Minimal Connectedness: Exploring the Effects of Positive Messaging using Mobile Technology

Marije Kanis

[1]Brunel University

Uxbridge, Middlesex UB8 3PH

United Kingdom

marije.kanis@brunel.ac.uk

Mark Perry

[1]Brunel University

Uxbridge, Middlesex UB8 3PH

United Kingdom

mark.perry@brunel.ac.uk

Willem-Paul Brinkman[1,2]

[2]Delft University of Technology

Mekelweg 4, 2628 CD Delft

The Netherlands

w.p.brinkman@tudelft.nl

Abstract

This paper describes a lightweight mobile technology designed to investigate the potential of positive messaging. We introduce the concept of *minimal connectedness* and examine how this form of connectivity supports and gives rise to user's positive affect. To explore this idea, a mobile application called *PosiPost Me* was developed, allowing users to randomly share positive messages. We present a study of the ways in which it was used and understood. As well as encouraging positive thoughts, analysis shows how the form of minimal social connectedness afforded by the application is marked by its minimal social obligation, curiosity and ambiguity.

Keywords

Positive emotions, social sharing, social interaction, mobile technology. minimal connectedness, ambiguity

ACM Classification Keywords

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

Introduction

Whilst it has long been acknowledged that the design of technologies should serve human needs and aim to make a positive psychological and societal impact [15], how we can deploy design strategies to facilitate this is less well documented. Research in the fields of HCI and CSCW offers a valuable starting point for exploring the design of technologies to support their users' psychological wellbeing. Yet these have their limitations. HCI typically focuses on the negative side of the user experience, for example removing usability problems or user frustration [5], and whilst CSCW typically focuses on improving social connectedness, this is usually directed towards work-oriented functional purposes. However, the lack of problems or user's negative feelings toward a system is not the same as the presence of positive feelings. Even though social computing and emotion in the field of HCI is gaining interest [17], examples and strategies of how designers and developers could provide interactive experiences that actively encourage and communicate predominantly positive emotions are scarce. Although little is understood about the area of computing technologies used to support positive affect, research [2] points to a clear need for social interaction in supporting positive emotions, and current trends in the design and growing use of communication technology have made this an increasingly important area of investigation. However, even though technology offers a wide range of possibilities to facilitate social interaction and expression, such as email, instant messaging and social networking sites, these digital technologies do not always have a positive impact on social wellbeing: social technologies can be sometimes felt as demanding and obligating, requiring substantial personal effort, input and commitment. This suggests

that there may be a role to play for a less demanding and more minimal form of social interaction than the engaging and rich forms of communication media that are available to users. This research looks to address this situation by presenting PosiPost Me as a probe for investigating positive expressive communication systems that facilitate minimal connectedness.

Positive psychology has devoted considerable energy toward understanding the value of positive emotions [8] and the development of reliable and valid psychological interventions. The beneficial effects of the disclosure of emotions have been extensively studied in the literature [16]. Studies have concluded that encouraging positive affect widens people's scope of attention, broadens their behavioural repertoires and alters bodily systems [7]. Particularly interesting to HCI and CSCW communities is that positive emotions appear to increase sociability and make people more aware of their social environment [19].

The Posipost Me application

Mobile technology offers users communication, connectivity, content consumption and content creation on-demand [3]. *PosiPost Me* (Mobile edition) utilises these functions via a smartphone to support positive, social interaction allowing users to send and receive messages that are intended to promote social and positive psychological wellbeing. Users are asked to complete the sentence *Today, I like* to encourage positive postings, which are then anonymously and randomly distributed to other PosiPost users via a mobile 3G network (see figure 1). Users can receive posipostings one at a time and view all messages that they have created for personal reflection. In this way, the user has direct control over the receiving and sending of the messages. For initial use, the system

was filled with postings from previous studies, so that posiposters could immediately use these as an inspiration for their own positive usage.
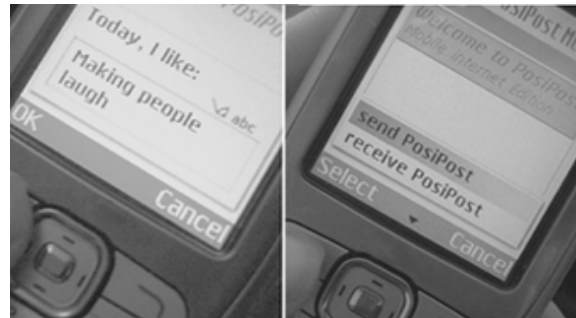

Figure 1. Creating and sending posipostings with PosiPost Me

Related work

Twitter's [18] very fast growing popularity shows a role for minimalistic messaging and micro-blogging. However, PosiPost's interactive mechanisms differ, in that Twitter does not facilitate an anonymised, single and personal distribution of messages that places the stress on distribution randomness or encourage positive messaging. Twitter is not intended as a minimal connectedness tool as it even tends to make some users feel "too connected" [14]. PosiPost Me is designed as a mobile application (although it can be used on a mobile browser), and so is interactively different, and offers different personal communicative affordances and immediacy.

Kaye's work [13] is interesting in demonstrating that simple, minimal devices can still be evaluated and interpreted as being rich. His work is different in that it

facilitates intense one-to-one bit communication between intimates as opposed to random strangers. It is therefore also not minimal in the social expectations and demands that this type of communication can bring. From this viewpoint, our work shares Hindus and her colleagues' [10] belief that social interaction should not be imposed on users as people can already feel increasingly obliged to keep in touch, and can see added communication as extra responsibilities.

Our work draws upon design lessons on the creation of ambiguity and intersubjectivity in personal communication (for example [1] and [4]). Ambiguity leverages space for multiple interpretations and can so create personal social space. Like ambiguity, also anonymity can be a valuable resource for design and user's (social) actions. Although anonymity is often believed to encourage malicious use and antisocial behavior, anonymity can have many positive effects, such as that it can encourage more open, honest and sometimes unexpected forms of communication between people at different levels [6].

Iterative design process

The design and evaluation of PosiPost Me was highly iterative. Three separate studies were carried out aimed to evolve the design as a result of the input received from participants. The first stage involved two studies, one with a paper instrument and the other with social on-line tools [12] that led to the design and development of the current version of PosiPost Me. These initial studies showed the potential for a prefix-based elicitation of positive emotions. A chi-square test of the distributions of postings during the first study showed a significant (χ^2(5, N = 78) = 13.25, $p.$ = 0.021) variation in the distribution of messages,

depending on the prefix used and similar results for the second study (χ^2(4, N = 73) = 68.16, *p.* < 0.001). As the prefix *Today, I like* was particularly effective in triggering *positive* and *situated* emotions [8] this prefix was incorporated into PosiPost Me to encourage the expression and sharing of positive emotions when mobile, affording users immediate expression of and access to positive thoughts wherever and whenever users so wish.

User study

In the remainder of the paper, we focus on studies investigating the real-world use of PosiPost Me. Twenty participants in The Netherlands and England were given a phone with PosiPost Me and used the application for a working week each. The participants were post-graduates with mixed cultural backgrounds, between 22-37 years old, equally divided between male and female and the vast majority normally used their phone for calling and SMS, but not for mobile Internet. At this stage of our studies, we wanted rather advanced users to overcome potential difficulties with using a phone in general (for example, typing in a message) so as we could focus on application use and the resulting issues raised. One group of five participants were friends and used the system at the same time, providing a contrasting data set to the other participants, who either used the system in different data collection periods, or were not known to one another.

Initially, participants were instructed to create and receive at least one posiposting whilst observed by the first author and initially questioned on their immediate experience of the system. Participants were then left with the devices and asked to make use of the system in their own time; the determination of when and where to posipost was left to the participant in order to permit the study and data-collection of real-world user behaviour. Participants were then interviewed, in which the application served several aspects: as a technology probe [11], to understand the needs and desires of users in a real-world setting, as an artefact for users and researchers to think about new minimal and expressive communication technologies, and as a way of studying in field-testing of the technology. The addition of more planned features such as the functionality to share pictures was held back to allow the study of the deeper motivational and social issues of interest, and allowing us to avoid any additional complications caused by major usability problems introduced by this added complexity.

Study outcomes

The use of PosiPost Me uncovered several potential impacts and discussion points relating to the system's usage and broader social context. The data gathered, in particular the qualitative data offers important insights into the contextual use of the technology and its role in motivating positive feelings. Important findings are outlined and discussed below.

Encouraging positive thoughts
Participants' usage resulted in over 125 posipostings created and many more received. All the participants created and received at least three posipostings, with an average of slightly over six (logged) messages created per person. It is important to note that due to the intentions of this work, users were slightly encouraged, but not pressured to post frequently, as our intention was not to collect as many postings as possible. Also, participants stated that they did not feel too pressured to posipost by fellow posters, which indicates that social demands were low.

All of these postings were categorised by two independent coders as positive or non-offensive (not racist, sexist, offensive or hurtful). A small serial of Cohen's Kappa-Index of Inter-rater Reliability was calculated and showed the highest levels (1.0) of agreement, and thus considered as satisfactory. Interestingly, all the postings created with PosiPost Me were observed and coded to be of a positive, non-offensive and more situated nature, which strengthens the findings in our previous studies that used a paper prototype of PosiPost Me and on-line tools, such as a blog to collect postings and encourage positive use. However, as the participants used the application for the purpose of a study, this could have influenced the positive nature of the postings. Nevertheless, this is a promising indication that the design rationale for PosiPost Me appears to have been effective in encouraging the expression of positive emotions, although still requires further evaluation.

Examples of posipostings created include messages as diverse as "Today I like: Cod! In the Metro", "Today, I like: Finding my purse" or "… the girl from the café." Some were long and thoughtful reflections on life, others, brief and humorous. When observing participants receiving posipostings, positive expressions and reactions such as smiles or laughter were frequently observed. When receiving posipostings, some participants reported reading them out loud or showing them to other people that they knew in their immediate surroundings. An especially enthusiastic reaction occurred when a posiposting was received which coincidentally matched the action and context of a participant at the time. While a participant was having a drink in a cafe, he received the posiposting "Today, I like: The smell of coffee. It is so good, and I love walking through town and being able to smell all the cafes." This might indicate that when posipostings synchronize with the current experience of the receiver, the message may be imbued with more meaning and be received more positively.

This relationship to context was also the case in message creation. References to location and what posiposters were doing at that particular moment in time were also more prevalent in the content of mobile posipostings (e.g. "Today, I like: picking blueberries from the road") than compared to the positive thoughts expressed during the first-stage study using desktop web-based technology [8] (e.g. "Today, I like: payday", or "…hugs and kisses"). Postings created in England, such as "Today, I like: view over the River Thames" and postings created in The Netherlands, such as "Today I like: cycling to work" showed that postings were dependent on the location of the study. Clearly, the mobile nature of PosiPost Me offers the potential for users to create messages that are situated within their contexts of use, and nearer the time that they feel the need for such expression.

The study points to a potential issue of reciprocal imbalance, in that one person's positive expression may not always provoke a positive emotion with the recipient; indeed the opposite may be true. For example, one participant noted that the posting "Today I like: Receiving sweet messages from friends" provoked mixed feelings, recognising that such a message might be pleasant to reflect on, but also that he felt a small sense of jealousy when considering why he had not received such messages from his own friends. This notion of reciprocal imbalance is an interesting point to recognise, and one that may have

implications for the use of the application by particular user groups. Nevertheless, such reciprocal imbalance also has the potential to allow users to appreciate the world from a different perspective and this itself may bring a positive value to its users. Moreover, even though some posipostings were valued more and seen as more interesting, funny, or pleasant than others, all participants indicated that the postings they received were perceived as positive.

The application tries to explore and affect the wellbeing of the senders and the receivers. As users can both send and receive, they could potentially benefit in both ways (see, for example [16]). Although so far, it is difficult to confirm whether posiposting had beneficial mental effects, for example on positive thinking, all participants indicated that they liked posiposting and enjoyed the experience on the whole. Participants also expressed that because of PosiPost, they had to instigate themselves to think more about the positive things happening in their lives. For example, one participant expressed: "PosiPost made me focus and reflect on the positives in my situation when I was posting. The things I posted about were all small things, but made me realize that these things made me happy."

Minimal Social Connectedness
From participant's discussions, the concept of PosiPost Me as a facilitator of *minimal connectedness* emerged. The notion of minimal connectedness means that people are *decidedly connected* (i.e. participants are connected by choice) to another person's thought or experience. The minimality refers to the simplicity of the system and the common ground between people, and the absence of known pre-existing connections, as

well as to the amount of social demand placed on users. Further characteristics are discussed below.

Social connectivity
PosiPost Me generates interactions between random, unknown people, and thus users are unlikely to have feelings of social obligation or expectations and to reciprocate within their relationships. As a participant explained: "I feel often guilty when I don't return a call or reply to friends' emails. PosiPost, in a way, feels less demanding than other social media." The fact that users do not actively have to engage in social relationships in order to receive positive emotional input is interesting in that it suggests that this minimal form of social connectedness has a positive emotional value to users without the costs of social engagement and the reciprocal effort and obligations that go along with maintaining social relationships. Minimal social connectedness does not mean that people do not feel connected to each other, but that *they are willingly connected with minimal requested knowledge of each other*. One participant expressed: "I am often interested in knowing who the other poster is, but I am not necessarily interested in really getting to know them." One participant even stated: "I do not really care about the other person posting, I care more whether their messages are interesting or not!"

Simply sharing
The low effort costs associated with receiving a PosiPost message appeared to be the main reason that receiving messages occurred far more frequently than the creation of postings, and most participants said that they preferred to receive posipostings because of this. However, the creation of postings on the whole, was also perceived as "fun". Also, whilst the generation of

messages required very little effort, sending messages was also relatively simple, not just in terms of physically generating content and inputting a new message through the smartphone interface, but also in that it did not require its users to take any consideration for the needs of other people in their social network, as might be seen in determining when and how a phone call or email message might be appropriate for its recipient. The designed-in anonymity of the messaging negated any requirement for considering the emotional needs of people that they knew and consequently also reducing the effort required to contextualise their expressions of positivity. The generation of messages was also considered an important part of the use of the system in another respect, with its users both recognising and gaining vicarious pleasure from the thought that other people might enjoy reading their own postings, as well as the fact that they could express to the world-at-large their own positive feelings at that moment. As one participant expressed: "I just want to share my happy feelings with the whole world!"

The point that more postings were received than sent may not be simply to do with the low effort costs of message retrieval: most participants reported that they often chose to receive multiple posipostings one after one another, indicating users' curiosity and broader interests in other (though unknown) people's thoughts and ongoing activities. As a participant expressed: "It gets very addictive to receive a message. Once I received a message, I kept on pressing the button to see the next positive thought as I was curious to see the next and the next one each time." Another participant also stated: "One is not enough. I want to see more of them". This links to what some of the

participants likened to an engagement and connectedness with the world at large, and perhaps that these were psychological insights that they might not normally be party to. This might be because of the message's utterly mundane character (such as "Today I like: When my hair smells nice") or allowing users to feel that they were as normal (or some other socially binding characteristic) as the original message poster (for example, "Today, I like: singing loudly like an idiot"). This access to people's inner mental and experiential worlds, even though those other people were unknown to the participants, provided both a sense of entertainment and self affirmation that, in both cases, carried a positive message to PosiPost recipients.

Curiosity and ambiguity
This issue of curiosity into the inner lives of others links to the embedded ambiguity of the design in the presentation of content to message recipients. PosiPost Me's random and anonymous distribution of posipostings results in messages that can be completely decontextualised. Details such as person, origin and time are completely unknown to the other user. As a participant noted: "These messages are rather cryptic". Another participant, responding to the message "Today I like: ballet flats" recorded that he had no idea what 'ballet flats' were. Instead of regarding this ambiguity as a problem, this can be seen as an opportunity. According to Gaver et al. [9] ambiguity can be frustrating, but can also be intriguing, mysterious, and delightful, and this is reflected in the reported attitudes of our participants. The cryptic nature of the posipostings impelled the participants to interpret the messages contexts for themselves, and seemed to encourage them to start grappling

conceptually with the messages, the people and their contexts. For example, participants frequently reported wondering after receiving posipostings "Who sent this?" and tried to find their own interpretations behind the postings. For instance, one participant said: "I like to fill in the blanks and make a story around the poster and the posting, even though it might not be the actual story behind the message." She also expressed: "I enjoyed trying to write ambiguous messages." Another, Dutch participant said: "PosiPost should definitely remain anonymous." —an opinion shared by many posters, often because they liked to keep the mystery around the posting.

Random togetherness
The nature of social connectivity provided by PosiPost Me as a form of random togetherness provides an interesting view into user's understandings of the 'global community' that we all form a part of. This is illustrated by participants who said to enjoy hearing about worlds of experience that were different from their own lives. For example, one English participant expressed that she particularly liked postings such as "Today, I like: trains and scenery in India" (even though this posting may not necessarily have been created in India) and another participant in The Netherlands said: "I prefer postings coming from other places as I already know about my own." The sharing of one's 'daily likings' could provide for a possible abstract or vibrant connection between random individuals, with the positive, affirming existential benefits that this can bring with this. Glimpses of other people's thoughts can be used as an insight or eye-opener into the nature of the likings of a remote individual, or could provoke an increased awareness for what is generally happening around the user's common

world of experience. However, the introduction of an expressive system facilitating 'minimal social connectedness' raises questions of how it influences social interaction. As interactions are decontextualised and not directed to any known person, do they still hold value for users? Our data would suggest that it does, but it is hard to assess its extent, or how it would motivate users to continue to use the application. In an attempt to answer these questions, participants were asked if contextualising social connections would add greater value. While few participants expressed the desire to use PosiPost amongst their group of friends, another participant expressed: "I don't mind the personal randomness at all. It is funny that it could be from anyone and anywhere in the world." This tension between decontextualised and contextualised interactions needs further attention in the literature.

Technical challenges
One clear usage barrier for PosiPost Me was that the application only works on Symbian smartphones, and although participants were given mobile phones with PosiPost Me and a free data connection, (or offered the option to cover the cost of using their own SIM-card) an exploration of how its long-term ownership and use might impact on the incorporation of the device into their everyday practices and needs could not be explored. In some cases, participants mainly posted from their home or work, as they did not want to carry an extra phone around all the time or were afraid to loose or damage the phone. Also, the unreliable nature of fast mobile Internet coverage meant that not all of the messages created could be posted or requested messages received, which sometimes caused user's frustration. As a participant explained: "I was often frustrated when I could not receive PosiPost Me posts

due to bad connection, but very happy when I did get them." Some users made interesting creative use of this issue, by challenging other users in a competition to receive the most postings by then picking out places (such as hanging out of the window) and times to obtain the best Internet coverage in order to share more postings than others.

At the end of the study, the majority of participants actively stated that they would like to continue to use the application on their own phone, but did not have a compatible model. Interestingly, the only participant that came into possession of a compatible phone and data connection after the study has continued to use PosiPost Me.

Discussion and Conclusion
In terms of its implications for design, the study offers an insight into possible directions and themes for future devices and communications technologies, but also in the potential role that such technologies might play in mental health interventions. Expressing and sharing emotions with others as part of a wider community of likeminded people (or indeed otherwise), and providing insights into what other people 'normally' enjoy doing may have positive health effects [7]. Such interventions go well beyond the remit of this paper, but the use of these kinds of technologies has a potential, although as yet unrealised, value.

PosiPost Me is extremely simple in its implementation, essentially providing a text stream between random mobile users. However, this description belies the complexity of its use for the production and consumption of posipostings, as evidenced by their interpretation, role and use as described by study

participants. As a technology probe, PosiPost Me provides insight into how positive technologies can have an emotional impact on their users, and the findings offer us a view into how people create, interpret and make use of content intended to provoke a positive emotional response. The study also explores the notion of minimal connectivity through its highly constrained model of social (dis)connectedness. What the findings perhaps unexpectedly demonstrate is that these restricted conditions for communication do not negate the usefulness of the application, rather they afford unique and valued characteristics that users employed for their own purposes, and which appeared to have an impact on enhancing positive affect in its users.

A remarkable feature of this particular study (and subsequent use) is that even though users are mostly anonymous, no malicious use has been found or reported. This is not to say that the system will not be appropriated for malicious purposes, but that we have no instances recorded, which in itself is an interesting outcome. Future work will need to involve larger in-depth studies to further assess the potential social effects and benefits of positive expressive technology, exploring how positive emotional responses can be engendered. How the concept of minimal connectedness can be employed for future technology design remains an open research challenge for the HCI community.

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