User attachment to smartphones and design guidelines

This item was submitted to Loughborough University's Institutional Repository by the/an author.


Additional Information:

- This article was published in the International Journal of Mobile Learning and Organisation [© Inderscience Enterprises Ltd.] and the definitive version is available at: http://dx.doi.org/10.1504/IJMLO.2014.067020

Metadata Record: https://dspace.lboro.ac.uk/2134/17186

Version: Accepted for publication

Publisher: © Inderscience Enterprises Ltd.

Rights: This work is made available according to the conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) licence. Full details of this licence are available at: https://creativecommons.org/licenses/by-nc-nd/4.0/

Please cite the published version.
User Attachment to Smartphones and Design Guidelines

Gisli Thorsteinsson¹ and Tom Page²

¹ University of Iceland, Reykjavik, Iceland, cdt@hi.is.
² Loughborough University, Loughborough UK, T.Page@lboro.ac.uk

Biographies
Dr. Gísli Thorsteinsson is a Professor in Education at the University of Iceland. He holds a doctoral degree in Philosophy from Loughborough University in England, which focused on using a Virtual Reality Learning Environment for idea generation training in Innovation Education in Iceland. Gisli was the chairman of the Icelandic Craft Teachers Society in 1995–2005, the chairman of the Nordic Slöjd Teachers Society in 2001–2005 and on the board of NordFo, an Academic Research Society for Pedagogic Craft Education in the Nordic countries, in 2000–2005. Gisli was involved in building up a new national curriculum for ICT and Technology Education in 1999. At present, his main research focus is on exploring the values of implementing mobile technology to support ideation via. Gisli has published numerous articles and several textbooks on Innovations in Education and Design and Craft Education.

Tom’s background is in electro-optics design at Ferranti Defence Systems Ltd. in Edinburgh where he was sponsored throughout his undergraduate studies. In 1990, he was appointed as a research assistant at Glasgow University with the Engineering Design Research Centre (EDRC) in Glasgow (two-year fixed-term SERC funded). Upon completion of this role, Tom taught Computer-Aided Engineering at the University of Hertfordshire in Hatfield. Since moving to Loughborough University in 2003, Tom has taught electronic product design, interaction design, design and manufacturing technology and physical computing. His research interests are in technology mediated education, electronic product design, value management and engineering design practice research.

Abstract This research examines the emotional attachments that users have towards their smartphones. An online survey and a case study were undertaken, in order to determine the degree to which users were attached to their smartphones, and the results of both studies highlighted that all participants displayed emotional attachment to their smartphones. Conclusions may be drawn from the results of the studies, in identifying how emotional attachments can be formed, the roles smartphone brands play in emotional attachment and the social implications of such attachment. The information gathered was utilised to offer advice to designers, in order to assist them in strengthening the emotional attachment of users to their smartphone.

Keywords: smartphones, attachment theory, design and emotion.

INTRODUCTION

The first iPhone was released in January 2007, to huge demand, and revolutionised the way in which people interacted with technology. Having a touch screen on a mobile phone became the new normal, and the ability to be constantly connected to the internet became increasingly popular. By 2013, almost everybody had a smartphone of some sort, whether a Blackberry, iPhone, Samsung or HTC. Today, it is estimated that, in the UK, more than a...
quarter of adults (27%) and almost half of teenagers (47%) now own a smartphone (CBR, 2011). It is regarded as normal to own a device that is always switched on, is kept on your person or nearby and is constantly sending and receiving data from the internet.

The aim of this research was to investigate the degree of attachment that smartphone users have towards their phone and whether this attachment is emotional in nature. It was found that there is very little research within the field of emotional attachment relating specifically to smartphone technology. Indeed, smartphone technology is relatively new, which may be the reason why the research that does exist is focused towards the behaviour of smartphone users, rather than the degree of emotional attachment to their smartphones (Haverila and Haverila, 2013). The main objectives of this research were to gain insights into how users may form emotional attachments to their smartphone and to understand a consumer’s attitude towards smartphone brands and models and how this may relate to the degree of emotional attachment they feel towards their smartphone. Furthermore, this work aimed to analyse the findings in order to formulate some recommendations (targeted towards both designers) that would be likely to increase the emotional attachment of users to their smartphones. These recommendations could also be used in an attempt to strengthen emotional attachment to other products.

This research comprised of a questionnaire and a case study: the questionnaire focused on the behaviour of smartphone users, such as their desire to have their smartphone nearby. Furthermore, it posed a series of questions that asked respondents to specify up to three emotions from a wide selection of differing potential emotions identified by previous researchers. With this knowledge, it is anticipated that corporations designing and producing smartphones may be able to adjust their designs, in order to encourage customer loyalty towards their brand. Moreover, in much the same way, designers of smartphone applications may use this information to aim the design of their applications towards encouraging customer loyalty.

2 LITERATURE SURVEY

2.1 Attachment theory
Attachment theory was first introduced by John Bowlby in the late 1960s and early 1970s, in relation to the bond that exists between parent and infant, and outlines the dynamics of long-term relationships between human beings. Bowlby (1969) observed that separated infants would go to great lengths to prevent separation from their parents or to re-establish proximity to a missing parent; they would cry, cling and frantically search. This ground-breaking research is often used as the building block for any understanding behind emotional attachment. As Bowlby informed: “Each Party manifests intense pleasure in the other’s company and especially in the expression of the other’s expression of affection…proximity and affectionate interchange are appraised and felt as pleasurable by both, whereas distance and expressions of rejection are appraised as disagreeable or painful by both” (1969: 242). In the late 1980s, attachment theory was extended from its focus on caregiver/child relationships to include adult romantic relationships. Work in this field was pioneered by Hazan and Shaver (1987), who proposed that attachments could vary in strength, with stronger attachments associated with stronger feelings of connection, affection and love.

Numerous researchers (Hirschman, 1994; Rubstein & Parmlee, 1992; Sable, 1995) have documented emotional attachments between individuals and various objects, including
pets, places and celebrities. A popular study of emotional attachment to non-human attachment figures (Thompson et al., 2005) is in the field of consumer attachment to particular product brands. It is clearly very useful for a corporation to deepen its understanding of how its consumers behave and the criteria that causes consumers to become attached to a particular brand; such knowledge will enable corporations to base product design and marketing around these findings. Thompson, MacInnis and Park (2005) attempted to measure the strength of consumers’ emotional attachment to brands using attachment theory as the psychological basis of their studies and were able to quantify various levels of emotional attachment to brands. However, they were unable to determine extreme levels of attachment and this was further explored as an antecedent for mobile phone addiction by Khang et al. (2012).

2.2 Extrapolations between attachment theory and various attachment objects

Hong and Townes (1976) conducted a cross-cultural study in order to investigate the incidence and characteristics of infants’ attachment to inanimate objects and some of the factors involved in their development, with close attention paid to child-rearing practices. They concluded that the phenomenon of attachment to an inanimate object appears to be closely associated with child-rearing practices. It was suggested that the occurrence of infant attachment to inanimate objects is lower in cultures in which infants receive a greater amount of physical contact, including a higher rate of breast feeding. These findings indicate that emotional attachment may be formed to inanimate objects in lieu of physical contact, which is relevant to smartphone technology: a smartphone is a device that can enable social interaction without a physical connection to another person. The principals of attachment theory have not yet been applied and tested with reference to smartphone technology, perhaps because this technology is relatively new.

2.3 Smartphones and human emotions

In order to fully understand people’s emotional attachment to their smartphones, it is necessary to understand human emotions. The way in which we identify and distinguish one emotion from another is a contested issue within the fields of emotional research and affective science. Affective science is the scientific study of emotion, induction of emotions, emotional experience and the recognition of emotions in others (NCRR affective sciences, 2012).

Ekman (1992), a pioneer in the study of human emotions, believes that humans display core emotions (anger, fear, sadness, enjoyment, disgust and surprise) as a result of human evolution. He states that each of these basic emotions have similar, more discrete emotional states within its ‘family’ and observed that all members of the anger family (including emotions such as rage and frustration) could be categorised by sharing similar facial expressions, with slight variations in the facial expressions indicating whether the anger is controlled, simulated or spontaneous.

With emotion-orientated computing systems becoming a reality, the requirement of a standard way of representing human emotions and related emotional states has emerged. Using such information, computing systems can and are being developed to recognise and diagnose human emotion from triggers such as speech, facial expression and tone of voice (Firth, 2012; Firth 2013). The emotion annotation and representation language (EARL) was
proposed by the Human-Machine Interaction Network on Emotion (HUMANE), in order to assist in the creation of an XML based language (Extensible Mark-up Language) for ‘representing and annotating emotions in an emotional context’ (Schroder et al., 2006: 88). HUMANE created a model in which they utilised the expressive power of language to categorise and identify 48 emotional representations for use in their mark-up language. The EARL model takes into account the fact that, in certain scenarios, a person may experience more than one emotion at a time, including emotions under different classifications. This allows for emotional intensity as well as a confidence value which can be used to reflect the human (or human-machine) level of confidence in the emotional annotation. This model was developed out of necessity, as stated by Schroder et al. (2006:5), who informed: ‘A unified theory or model of emotional states currently does not exist’.

Derks et al. (2004) conducted a psychological study in the hope of trying to learn of the social implications of emoticons, and they confirmed that people use more emoticons in socio-emotional contexts than in task-oriented contexts, utilising more positive emoticons in positive contexts and more negative emoticons in negative contexts. However, they found that there appeared to be a socially acceptable usage of emotive symbols; for example, they ascertained that negative task-orientated contexts yielded the least usage of emoticons. These findings are interesting in terms of emotional attachment and smartphone usage, as it is indicated that users will utilise such emoticons in expressing their emotions through their phones.

2.4 Youth market

The studies that exist in the field of mobile phone and smartphone usage are largely focused on the youth market, in particular undergraduate university students. Dresler-Hawke and Mansvelt (2008) researched mobile phone usage amongst 111 university students between the ages of 18 and 24 in New Zealand, and their findings indicated that, in young adults, phones are considered an ‘extension of self’. As reported by Dresler-Hawke and Mansvelt:

Phones were an extension of self, with the majority of students leaving their phone on continually and believing their phone was an essential medium for communicating effectively. The findings suggest mobile phones occupy an integral place in young people's lives; not as a means of social differentiation but as a necessary part of social communication through the maintenance of key social networks (2008:1).

Balakrishnan and Raj (2012) explored the relationship between Malaysian youth and their mobile phones, and the results of their studies suggested that the majority of survey respondents exhibited symptoms of addiction. The respondents had a compulsion to constantly check their phones for messages and missed calls, and it was also found that the majority of respondents showed real feelings of distress when they were unable to have their phones with them. Applying attachment theory to Balakrishnan and Raj’s studies may indicate that there was a strong emotional attachment between the users and their mobile phones. The studies also found that, when selecting their phone models, women placed a greater emphasis on the safety features of the phone (such as applications that enabled them to find their phone when lost). This finding is consistent with the principal in attachment theory, which states that individuals will often seek physical or psychological protection from the attachment figure (Kim et al., 2013).
A study into mobile phone habits, conducted by Oulasvirta et al. (2012), indicated that brief usage sessions repeated over time comprised a large part of smartphone use: this was referred to as ‘checking habits’ and it is believed that such checking habits may increase the overall usage of the phone. These ‘checking habits’ are not dissimilar from the behaviour of a child who feels comfortable playing a distance away from their caregiver as long as they can look up from playing from time-to-time and see that the caregiver is nearby.

3.0. RESEARCH METHODOLOGY

There were two hundred and five respondents to the online questionnaire, comprising of people living in the UK; Hong Kong; China; Canada; Australia; Peru and the US. The age range of the respondents was between sixteen and sixty-four years old. The questionnaire featured two parts: the first part sought basic information, such as age and gender, in addition to information about smartphone models and some of the characteristics respondents displayed while using their smartphone.

Some of the questions in this section used the Likert Scale (McLeod, 2008) as a means of establishing how strongly participants agreed or disagreed with statements about their smartphone use, and the answers to these questions helped to highlight how users interacted with their phones. The second part of the questionnaire sought to gain information about the specific emotions users experienced in certain smartphone related situations. Participants were given a scenario such as ‘I have lost my phone with no chance of finding it’ and were asked to choose the emotions they thought they would feel in that given situation from a list: the listed emotions for the survey were those outlined in the emotion annotation and representation language (EARL). Participants could choose multiple emotions for each scenario, but were encouraged not to pick more than three, unless absolutely necessary. This information was used to gauge how emotionally invested users were in their smartphones, with each scenario revealing a different aspect of their emotional attachment and attitudes.

The questionnaire was designed to ensure that responses were reliable and relevant. Open-ended questions were avoided, in order to ensure that the data would not become too obfuscated with periphery information. The questionnaire method was chosen rather than interviews as a result of the large and diverse sample size of the participants. The information would not have been able to be achieved in a one-to-one situation, due to the international target of the questionnaire respondents. The questionnaire employed a quantitative research method, as opposed to qualitative, and, as such, the information gathered was not in as great a detail as the information obtained through interviews. It was also acknowledged that participants may not have always answered everything truthfully, particularly if a question sought to determine whether participants displayed signs of addiction. It is interesting that a large number of the respondents advised that they completed the questionnaire via their smartphone, rather than their computer or tablet.

In order to gain insights into the emotional attachment of users to their smartphones, a single user was asked to take part in a case study. Information collected over a five-day period was analysed, in the hope of providing an insight into how emotion and attachment influences the behaviour and attitudes of users towards smartphone technology. In sourcing the ideal participant, perceived emotional attachment to their smartphone was taken into account. The chosen participant displayed traits of strong emotional attachment to her phone: she became distressed if she was unable to locate her phone (i.e., she often rang her
The need to maintain proximity, both physically and mentally, was pointed out by Bowlby (1969) as a strong indicator of emotional attachment. The participant was a 57 year-old retired lawyer, who is currently both a non-executive director of an overseas company and a masters student.

The main goals of this study were to learn in what respect the user was attached to her smartphone and to gain an understanding of which aspects of smartphone usage created the attachment. The willing participant was asked to participate in a case study over a five-day period, during which she was downgraded to a non-smartphone model (from a Motorola Razr i XT890 to a Nokia 1616). The Nokia 1616 is a pre-smartphone model and works simply as a mobile phone, in making and receiving calls and sending text messages via the ITU keypad. It does not have internet access, nor does it have a QWERTY keyboard; thus, the participant in the case study was unable to perform tasks even some of the most primitive smartphones are capable of performing.

Throughout the five days of the case study, the participant used the replacement phone and was asked to keep a diary, in order to document her experiences and thoughts. The diary featured some generic questions, in addition to a scale that the participant could use to indicate how pleased or displeased she was in living without a smartphone. The scale featured pictograms, indicating dissatisfied and satisfied. The diary also featured an area in which the participant could add additional information. In depriving the participant of a smartphone, the use of her smartphone became more apparent: she realised all the small things that she used her phone for day-to-day and that she could not perform tasks in the same manner in the absence of her smartphone.

RESULTS & FINDINGS

One portion of the questionnaire (parts 1 and 2) featured questions designed to gain information that could be used to determine participants’ emotional attachment to their smartphones. Comparing the results for gender and age, it became apparent that there was little to no correlation between age and gender and behaviours and attitudes pertaining to smartphone usage: this indicates that the way smartphones affect emotion and attachment is uniform for all ages and for males and females alike. The attachment of users in the 18-24 age group appeared to be just as strong as for those in the 55-64 age group. The results of the survey indicated that smartphones were used in a similar way by the young, middle-aged and older participants.

It was found that 87.3% of participants admitted to using their smartphones whilst waiting for something or someone. As stated earlier, when confirming that they had completed the survey, many respondents indicated that they had used their smartphone to complete the survey when waiting for a plane or a meeting to begin, etc. Seventy-six percent of users either strongly agreed or agreed with the statement ‘I will often check my phone, even if I have not received a notification’, while 60% of users either strongly agreed or agreed with the statement ‘I often feel the need to touch or locate my phone (not performing a task)’. When combined, the results of these three responses demonstrated a clear indication of the ‘checking habits’ outlined by Oulasvirta et al. (2012). These researchers hypothesised that such ‘checking habits’ may lead to an increased frequency of the usage of an object; in
In this case, the smartphone. It could be that this increased frequency of smartphone use allows strong emotional bonds to form between the user and the smartphone. The fact that these participants admitted a need to touch or locate their phone is indicative of a strong emotional attachment to the object. Bowlby (1969) believed that, the stronger a person bonds to an attachment figure (in this case, a smartphone), the greater the desire becomes to maintain proximity to the attachment figure: this is outlined as one of the 4 key components of emotional attachment. These checking habits could be the incubator of a desire to maintain proximity to the device. In addition, the majority of participants also agreed that they ‘find it hard to cope without their phone’.

From these initial results, it is no surprise that 16% of users strongly agreed and 45% agreed to having an attachment to their phone. Thirteen per cent disagreed with this statement, while a mere 4% strongly disagreed. These findings are of particular interest when compared with the second portion of the questionnaire, which covered the emotions users felt in particular situations, as it is possible that some users may have not been aware of the extent to which they were emotionally attached to their smartphone.

The participants were asked to imagine a scenario in which they had lost their phone somewhere in their own home; thus, their phone was only temporarily separated from them. This question was asked in order to test one of Bowlby’s (1969) key components of attachment, in which separation from an attachment object results in distress. The results confirmed that the participants did experience feelings of distress when faced with separation from their smartphone. 79.6% of selected emotions fell within the category of negative emotions (negative and forceful, negative and not in control, negative thoughts, negative passive and agitation), with negative and forceful receiving the most responses (32.1%). The most frequently selected emotions in this were annoyance (16.8%) and irritation (12.4%). As the users experienced strong negative emotions in a scenario during which they were temporarily separated from their phone, it was readily apparent that, on average, participants did indeed have an emotional attachment to their smartphones. This was also confirmed by the results of the following question, where they were asked how they would feel if they had lost their phone with no chance of recovering it. The results here changed drastically, with the selection of negative emotions yielding a shocking 100%. Every single emotion selected for this question (a total of 166 selections) was of a negative nature, with 35.6% of the emotions referred to as ‘forcefully negative’ and 31% as ‘lacking control’. The most commonly selected emotion was stress, at 11.4%, followed by annoyance and anger, at 10.8%. This indicates that every single participant had some level of emotional connection to their phone, even those who had indicated in earlier questions that they did not believe they had such an attachment.

When asked to react to a situation in which their phone was damaged, 46% of emotional responses were forcefully negative, with the highest forceful negative result for any question (96% negative overall negative emotions). This indicates that nearly half of respondents felt strong emotions when put in a situation where their phone had been damaged, which may indicate that participants were protective towards their smartphones, thus responding negatively to the thought of it being damaged. Such emotional attachment, which every participant appeared to display to some extent, was confirmed when users were asked what emotions their phone made them feel most frequently: 86.5% of responses referred to positive emotions, with satisfaction being the most commonly selected emotion (12.7%). The fact that the majority of responses referred to positive emotions indicates that
smartphones make people feel good. This may be due to the fact that smartphones invoke positive emotions, causing users to become more emotionally invested in them as objects and thus more emotionally attached. This in turn results in a display of strong negative emotions when the security of the smartphone is threatened. Some of the questions in the questionnaire were designed to gain insights into the users’ attitudes and attachment towards their smartphone brand (and the specific object itself). This attempted to determine whether or not users were emotionally attached to their specific smartphone or whether their attachment to it was more towards the technological capabilities of their phone.

Participants in the questionnaire were asked to write down the make and model of their smartphone and this information was used for two purposes; firstly to verify that users did indeed have a smartphone and, secondly, so that the make and model of their smartphone could be used to identify the age of the phone (allowing us to establish how up-to-date users liked their smartphone model to be). It was found that 61.8% of smartphones belonging to users were released within the preceding 18 months, with the most popular phone being the iPhone5, which was released only 5 months earlier. These statistics demonstrate that people frequently upgrade their phones to a newer model. The oldest phone, as highlighted in the survey (iPhone 3GS), was only 3.8 years old, which is still quite young, in terms of technology.

In order to establish people’s attitudes towards their smartphones (in terms of brand and technical capabilities), a series of questions were asked. These questions used the same structure as the previous questions, in which participants were asked to choose emotions from the EARL categorisation of emotions. Users were asked which emotions they would be most likely to feel if they were to receive a branded upgrade of their phone, if they were to receive an upgrade (from another brand) of their phone and if they were to switch to a similar phone of another brand. The branded upgrade was the most well-received, with 94.2% of chosen emotions being of a positive nature and 59% being of a positive and lively nature (due to the high frequency of excited emotions (23%)). Upgrade to another brand only yielded a rate of 71.9% of positive emotions; while the general consensus was still positive, there was a large drop in positivity, when compared to the corresponding results of the branded upgrade. The drop in positivity continued when there was no upgrade, just a change in brand, with only 61% of chosen emotions being of a positive nature: questions of this structure demonstrated the biggest mix of positive and negative emotions. These results clearly indicate that, comparatively, users were more passionate about their current phone brand than an alternative. It was also highlighted that the promise of a new phone, regardless of brand, was positively received. This appears to indicate that the attachment is to the technology and the capabilities of the phone, rather than the specific object. Participants were also asked to respond, with emotional words, to a scenario in which they are having a meal with a friend and their friend was preoccupied with their phone. The emotional response to this question was 91.1% negative, with 60.7% of emotions being forcefully negative: the highest frequency
of forcefully negative responses than for any other question, even those concerning respondents losing their phone. This reveals a lot about user attitudes towards smartphone usage. Although the participants themselves demonstrated an emotional attachment to their own smartphones, they appeared to display negative emotions towards someone else using their smartphone in a social situation. Only one person who responded to this question said that they would feel empathy in that given situation.

The case study did not yield the desired results, as the participant found it so difficult coping without her smartphone that she needed to resign from the case study halfway through the second day. Although it would have been ideal for the participant to complete the full five days without her phone, some interesting information regarding emotional attachments and smartphones could still be salvaged from her two-day diary entries and a concluding interview. The mere fact that the user found it too difficult to cope without a smartphone for five days is in itself a testament to the strong emotional attachments users may form towards their smartphones. In terms of the analysis of the two-day diary entries, it was clear that, on the first day, the participant was most displeased with the lack of third party applications, lack of internet connectivity and the overall experience. By the second day, the participant had become so frustrated by the lack of her smartphone that she placed nearly every option at the ‘displeased’ end of the scale. However, the most interesting results from the diary study were featured in the notes section. Here, the participant used very emotive language, often using multiple exclamation points and underlining words to express the inconvenience of not having a smartphone. The language she employed was very emotive in nature, often using emotion-heavy words such as ‘hopeless’, ‘annoying’ and ‘hate’.

The language the participant used to describe her experiences without a smartphone during the interview was also very emotive. Although she was very calm and composed in the interview, she frequently used words from the negative categories of the EARL model when discussing the non-smartphone Nokia mobile phone, such as ‘frustrating’, ‘annoying’ and ‘anxiety’, in addition to other words relating specifically to emotions. This subconscious choice of wording during the interview, in discussing both her smartphone and her experience of the basic Nokia phone, indicate that the participant strongly associated emotion with smartphone technology. During the interview, the participant highlighted many features of her smartphone, attributing these as to why she found it so difficult to live without her smartphone, with third-party applications being one of the most prominent features. This indicates that a level of customisability and the freedom to use a phone in a personal way makes it more successful, possibly fostering emotional attachment. The participant also touched upon ‘checking habits’ (Oulasvirtra et al., 2012), in discussing how being unable to check emails, LinkedIn, Facebook and BBC news was a cause of frustration, ultimately resulting in the abandonment of the case study.

The participant had been willing to undertake the case study, but she had clearly not anticipated that being without her smartphone would be so disruptive to her life. In the interview, she explained that she was leaving for a business trip towards the end of the case study period and that her mother was unwell and that she needed to accompany her to a range of appointments with a variety of doctors. She admitted that she had resorted to using her smartphone (which she admitted that she kept nearby, even though she was appropriately participating in the survey) when she found the Nokia too cumbersome and slow to undertake a range of important tasks. For example, she needed to arrange a taxi for her mother and to juggle the dates, times and places of doctor appointments. She also wanted to check the
seating on the plane for her overseas journey before she selected and printed her boarding pass and confirmed that, for these tasks, she had to use her laptop, when normally she would have performed all these functions through her smartphone.

The participant was very surprised at how dependent she was on her smartphone and did not quite realise how much it featured in her day-to-day life. She was particularly surprised at how dependent she was on the applications on her phone, and found tasks such as hailing a taxi (the ‘hailo’ app), writing appointments and notes on the phone (lack of a QWERTY keyboard) and inability to check seats on the plane for her upcoming flight (‘seatguru’ app) particularly frustrating, as each task took significantly longer to complete than it would have done with her smartphone. The participant had anticipated that being without a smartphone would be refreshing, but she was surprised at how anxious she felt when out having coffee with only the Nokia basic phone on her person. Although she could be reached by phone and text, she felt less relaxed than usual, as she had no idea whether or not she was receiving emails while out of the house. There was a clear lack of trust in the Nokia and it became apparent that the participant had placed quite a high degree of trust in her Motorola smartphone.

From the results of this case study, it became apparent that there are several appealing aspects of smartphone technology that may lead to the development of an emotional attachment. Most prevailing of all was the importance the user placed on ease of use and the ability to perform tasks quickly and simply, due to the fact that tasks can be performed so quickly that the frequency with which one interacts with their phone is increased; for example, it may only take 10 seconds to check an email on a smartphone and, as it is not considered a burden to do so, the user may do this often. Being able to perform tasks in a very short timeframe encourages checking habits, thus increasing the times that the user interacts with their smartphone, in turn creating more opportunities to form an emotional attachment to their phone.

Another smartphone feature that may lead to the development of an emotional attachment is its inherent customisability. The case study participant talked of how her phone was set up the way she liked it. Indeed, the ability to set a family photo as a screensaver, organise app folders, select which applications to download and select the content stored on the phone allows users to make their phones unique to them. In being able to set their phone up just how they like, a smartphone is no longer just an object, but their smartphone: this conclusion is reinforced by the growing market for smartphone covers and cases. Upon learning of this result, further research was conducted into the topic and it was found that phone cases are used to enhance identity, sociability and aesthetics (Cui et al., 2007). The range of tasks the participant could perform on her smartphone could have also been a contributing factor to the emotional attachment she felt towards it. In being able to perform almost any task on the device, she was more likely to use her smartphone over another device, when performing a specific task. For example the participant used the ‘hailo’ application to request a taxi, rather than walking down the street and hailing a cab. Any emotional satisfaction she gains from performing this task of hailing a taxi is now associated with her smartphone and, to a lesser extent, the application.

The questionnaire and the survey yielded some surprising results. In particular, it is significant that it was not only the ‘always on’ generation that found it difficult to live without their phone, due to the fact that they used it all the time. Indeed, the generation that
grew up without smartphones appear to be equally dependent upon such phones; this may be because the latest technology is increasingly geared towards a ‘user friendly’ interface. When a user buys a new smartphone, they do not need to read pages and pages of set-up instructions; they merely insert the sim card and turn it on. Smartphones even come with some battery life, so they don’t even need charging for 24 hours before they can be used. Alternatively, perhaps it is the frequency of use of a smartphone and its portable size that results in the user becoming rapidly familiar with its features and capabilities. It is also interesting that the results appeared to suggest that it is more likely that the user is attached to the technology of his or her smartphone, rather than to the phone itself.

In the literature survey and the research methods carried out for this paper, it was highlighted how ‘checking habits’ are linked to the emotional attachment users have towards their smartphones. The reasons for this could be that users have a desire to frequently check their device and may feel as though they need to maintain proximity to it in order to enable these ‘checking habits’: this need and desire to be close to the object will only strengthen emotional attachment. Designers seeking to strengthen the emotional attachment of smartphone users should be encouraged to create product features that make the user want to check for updates. One way to achieve this would be to create an interface for their product that may be accessed through a smartphone. Indeed, it is becoming more and more common for external products to feature a smartphone application; for example, Sphero is a remote-control toy that is controlled by a plethora of different applications for smartphones (with each application being a different way to interact with Sphero). Integrating smartphone technology with toys is a great way to attract new young users to smartphones and encourages the formation of emotional attachment.

The case study and literature review revealed that the way people interact with their phones can have a huge impact on how emotional attachments are formed. Users may be more likely to form an attachment to a phone if they can perform simple tasks on it quickly. Designers should thus be encouraged to ensure that interaction with their products is as quick and simple as possible. Smartphone companies are constantly trying to improve upon this, making their phones increasingly interactive. One company in particular, Apple, has made huge strides in this direction, with the development of Siri, the voice command system. Siri allows users to speak commands and questions into their phone, to which they receive immediate results and answers. This type of interaction would go a long way in strengthening the emotional attachment to a brand or product, and it is important to note that, by personifying their voice command system (as with Siri), they could further strengthen the emotional bonds users have with their smartphone, which in turn relates back to emoticon usage. In personifying smartphones, manufacturers make the object appear more animate, thus far more than a collection of circuits and chips.

Another tip for designers is to make their products, particularly applications, as customisable as possible. The act of customisation creates a detachment from the product line: a fully customised phone ceases to be a Samsung Galaxy S3 in the eyes of the user and simply becomes ‘their’ phone. An example of this level of customisation and emotional influence selection can be seen in the game ‘Little Big Planet’. Players can fully customise their ‘sack man’ with outfits and even use the controller to change the sack man’s facial expressions. This level of customisation makes players emotionally invest in their character, making them more compelled to play the game in order to collect new items with which to customise their sack man and his living environment.
A further benefit to increasing smartphone users’ customisability options is that it can open up a whole new market of products to sell. When Apple launched the iPhone app store, which allowed users to download their own third party applications, they created an entirely new way of making money on the back of the iPhone. Indeed, these ‘bolt-on’ type purchases are so commercially viable that the latest Google produced phone, the Nexus 4, is being sold at a loss, which is possibly due to the fact that they stand to make more money, over the longer term, as a result of the Google play store. In selling their phone at a more affordable and competitive price, they increase the number of potential customers to the play store (Grisaffe and Nguyen, 2012).

One important issue that must be raised when discussing people’s emotional attachment to their smartphones is the social implications of this. How does being emotionally attached to their smartphones affect how people interact with one another face-to-face? Some of the findings of this paper were shocking. In the questionnaire, 100% of people felt only negative emotions when faced with the situation of losing their smartphone, yet, in the survey, positive options such as hope, calm and trust were presented, which could have easily fitted within such a situation. Although creating emotional attachment to smartphones is a good thing for designers and companies and individuals who are involved in the smartphone industry, is it necessarily a good thing for the future of social interaction?

It is becoming more and more common for a person to use their smartphone when in the company of another; indeed, it is so common that it was a question that users easily related to in the questionnaire. A large percentage of people felt negative emotions towards the idea of people using a smartphone in their company, which would indicate that it is not a desirable thing to do in front of someone else. However, in sitting in a coffee shop for 10 minutes, it was readily apparent that many do exactly this when in the company of another person. It is true that it is desirable for users to have an emotional attachment to any product, but certain measures may need to be taken, in order to ensure that they do not become attached to the point of addiction, as exhibited in Balakrishnan and Raj’s study (2012).

Similarly, could the development of emotional attachment to smartphones hinder the users’ ability to form emotional attachments to others? As Derks et al. (2004) found in their study, infants tended to form emotional attachments to inanimate objects when physical connections were limited. It is possible that attachment to such inanimate objects leads to us becoming more closed off from others emotionally, thus seeking emotional comfort from our smartphones instead.

CONCLUSION

The research undertaken for this paper was by no means perfect: there were some limitations to certain parts of the methodology that, with the benefit of hindsight, could have been improved upon. The sample size of the questionnaire was only 55 people, which is a relatively small sample size for a questionnaire. In addition, given the trend in the responses, it would have been useful to include more questions in the survey; in particular, questions designed to elicit information that would have helped to gauge whether some responses were affected by a person’s age, gender or social status. The occupation of respondents, the estimated time per day the respondent used their phone and even their income bracket would have all been useful for designers and manufactures of smartphones.
One of the main issues with the questionnaire was that, due to the nature of the online tool used to create it, it was not possible for participants to use a rating system, in order to rate the intensity of the emotions they selected in part two. If this could have been achieved, the chosen emotions could have been analysed, in addition to the intensity of the selected emotions. Although a questionnaire can retrieve good results from a large amount of people, it would have been ideal to conduct the questionnaire face-to-face with participants: this would have allowed the researchers to take several other factors into account, such as facial expression and tone of voice. The case study also had several limitations; firstly, only one participant could be sourced who was willing to forgo their smartphone for 5 days. Ideally, the case study would have featured a few select participants, each of whom demonstrated different levels of emotional attachment (vetted beforehand). Unfortunately, this was unachievable, as the only participant could not finish the course as a result of her intense frustration in being without her smartphone. If time had permitted, it would have been better to begin again with a new participant.

The findings of the literature review, questionnaire and case study were successful in explaining emotional attachment to smartphone technology. It was apparent that the majority of smartphone users had developed an emotional attachment to their smartphone on one level or another. Through the study of emotions and attachment theory, it is clear that these attachments are most likely the result of smartphone technology, rather than the physical object of the smartphone. For example, if a user loses his or her phone, they can replace it with one of the same model, apply a backup to get it exactly as it was and thus should not be emotionally distraught by the ordeal. This is unlikely to be true for other objects to which people can form emotional attachments; for example, to take it to the extreme, the same could not be done with the family dog.

Some of the key features that led to smartphone users developing an emotional attachment to the technology were also revealed. The quick and simple nature of interacting with smartphones has encouraged a high frequency of use amongst users, thus creating more opportunities for the user to develop an emotional attachment to their phone: this in turn encourages users to maintain close proximity to their phones. The customisability of smartphones has enabled users to feel that their phone is very personal to them; in being able to change almost everything about how their phone functions internally and looks externally, the user is able to pour their personality into the device, from photos stored on the device to the cases used to keep it safe. This level of personalisation makes the product unique to the user and allows them to make their phone an extension of themselves.

It was discovered that smartphone users displayed some loyalty towards their smartphone brand, preferring a new phone from the same brand to that of an unfamiliar brand: this is an interesting topic for future research. Discussions concerning which smartphone brand is the best can become very heated, particularly on internet forums, and it would be interesting to establish what has led to the passionate avocation of one phone over another. In terms of future research, it would be beneficial to carry out wider studies on the topic of users’ emotional attachment to smartphones. It would be helpful to use similar research methods as discussed in this paper, taking into account the previously outlined limitations. Smartphones are creating a huge ripple in the pond of human behaviour and it is important that, as smartphones develop, we continue to study the way they affect behaviour, emotions and emotional attachments.
REFERENCES


Cui, Y., Chipchase, J., & Ichikawa, F. (2007). A cross culture study on phone carrying and physical personalisation. In *Usability and Internationalisation. HCI and Culture (pp. 483-492).* Springer Berlin Heidelberg.


