influence on behaviour. A good example of this is how placing caches in this forum provided a socially accountable way for a person to tag a place as important to them.

This begins to point to another important issue in understanding geocaching practices, namely the relationship between on-line and in situ behaviours. What the study has demonstrated is that such practices are intimately bound up together and that on-line participation can be a significant influence on associated location-based experiences and vice versa. There are number of issues to note here. First and perhaps most significant, is how the on-line technology and community it supports provide a social context within which these activities take place which motivate and shape ongoing participation. For example: the log responses to caches can motivate creation of caches; the friendly rivalry between participants can create an urgency to get out there; the social accountability of moving travel bugs on creates further urgency to get out there. All of these things and others emerge from the social context of these location-based activities provided by the on-line communities. This is a worthy consideration for designers of other location-based experiences. The on-line aspects of the experience also provide participants with what we might call *in between* participation. That is it provides more convenient touch points into the activity in between the in situ experiences that maintain a person's participation even when not possible to get out to so the in situ parts of the experiences.

Geocaching is also significant in demonstrating an interesting alternative perspective on location-based and context aware activities. In some traditional views of location and context aware computing, the idea is that the technology simply responds to wherever you are. In this sense there is a fundamental notion of opportunism associated with the technology. But what is demonstrated in geocaching is that people are also planful about location-based experiences, planning to go somewhere *because* there is a location-based experience there. This is an important distinction from a design perspective because it emphasises the need to consider not just the location-based experience itself but also how to support the particular practices associated with planning to go to these places. Some good geocaching specific examples of this were visualisation tools to help people see the location of visual clusters of caches and also the context pages for each cache on the web site that encourage people to go in the first place.

In sum, the study has shown the importance of looking beyond the simple in situ consumption of a “treasure hunt”. Rather it is important to consider it as an ongoing practice that acquires social significance through its positioning within an on-line community. In addition, it is important to consider creation activities as well as consumption. We hope this perspective provides more general insight into the understanding and design of location-based experiences.

REFERENCES

1. Brown, B., MacColl, I., Chalmers, M., Galani, A., Randell, C. and Steed, A. (2003) Lessons from the Lighthouse: Collaboration in a shared mixed reality system. In *Proceedings of CHI '03*, Ft Lauderdale, USA.
2. Benford, S., Crabtree, A., Flintham, M., Drozd, A., Anastasi, R., Paxton, M., Tandavanitj, N., Adams, M. and Row-Farr, J. (2006) Can You See Me Now? In *Proceedings of CHI '06*, Montreal, Canada.
3. Chavez, D.J., Courtright, R., and Schneider, I. (2004) Over the river and through the woods. *Parks & Recreation*, 39 (4), 68-72.
4. Chavez, D.J., Schneider, I., and Powell, T. (2004). The social-psychology of a technology driven outdoor trend: Geocaching in the USA. In *Proceedings of HICSS, 2004*, Honolulu, HI.
5. Harper, R., Regan, T., and Rouncefield, M. (2006) Taking Hold of TV: Learning from the Literature. In *Proceedings of OzCHI*, Sydney, Australia,
6. <http://www.createascape.org.uk>
7. <http://www.geocaching.com>
8. <http://www.mscape.com>
9. <http://www.mobilebristol.com>
10. <http://www.yellowarrow.org>
11. Hull, R., Clayton, B., Melamed, T. (2004) Rapid Authoring of Mediascapes. In *Proceedings of UbiComp 2004*, Nottingham, UK.
12. Hurd, A. R., & Schlatter, B. E. (2005). Geocaching: 21st century hide-and-seek. *The Journal of Physical Education, Recreation, and Dance*, 76(7).
13. Kelley, M.A. (2006) *Local Treasures: Geocaching across America*. Santa Fe: Center for American Places.
14. Lane, G. (2003) Urban Tapestries: public authoring and social knowledge. In *Proceedings of IAD Conference on Appliance Design*, Bristol, UK.
15. McIntosh, W. D. & Schmeichel, B. (2004) Collectors and Collecting: A Social Psychological Perspective. *Leisure Sciences* 26: 85-97.
16. McGonigal, J. (2007) Why I Love Bees: A Case Study in Collective Intelligence Gaming. <http://www.avantgame.com/writings.htm>
17. McNamara, J. (2004) *Geocaching for Dummies*. John Wiley and Sons.
18. O'Hara, K., Kindberg, T., Glancy, M., Baptista, L. Sukumaran, B., Kahana, Gil. Rowbotham, J. (2007) Social Practices in Location-Based Collecting. In *Proceedings of CHI '07*, San Jose, CA, USA
19. O'Hara, K., Slayden Mitchell, A. and Vorbau, A. (2007) Consuming Video on Mobile Devices. In *Proceedings of CHI '07*, San Jose, USA.
20. Palen, L., Salzman, M. and Youngs, E. (2000) Going wireless: behavior & practice of new mobile phone users. In *Proceedings of CSCW '00*, Philadelphia, USA.
21. Peters, J. (2004). *The Complete Idiot's Guide to Geocaching*. New York: Alpha Books.
22. Shermann, E. (2004) *Geocaching: Hike and Seek with Your GPS*. Apress.
23. Williams, M., Fleuriot, C., Reid, J., Hull, R., Facer, K. and Jones, O. (2002) Mobile Bristol: A New Sense Of Place. In: *Proceedings of UbiComp 2002*, Goteborg, Sweden.
24. Wright, T. (2003) Geocaching: Trees as treasure. In *American Forests*; 109, 2, p.7-9