

# Who actually wants to use ‘the killer app’? Perceptions of Location Based Services in the Young and Old

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## ABSTRACT

This paper describes the results of two qualitative case studies that assessed the perceptions of Location Based Services (LBS) with two UK user groups: a family with a behaviour-disordered teenager, and a group of older adults. The family (n=2) and older adults (n=13) were interviewed individually after experiencing LBS. The data from the interviews were thematically analysed with the aid of Nvivo software, and organised into themes to better understand attitudes towards LBS technology. Whilst both groups had the opportunity to use, adapt to and experience LBS, perceptions of ‘cool’ and ‘trendiness’ affected judgments of it, and their subsequent usage intentions. The family adopted the LBS system fully, with the device aiding navigation, and ultimately developing trust. Their teenage son also embraced the technology, aided in part by the unobtrusive and ‘trendy’ nature of the mobile phone the LBS was deployed on. In contrast, the older adults felt that LBS could not assist them in any way, and were concerned about the potential for invasions of privacy. This work highlights clear generational differences in the acceptance of LBS, and suggests consideration is needed for the future design of LBS to ensure suitability for the user.

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## 1. Introduction

The use of technological devices, in social as well as business contexts, has grown and is predicted to continually do so over the coming years (Bryce, 2012). Personal devices such as mobile phones, mp3 players, tablets, laptops, digital cameras and desktop computers offer people more choice, and ownership has become more affordable, in particular for younger generations (Yarrow and O’Donnell, 2009). Competition to develop the most desirable products is therefore a major consideration

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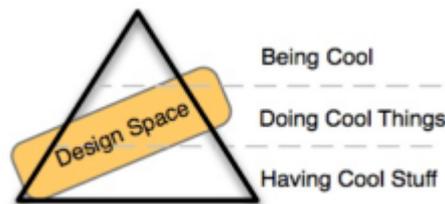
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for manufacturers. The design of 'cool' products has often focused on the desires of younger people (Read, Fitton, Cowan and Beale, 2011), yet the concept has not been extensively explored in older generations. Other work has also looked at the cultural differences between the concept of cool (Schiller, 2012). The case studies reported in this paper come from a larger body of work dedicated to the investigation of location-based services (Thomas, 2011), revealing generational differences in attitudes towards this novel technology. This paper will discuss relevant literature related to the notion of 'cool', and briefly explain LBS technology. The approach taken for two LBS case studies will then be presented, followed by the case study findings, conclusions, and future considerations.

### 1.1 What is cool?

Whilst there may not be one single concept of cool, it has tentatively been defined as "a set of shared meanings [...] within a peer group which signify group affiliation" (O'Donnell and Wardlow, 2000, p. 13,). This definition would suggest that peer groups with strong social ties have more consensus as to what constitutes cool, despite not necessarily being able to express exactly what it means. In terms of academic attempts to explore this concept, theoretical approaches have represented cool hierarchically: cool is comprised of 'being cool', 'doing cool things', and 'having cool stuff' (Figure 1., Read et al., 2011).



**Figure 1.** The Hierarchy of Cool (Read et al., 2011)

Much like Maslow's Hierarchy of Needs (Maslow, 1943), the 'cool pyramid' suggests that 'having cool stuff' is more attainable than 'doing cool things' or 'being cool'. This model is a useful tool for considering how people may think about the concept of coolness in terms of technology adoption. In this paper, the use and potential adoption of location-based services are explored.

### 1.2 What are LBS?

'Location-based services' (LBS) is a term to encompass any technology that is able to pinpoint the geographical position of a product or individual. They are now most

often deployed on mobile devices using GPS to locate an individual person. There has been huge growth in the LBS industry, and the emergence of this technology in more mainstream settings has caused people to take notice and question its unobtrusive nature (Bettini, Jajodia, Samarati and Wang, 2009). This technology is now recognised as being applicable to a variety of different user groups, not just the lone worker population for which it was predominately designed. Vulnerable, young, disabled and older groups are now a focus for LBS marketing campaigns (e.g. [www.buddi.co.uk](http://www.buddi.co.uk)). The perception of LBS in different contexts is also changing. Previously 'uncool' uses of the technology such as 'tagging' people when on parole (Michael, McNamee and Michael, 2006) has become cool by association, with the tag becoming a status symbol rather than a stigma (Richardson, 2002). In terms of more mainstream adoption, LBS technology has been utilized in many mobile phone applications, including Facebook, Twitter, Instagram, and Flixster.

When LBS technology emerged many researchers and social commentators described it as the 'killer app' (Junglas and Watson, 2008). The uptake, however, has certainly not been as great as expected. It could be argued that the potential for information loss or the public's growing appreciation of privacy has slowed the success of LBS (Fitzpatrick, 2010). More recent uses of LBS on social networking sites also suggest it is being used in different contexts (Sullivan, 2010). Services such as Facebook Places and Foursquare are now enabling users to specify where they are, what they are doing, and who they are with. This use of LBS may be inherently linked to the social norms of public disclosure using social networking sites, and the ability to tell people the 'cool' locations we are at, where we have taken our publicly posted photographs, or which is the closest cinema. Whilst LBS are becoming more familiar in some contexts, however, psychological research into its use and acceptance has been lacking. The two studies described in this paper highlight how 'cool' design can impact on adoption and use of LBS. In particular, a service delivered through a technology that is considered 'cool' is shown to appeal more. Cool design also appears to be of more importance to a younger generation.

## **2. Method**

In order to understand how LBS technology is perceived, two case studies were conducted with real LBS users. These studies explored the perceptions of, and

feelings towards LBS, and utilized in depth interviews with LBS users. The participants took part in semi-structured interviews, and were encouraged to discuss their current use, as well as considerations for future use of LBS technology. Ethical approval for the studies was granted by the School Ethics Committee prior to contact with participants. Each participant was provided with detailed information about the research (written and verbal), and completed consent forms before testing.

### **2.1 Study 1: LBS in a family environment**

The parents (one male, one female) of a 16-year-old male teenager with ADHD and Asperger's Syndrome participated in Study 1. The family had been using an LBS system for approximately 4 months. The LBS technology was provided via a Blackberry phone running a location-tracking and alert system (see Figure 2). This enabled users to raise an alert if in danger. This technology was implemented specifically with the aim of aiding the family, who had problems locating their teenage son. His disorder meant that he often got lost if allowed outside, and had trouble finding his way home. To assist with the parent's participation, a mediator who already worked closely with the family was contacted to arrange the interview. The mediator was also present at the interview to provide support to the family.

### **2.2 Study 2: LBS with older adults**

Three males and ten females (mean age = 82) participated in Study 2. Participants had experience of using LBS as part of previous mobility study they had participated in at Northumbria University. In that earlier trial participants were given the use of 'i-Locate', a location tracking pack worn on the arm (see Figure 3). As the older adults were not in poor health, they were interviewed from the perspective of using this kind of technology to enhance their existing social activities. The interviews were transcribed verbatim, and the data were analysed thematically with the aid of NVivo software. Themes were identified in the data when important information was highlighted by the participants regarding their feelings towards the LBS system. The analysis process involved reading and re-reading of the transcripts and coding responses into similar groups before labelling them, a practise recommended in the literature (Braun and Clarke, 2006). Thematic analysis was conducted by the lead researcher initially.

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**Figure 2.** LBS alert system on a Blackberry



**Figure 3.** i-Locate LBS system

Two other research team members then read the transcripts and considered the themes. Constant comparison was used to ensure that the analysis represented all perspectives. Discrepancies between coders were resolved through discussion.

### **3. Results**

#### **3.1 Study 1: LBS in a family environment**

The interview provided some important insights into how LBS might be introduced into the lives of families with children who have psychological disorders. There were seven main themes identified within the data: Navigation, Anxiety, Well-being, Personality changes, Personal Development, Freedom, and Technology Adoption. These themes related to two dimensions of family life; first, the impact that behavioural problems had on the family before LBS use, when the teenage son would become lost, get in trouble, and lack concentration. The second was the way the LBS technology impacted on the family as a whole, and improved not only navigational problems, but more interpersonal family relationships. One major finding was that the LBS

technology was used reciprocally, with the parents tracking the location of their son, and the son tracking where they went. This built up trust within the family unit, and aided acceptance of the system as a routine practise of family life.

In terms of design, the familiarity of the mobile phone enabled this system to be adopted by the family quickly and seamlessly. Whilst the parents had occasional technical trouble with the Blackberry, their son was more knowledgeable and taught them how to use it. The parents also reported that their son liked having a new expensive mobile phone, but did not show it off to friends, respecting its utility. It was an acceptable and 'trendy' piece of technology to carry around, and was deemed so useful that at the time of the interview, the family were planning to continue their use of LBS as their son progressed to high school.

### **3.2 Study 2: LBS with older adults**

In contrast to the successful adoption of LBS in the family setting, older adults were far more concerned about their privacy and being tracked. The themes emerging from their data included, but were not limited to: Usability, Apathy, Autonomy /Resignation, Stakeholder Credibility, Data abuse, Secrecy and Physical Safety.

The physical design of the i-Locate system caused a number of problems. Participants felt that LBS were not suited to them, designed inappropriately, and they failed to see how it could be integrated into their existing routines. A few participants even forgot to wear the tracking device, or didn't remove it from its packaging, requiring a repeat of the LBS trial.

The familiarity with this kind of technology was an issue for participants, and in general, it was not deemed 'cool' or usable for them. The older adults described other preferred methods they used to keep in touch with friends and family (e.g. diaries and phone calls). These more useful ways of locating people were ingrained into their daily patterns. Of those that did feel they might use this kind of technology, they felt it would be because they may become disoriented or fall and injure themselves. There was no appreciation for the novelty of LBS, and the consideration of the technology being incorporated into a cool accessory such as a mobile phone was not desirable to them either. Some older adults discussed that they would like to be able to use the technology to keep a record of their whereabouts, and one participant thought the LBS capabilities for activities such as orienteering would be useful, but in general, neither the technology, nor the concept of locating themselves was perceived as cool.

#### 4. Discussion

The design of LBS technology trialled in these studies exemplify how aspects of 'cool', and in particular, context, can be important when adopting a new system. Whilst the older adults didn't feel that the i-Locate packs were helpful or suited to their lifestyles, the family using the LBS system with a mobile phone enjoyed its benefits and familiarity. There was a clear generational difference in perceptions of this technology. In the family situation, where mobile phones were already being used, the LBS device was an extension of an already accepted technology. In particular, the teenage son felt the mobile phone was a 'cool' and unobtrusive way to navigate and manage his disorder. In contrast, the older adults did not consider the value of the technology in terms of how cool it was. With a distinct lack of experience using anything like this before, they were more hesitant to adopt LBS, and seemed afraid of the unknown. With this lack of consideration for 'cool', the older adults preferred to use trusted devices they were already familiar with to help locate themselves to others.

These findings give us an insight into the motivations behind the adoption of LBS technology for different generations, but more importantly, highlight that the notion of 'cool' is not universal, and importantly the idea of 'cool' is not paramount for older adults. The idea of a technology being 'cool' was mainly upheld by the teenage son, rather than the parents. The functionality of the technology played a much bigger part for them than its cool status. Taking cues from previous literature, this may be understood more clearly when considered in the social contexts that were investigated. Whilst the family with the teenage son compared their experience of LBS with that of their son's peers and his younger brother, the older adults rarely used people in their age group as a gauge for what was acceptable. From these in depth discussions with young and old users of LBS, we now know that the idea of cool may certainly influence adoption of technology in a younger population; however this is unlikely to have any sway over the perceptions of older adults.

It needs to be noted however, that this was a case study approach, and the findings of the studies here may not apply broadly to the rest of the UK population. However, this work was conducted not with the aim of achieving generalisable results, but as a starting point to understand generational differences within LBS acceptance and adoption. Whilst one case study is not enough to understand the preferences of family units, this work highlighted the unexpected benefits that LBS may offer this user group.

Similarly, the exploration of LBS attitudes in the older adult population has suggested different reasons for adoption and acceptability.

In terms of theoretical relevance, the findings from these case studies suggest that only 'having cool things' has been identified from the 'cool hierarchy' (Read et al., 2011). There was no discussion that using LBS was necessarily classed as 'doing cool things'. However, the functional nature of the technology in these contexts did not necessarily allow for broader thinking about its applications for cool behaviours. Certainly an exploration of the use of something like Facebook locating systems and the ability to do 'cool things' might reveal a different perspective. The design of the hardware that was used also made a huge difference to their evaluation of it, with the teenage user perceiving the modern technology as 'cool'. Clearly, however, there are differences between the two types of LBS technology tested here. The i-Locate pack may have been rejected wholeheartedly by the teenager and his parents, as an unusual piece of kit they would have had to adapt to. Similarly, the older adults may have embraced the mobile phone concept more willingly than the wearable pack, had they the opportunity to trial it. This exemplifies the need to understand the design of these systems firmly with their intended users in mind. This newer trend of LBS use on mobile phone applications is a good example of the way LBS has been adopted into the mainstream, without the associated privacy or security concerns. This may be the only way that LBS will truly become the 'killer app' it has been described as, adopted on the premise of being the socially acceptable way to track friends and family.

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