



Designing for positive disclosure: What do you like today?

Marije Kanis^{a,*}, Willem-Paul Brinkman^{b,1}, Mark Perry^a

^a Brunel University, Kingston Lane, Uxbridge, Middlesex UB8 3PH, UK

^b Delft University of Technology, Mekelweg 4, 2628 CD Delft, The Netherlands

ARTICLE INFO

Article history:

Received 31 December 2007

Received in revised form

12 July 2008

Accepted 15 October 2008

Available online 22 November 2008

Keywords:

Mobile technology

Positive psychology

Positive emotions

Social sharing

Expressive technology

ABSTRACT

This paper's premise is that technology has the potential to support the elicitation, expression and communication of positive thoughts. However, its success depends on understanding and incorporating appropriate strategies for interactive system design and development. Following in the positive psychology tradition, this paper presents two co-design studies investigating how positive thoughts can be mediated and shared. These studies involved approximately 50 participants, using paper-based questioning techniques and social-online tools that captured 151 contributions on what thoughts people like to share. The collected data demonstrated the potential for designing systems based on a prefix-based elicitation of positive emotions. Analysis of participants' contributions suggests that various messages of a predominantly positive nature can be harnessed, emphasising the importance of immediacy and situatedness in expression. Moreover, the analysis resulted in a set of design considerations for the design and development of positive expressive technologies. These considerations were used to develop a mobile application called PosiPost Me (Mobile Internet Edition) that allows users to create and share positive thoughts at any time and place. In this way, this research sets an exemplar of a design process for positive communicative systems while building on research in positive psychology, human-computer interaction and cognitive ergonomics.

Relevance to industry: The studies conducted showed the feasibility of proposed approach and opens new avenues for technologies aimed at positive communication and wellbeing in the mobile environment. It also offers a set of design considerations to support designers in creating such positive expressive technologies.

© 2008 Elsevier B.V. All rights reserved.

1. Introduction

Traditionally, the field of human-computer interaction and cognitive ergonomics often focus on the negative aspects of the user experience; for example, diagnosing and avoiding usability problems, identifying design flaws and inadequacies or removing user frustration (e.g. Ceaparu et al., 2004). However, the lack of problems or user's negative feelings towards a system is not the same as generating the presence of happy, or emotionally positive feelings in the user. The nearest commonly used measure to this in the field of human-computer interaction is the notion of user satisfaction (Pearson and Bailey, 1980; Rushinek and Rushinek, 1986). Yet, this is generally considered to be related to the enjoyment or usability of a system, matching this to a user's goals. Certainly, a satisfied user may indirectly become happier, but this

affect is only elicited and measured by reference to the way that their tasks are carried out. However, technology offers the potential for more than this task-oriented perspective on a user's positivity. Psychological research offers an insight into what could be possible to achieve through harnessing technology to improve the experiential quality of life.

Positive psychology, the study of human flourishing (Seligman and Csikszentmihalyi, 2000), arose from the need to add a positive side to the predominantly negative discipline of psychology – negative, in terms of its focus on mental illness, rather than wellness. Research in the field of positive psychology has added to an increasing understanding of the value of positive emotions, and why and how they matter. Longitudinal studies (Fredrickson, 2003) for instance, show that the presence of positive emotions can play a role in the development of long-term resources such as psychological resilience and flourishing. Fredrickson's (2001) broaden-and-build theory proposes that positive emotions broaden an individual's momentary mindset, and by doing so help to build enduring personal resources. As such, experiencing a positive emotion leads to states of mind and to modes of behaviour that indirectly prepare an individual for later hard times, and the

* Corresponding author. Tel.: +44 1895 274000; fax: +44 1895 251686.

E-mail addresses: marije.kanis@brunel.ac.uk (M. Kanis), w.p.brinkman@tudelft.nl (W.-P. Brinkman), mark.perry@brunel.ac.uk (M. Perry).

¹ Tel.: +31 15 2783534.

expectation exists that these resources will have a role in improving the person's long-term quality of life in terms of mental wellbeing.

Whilst psychology has grappled with these issues, so far, this refocusing towards the role and value of positive affect does not appear to have filtered deeply into the theory and practice of technology design. This is perhaps surprising, given that HCI and cognitive ergonomics have a tradition of integrating other disciplines, such as cognitive psychology for a better understanding of users' perception and problem solving abilities. Nevertheless, the field of positive psychology, combining theories and studies to encourage user's positive emotions, has been largely left out.

Although emotion in the field of HCI is becoming recognised as an important factor in the user experience (e.g. Picard, 1997), examples and strategies of how designers and developers could provide interactive experiences that actively encourage positive emotions are still scarce. The research presented in this paper is an exploration of how to progressively engage with this focus and make a contribution to detailing the design steps in developing systems that aim to bring out the expression and sharing of emotions of a more positive nature. The paper begins with a brief summary of the relevant background to the domain, describes the investigation of a prefix-based design approach to trigger positive emotions, and discusses the design of a resulting mobile application for eliciting and sharing positive thoughts.

1.1. The value of positive emotions

The field of positive psychology attempts to respond to the systematic bias inherent in psychology's historical emphasis on mental wellness rather than on mental illness (Seligman, 1990) and has made a clear contribution towards an understanding of the value of positive emotions. While some pioneering humanistic psychologists developed theories along these lines at an earlier stage (Maslow, 1962), research in positive psychology has recently made a push to provide empirically supported foundations for the study of human happiness and the nature and role of positive emotions in this (Duckworth et al., 2004; Seligman and Csikszentmihalyi, 2000).

Many studies on the benefits of frequent positive affect clearly suggest happiness precedes important outcomes and indicators of thriving, including fulfilling and productive work, satisfying relationships, high levels of mental and physical health, and longevity (Danner et al., 2001; Lyubomirsky et al., 2005). Positive emotions – such as joy, contentment, interest, liking and loving – and many of their speculated benefits, include novel, expansive, or exploratory behaviours that over time can lead to meaningful, long-term resources, ranging from physical, intellectual, psychological and social in nature. According to Fredrickson and Joiner (2002), there is an upward spiral (or snowball effect) in which positive emotions contribute to building such human resources. This means that when people engage in positive emotions habitually, over time, they can become life enhancing. For example, when people experience positive affect, they are usually more open to, and aware of, their social environment (Fordyce, 2000). In this way, cultivating positive thoughts can eventually lead to social bonding and lasting relationships (Waugh and Fredrickson, 2006). These building resources, such as psychological resilience or social relationships, also help in building a strong and improved system of coping with stressful life events and to finding positive meaning in negative events and circumstances (Fredrickson and Joiner, 2002). The implication of this is that people, who habitually experience positive emotions, become more resilient over time and develop a greater sense of emotional wellbeing. Considered together, this sample of research from the field of positive psychology helps in understanding of the value of positive emotions and their various potential long-term benefits.

1.2. The value of expressing emotions

There is a substantial amount of research suggesting that expressing emotions can improve a person's wellbeing. An extensive meta-analysis of emotional expressive studies by Smyth (1998) shows that the act of expressing one's thoughts is in itself thought to be healing. Also, a more recent meta-analysis (Frisina et al., 2004) on similar studies clearly suggests that expressing emotions can be beneficial for a person's health and wellbeing. Because of its promising potential, the use of expressive writing techniques has been increasingly tested for its psychotherapeutic benefits (e.g. Pennebaker, 1997), offering an alternative to traditional therapies (with the advantage of lower cost and greater accessibility).

Research has shown that, although the topic of writing may differ, the simple act of writing and expressing emotions can have many valuable effects (e.g. Pennebaker, 1990). For instance, a study involving freshman students writing about emotional topics related to coming to college showed improvements in grades, and even enhancements in months following the exercise (Pennebaker et al., 1990). As with the majority of the past psychology literature, initial research efforts have mainly focused on the beneficial disclosure of negative emotional, traumatic experiences. However, more recent efforts have shown that various benefits can also be gained by concentrating on the expression of positive emotions. King (2001), for instance, showed that writing increases positive affect, as opposed to negative affect, and that it is beneficial not only for one's health, but also for one's social wellbeing. Likewise, Burton and King (2004) elicited better health and mood from participants instructed to write about intensely positive experiences.

Studies focusing on the disclosure of positive emotions (such as Lyubomirsky et al., 2005) suggest that by using happiness-increasing interventions, it is possible to harness and increase positive emotions such as joy and gratitude. Similarly, Emmons and McCullough (2003) found that practicing grateful thinking on a regular basis can enhance wellbeing; it appears that gratitude promotes the savouring of positive life experiences and situations, so that the maximum satisfaction and enjoyment can be distilled from one's circumstances. Other studies in similar lines (Seligman et al., 2005) would also suggest that people can improve their wellbeing by doing simple exercises that relate to harnessing positive thoughts. In a rigorous Internet study with 471 participants, Seligman and his colleagues compared positive psychology interventions with a placebo-controlled exercise. For an activity termed the 'Three Good Things' exercise, participants were asked to write everyday for one week about three good things that happened to them. Participants expressed that the exercise made them increasingly focus on the good things that happen during the day and researchers reported increased happiness and reduced depressive symptoms for the six months that researchers tracked the participants. In conclusion, there is a substantial and empirically based body of research which suggests that expressing and inducing positive thoughts can be a simple yet powerful way of improving a person's wellbeing and offers a set of techniques that could be employed to achieve this through technological intervention.

1.3. Encouraging positive expression mediated by technology

Building on the previous work in positive psychology, there is an opportunity for the HCI and cognitive ergonomics community to design applications that encourage and support the expression and sharing of positive emotions. A small number of researchers in the field of human factors, HCI and information and communication technology development have already drawn inspiration from positive psychology for a more explicit positive approach to human-centred design and evaluation (Sklar and Gilmore, 2004),

for user experience research with a focus on positive emotional outcomes such as joy, fun and pride (Hassenzahl and Tractinsky, 2006), or for preliminary design theories that are based on supporting human needs and flourishing (Zhang, 2007). So far, however, most inspiration and research efforts have come from the flow theory, one of the key concepts of positive psychology that was originally coined by Csikszentmihalyi (1990). His motivational theory describes the optimal psychological state (thus flow or zone) when people reach total enjoyment and engagement in an activity, and this has been applied to a number of HCI and media theories, such as by Sherry (2004).

The PostSecret website (Warren, 2005) is a project that uses technology, in the appearance of a blog, and postcards to encourage the expression of emotion and inner thoughts. However, this site mainly addresses the uncovering of negative emotions, such as fear or shame. Others (e.g. Angeli et al., 2006) addressed the rather dark topic of the misuse and abuse of interactive technologies by examining how computers sometimes bring about the expression of negative emotions and disinhibited behaviour.

However, technology also offers much potential for encouraging positive disclosure. The advantage of utilizing technology is that it enables researchers to examine natural interactions in a relatively simple, inexpensive, and straightforward manner. Slatcher and Pennebaker (2006) also point to the benefits gained in using online technologies for psychological research. Furthermore, technology offers advantages that might lower the barriers that prevent people from engaging in traditional psychotherapy (Lange et al., 2003). Particularly, and unlike previous expressive writing studies, the connective and recording qualities of technology are particularly promising in demonstrating some of the social processes that may underlie the effects of expressive disclosure. Following this, there is evidence to suggest that the mode of writing – using computers or longhand – has no effect on disclosure and self-censoring of personal content (Blunt, 2006). This is encouraging as it suggests that beneficial effects of expressive writing could also be gained using input technology. However, the use of input technology for the social sharing of positive emotions and its effects instead of verbal or written disclosure is under-explored.

Whilst our work is inspired by research in positive psychology, it aims to build on and extend related research and studies on positive emotions to optimize and increase understanding of its potential benefits. The aim of the research reported in this paper is to increase understanding of the design of technologies that support the elicitation and sharing of positive emotions. A further goal of this is to develop a tool to encourage social expressiveness that allows investigation and to improve the potential for shared positive communication. The following studies conducted offer a way to develop understandings of possible tactics for effective positive disclosure and how this might be enhanced technologically.

2. Methods

Two studies were conducted to inform the socio-technical design steps and rationale for a positive expressive application. The main objectives of the studies were to:

- provide insights into the ways positive emotions can be expressed and shared;
- investigate the tactics that could be used to encourage the sharing of positive emotions;
- detail the kind of positive and social interactions people (could) engage in;
- specify the nature of expressions people like to share, and
- determine if predominantly positive expression could be provoked.

2.1. First study with a paper instrument

The first study was conducted in Scotland over two days with children and young people ranging in age from 6 to 15 years old. The study was primarily set in three classrooms in the Highlands and Islands region, during an educational event. The first author was locally present and the participants, from different Scottish schools, were fairly evenly distributed in terms of gender. Appropriate consent had been obtained for the study from all involved.

This study was intended to allow testing of the effectiveness of different prefixes for expressing positive affect, and to understand how the technique could be used most effectively to elicit positive thoughts. A paper instrument, as shown in Fig. 1, was developed to elicit insights such as how and in which form people could be stimulated to express positive thoughts and what kind of content participants would create with a positive expressive medium. A prefix approach was taken to allow a simple and quick way of expression that could work across different media. With the paper instrument, participants were asked to finish sentences starting with the given prefixes *Today I like, I like, Today I love, I love and I dream about* to try and capture mainly positive thoughts. The prefix *I am sorry for* was also included to test if the postings of this nature would provoke emotions of a more negative kind.

Each prefix was put on a different slip of paper. The rationale behind the design of the individual slips with prefixes was to avoid giving participants the impression of having to complete all the prefixes on an A4 form in a fixed order. The participants were instructed only to complete the prefixes that they wished to do so for. The participant's paper responses were returned to the researcher or the paper slips were posted in a paper mailbox.

2.2. Second study with online tools

The second study concentrated on how positive expressions can be triggered, shared and mediated by desktop and Internet technology in particular. This stage of the research was used to gain more positive postings for analysis and to gain insights into the elicitation and sharing of positive thoughts. As most of the participants in the initial study were relatively young and from the same country (Scotland), the use of Internet technology had the advantage of reaching a wider range of participants worldwide. Participants came from countries such as The United States, Canada,



Fig. 1. A participant posting a message with the PosiPost paper instrument.

Romania, Germany, Israel and The United Kingdom. This subsequent study built upon the outcomes of the first study and allowed further refinement of the prefixes. Because in the first study some participants had given the same answers while using different prefixes, the second study used less prefixes of similar kind (e.g. *Today I love, I love*) and introduced the different prefix *This is nice about you*.

This second, longer-term study ran for nearly six months and made use of these social online tools:

- a blog (<http://posipost.blogspot.com>);
- an email address (posipost@gmail.com), and
- Justcurio.us (2005–2007) an already existing anonymous question and answer system on the Internet.

Existing social-online tools were included in the study as these brought advantages including large existing communities of users and platforms where the expression of positive as well as negative thoughts occurred. The prefixes (*Today I like, I love, I am grateful for* and *This is nice about you*) were used and applied in combination with the online tools. For example, people used the mail address to send posipostings with a prefix such as *I am grateful for* in the subject header, and in the case of the PosiPost blog, the prefixes were posted as individual entries that users could respond to. Justcurio.us is an anonymous question and answer system, open to anyone, with one simple rule: to ask a question, you must first answer someone else's question. In the case of Justcurio.us, the prefixes were posted as questions (e.g. What do you like today?) that any random stranger could then answer. The prefixes were posted at analogous points in time, and displayed in no fixed order.

In the first paper-based study, participants were observed by the researcher on location and this could have had an influence on their postings. In order to address this potential bias, in the second study, users were not directly and explicitly told that their postings were also intended to be used for the purpose of a study. This was to ensure that the postings received were the same as those that would occur in naturalistic settings. The online posters only completed the prefixes that they wanted to do so for. In addition, people posted based on their own initiative and were not presented with any incentives, other than those gained from the pleasure of posting.

3. Data analysis

The total of the first and second study resulted in the collection of 151 postings from approximately 50 participants; 23 face-to-face and ± 27 online individuals. The first study involved 23 participants and resulted in 78 positive thoughts that were mostly completed in 1 or 2 min, indicating that the method used for positive disclosure was easy and quick enough.

The 27 participants for the second study are an estimate because of the anonymous nature of the posting. Table 1 shows the number

Table 1
Distribution of posipostings in relation to participants during both studies.

	N	Po	M Po	SD
First study	23	78	4.0	2.2
Second study	27 ^a	73	2.4 ^a	2.3 ^a
Both studies			3.0 ^a	
Total	50	151		

N = participant sample size, Po = total number of posipostings, M Po = mean of posipostings per participant, and SD = standard deviation of the number of postings per participant.

^a This is an estimate based on online alias as the individual posting was anonymous.

of postings across both studies. In the first study, the mean of posipostings per person was four, and in the second study this was in the region of almost two and a half postings.

3.1. Categorization and analysis of PosiPost content

The posipostings from the first and second study (e.g. "Today I like surprising people with flowers" or "I am grateful for having a good book to read") were analysed and coded into different categories. The characteristics of the contents that emerged were categorized by two coders to ensure reliability. They used the following categories:

- *Time*; a reference to time, e.g. "I am grateful for the day".
- *Human (social)*; posting contains a social element or reference to a person, e.g. "Today, I like receiving a surprise phone call from a friend".
- *Environment (location)*; a reference to a physical location or posting contains an environmental factor, such as a reference to the weather, e.g. "Today, I like sunshine".
- *Object*; a reference to a physical object, e.g. "I love my new shoes".
- *Activity*; a reference to an action, e.g. "Today, I like going to the gym".
- *Right here, right now (situatedness)*; a reference to what is happening at that particular moment in time and place, e.g. "Today I love the workshop" when attending a workshop at the time of expression.
- *Emotion (explicit)*; an explicit reference to an emotional state of a person, e.g. "Today I like smiling".
- *Everyday event*; a reference to ordinary things, e.g. "Today I like eating".
- *Positive*; the content is of a mainly positive nature, e.g. "Today, I like waking up to another beautiful day".
- *Offensive*; the content could easily be regarded as racially, sexually or politically offensive.

The categories were not designed to be mutually exclusive. For example, a posting such as "Today, I like working" could be placed in *Activity* and further be placed in other categories such as *Everyday event*, and *Positive*. Thus, each posting could have multiple codings. The consistency of the allocation of the codings was analysed by calculating a series of Cohen's Kappa-Index of Inter-rater Reliability (see Table 2).

Table 2 shows a general high level of agreement between the coders, given that values above 0.70 are normally considered satisfactory (Robson, 1993). In the few cases where the two coders disagreed, they discussed the comments and agreed on a classification afterwards.

Table 3 shows the number of the postings that were classified in a specific category, displaying both the absolute frequency and the

Table 2
Agreement between the coders expressed by Cohen's Kappa.

Category of content evaluation	Cohen's Kappa		
	Study 1	Study 2	Mean Studies 1 and 2
Time	1.00	1.00	1.00
Human (social)	0.86	0.93	0.90
Environment (location)	1.00	1.00	1.00
Object	1.00	0.97	0.99
Activity	0.88	0.97	0.93
Right here, right now (situatedness)	0.87	N.A.	N.A.
Emotion (explicit)	1.00	0.94	0.97
Everyday event	1.00	0.70	0.85
Positive	1.00	1.00	1.00
Offensive	1.00	1.00	1.00

Table 3
Numbers and percentages of postings according to topic category and study.

Category	Posted content that falls in category			
	First study		Second study	
	Freq.	In %	Freq.	In %
Time	0	0	7	10
Human (social)	8	10	21	29
Environment (location)	3	2	14	19
Object	13	17	21	29
Activity	27	35	24	33
Right here, right now (situatedness)	40	51	N.A.	N.A.
Emotion (explicit)	6	8	11	15
Everyday event	7	9	13	18
Positive	76	96	73	100
Offensive	0	0	2	3

percentage of a specific study. As there is no absolute guarantee that users will (always) only post positive messages, the most remarkable finding, as shown in Table 3, is that the posted content was of a predominantly positive and non-offensive nature. As anticipated, the prefix *I am sorry for* encouraged the only expressions of non-positive emotions, like sadness or regret (e.g. “I am sorry for Busted splitting up”, “I am sorry for my lack of ability”). The prefix *This is nice about you* was not found to be the most suitable for encouraging positive communication, as from all the tested prefixes, it provoked the only two comments that people may find offensive. Table 4 shows that this prefix generated a relatively low amount of postings as well.

The following analysis was to study the effect of these prefixes in more detail. The prefixes used and posipostings that they generated are shown in Table 4. A Chi-square test on the distributions of the postings in the first study shows that there is a significant ($\chi^2(5, N = 78) = 13.25, p = 0.021$) variation of the distribution of messages depending on the prefix, and likewise for the second study ($\chi^2(4, N = 73) = 68.16, p < 0.001$). This suggests that some prefixes were more popular, or more effective in the elicitation of messages than others. As Table 4 shows, from the eight prefixes used, the most popular prefix was *Today, I like* as this elicited the widest range of positive responses in both studies.

3.2. Expressing emotions: right here, right now

From the analysis of the first study conducted on location, the category *Right here, right now (situatedness)* scored relatively high (see also Table 3), which suggests that expressing situated experiences is popular. The following step of the analysis was, therefore, to examine the relation between the usage of a prefix and reference to what is currently happening at that location or particular time. Table 5 shows a cross tabulation between prefix and situatedness.

The distribution of the messages reveals a significant variation ($p = 0.002$, Fisher's exact test). Thus, especially when using the

Table 4
Used prefix versus generated posipostings.

Study 1:		Study 2:	
Used prefix	Total	Used prefix	Total
Today I like	21	Today I like	40
I like	20	I like	6
Today, I love	10	Today, I love	3
I love	10	This is nice about you	4
I am sorry for	9	I am grateful for	20
I dream about	8		
Total	78	Total	73

Table 5
The number of postings according to prefix and relation to ‘Right here, right now (situatedness)’.

Used prefix	Right here, right now		Total
	Relates to what's happening at the moment (situatedness)		
	No	Yes	
Today I like	6	15	21
I like	7	13	20
Today, I love	3	7	10
I love	7	3	10
I am sorry for	8	1	9
I dream about	7	1	8
Total	38	40	78

prefix *Today, I like* the majority of the expressions were related to that particular moment in time or location. For example, “Today I like making music” was expressed right after a workshop on making music with a computer program. The online study was not taken into consideration for this category, as it was not possible to know or observe what people were experiencing online at the time of their postings.

The analysis of the content of the posipostings also showed that people sometimes include a location in their positive thought. People, for example, posted that they liked collecting shells on the beach, working at home, Dublin or sitting with their laptop in a bar. As many of the expressions were suggested as *time* and *location bound*, and the category situatedness scored high, the belief was strengthened that a positive expressive technology should preferably allow for immediacy of disclosure so that positive emotions can be expressed at *any time* and from *any place*. As such, this motivated the need for a mobile tool and resulted in the iterative design of *PosiPost Me*. This application allows users to create and share positive emotions at any time and from any place and will be discussed further in Section 4.1.

3.3. Review and further discussion of social online tools

Following the previously described studies, a review of existing online tools was undertaken. This involved the analysis of hundreds of existing positive thoughts found in discussion groups online. Two sites were studied: the photo management and sharing site, Flickr, and a social networking site called 43things. This site was particularly interesting as it is a virtual space where users create and share lists of goals and desires. Examples include listing 100 things that make them happy, learning to drive, getting a tattoo or wanting to make pesto. The rationale of studying these two sites was to gain a wider idea of the kinds of positive emotions people share and engage in on an everyday basis.

While some people use Flickr to archive their image collections, most users see Flickr as a social site, a place for sharing images (House, 2007). People who tag and share pictures of things they like and love were observed to be popular. The Flickr *I love* discussion group and numerous tags starting with “I love” are an example of this.

On the website 43things (2004–2007) it was found that a high number of people had stated existing wishes of a positive nature. For example, out of 1,038,570 people wanting to do 974,515 things in total, 13,297 people stated that they wanted “to be happy” (number 5 of 43 things most popular goals), 417 people expressed the desire “be more optimistic”, 424 people wanted to “be positive”, more than 50 people wanted to express positive thoughts and even two people had expressed the desire “to anonymously post positive messages wherever I go”.

An indication of the constancy of our studies can be found in the similarities between the *expressed* content of our collected postings, combined with the additional postings found online (e.g. on Flickr) and more detailed research (e.g. Fordyce, 2000) on what generates happy emotions. Some broadly defined categories that merged from the positive psychology literature (such as Fordyce, 2000; Csikszentmihalyi, 1990) (with concordant examples from the collected postings to show overlappings) of factors that contribute to people's subjective wellbeing include:

- Overcoming negative emotions or experiences, such as resentment (e.g. "I am grateful for leaving the army: It was the happiest decision I made this year" or "I love being able to overcome my unrealistic negative thoughts".);
- Wealth and materialistic possession (e.g. "I like my new car");
- Flow, progress and accomplishment (e.g. "I like getting a good mark" or "Today, I like getting my work done");
- Social contact (e.g. "Today, I like talking to a friendly stranger" or "Today, I like dancing with a friend"), and
- Savouring ordinary activities in daily life (e.g. "Today, I like listening to music at home").

Most notably, the two last factors have similarities with the categories defined in our first and second study. The category *Human (social)* can be linked to *Social contact* in which, on average, 20% of the postings were categorized. The last point shows similarities with the category *Everyday event* (13%) and *Activity* (43%).

4. Design outcomes

Analysis of the study results led to an investigation of the design considerations for systems that aim to encourage the sharing of positive emotions. The design considerations are socio-technical in nature, i.e. they emerged from framing of the studies, but also from people's use and social interaction using the tools provided. As such, the considerations aim to highlight critical underlying aspects of design where the sharing of positive emotions is a key concern. The rationale behind these considerations is to offer designers and developers a design approach for interactive experiences that actively encourage positive emotions, as these are still scarce. The design considerations are as follows:

1. *Design for positive reflection*: Stimulate positive thought processes by giving users the opportunity to positively reflect on their situation. Enabling user's expression and reflection on past and current positive experiences can enable the user to re-experience these and stimulate positive thought processes in future (e.g. Pennebaker et al., 2001). Furthermore, incorporating examples of others' positive or desired behaviour can encourage the creation of a positive mental framework for the user's own positive use.
2. *Design for the functionalities of (particular) technologies*: Computing technology has notable useful functionalities for the sharing of positive emotions. Particularly, it allows recording, registration and communication of positive thoughts. For example, the fact that expressions can be recorded means that these can be used to 'seed' positive messages for new users even before they have posted, thus giving them an idea and positive example of what is expected. Each technology has their own useful functionalities which – depending on user's preferences – can be exploited and combined in different ways.
3. *Induce intended (positive) emotions via information and communication technology surface features*: Encouraging positive emotions during interaction can be accomplished by designing certain technology interaction features, such as an

appropriate graphical interface. Although in this case the focus is on positive emotions, negative emotions may be desirable, and thus may be the intended emotions designers want to induce via system interaction. For example, anxiety is a negative emotion, but anxiety can be motivational in achieving certain positive goals (see also Zhang, 2007). It is important to have the intended emotion in mind from the beginning, so that appropriate mechanisms and features can be designed accordingly, and are then more likely to result in the desired (emotional) outcome.

4. *Use an effective format—such as a prefix approach – to elicit positive thoughts from users*: It is important to use an elicitation format suited to the technology and the context to be designed for. In our case, by designing applications using a prefix approach, users are provided with a direct, simple mechanism by which to share their feelings. It is easily integrated into any number of technologies, from simple pen-and-paper to the latest mobile devices. Furthermore, it frames each participant's input and sharing as no one is required to provide more or completely different information than another: there is an equitable distribution between participants.
5. *Trail a number of prefixes; the decision on the kind of prefix to use is critical*: Designers should try to link these to the type(s) of emotions that they are trying to elicit and enquire which prefixes can help them to do this. The nature of the particular audience and the context in which emotions will be shared (with friends, work colleagues, etc.) should be kept in mind. In this paper's studies, the prefix *Today I like* appeared to be the most effective because it invoked the widest positive response.
6. *Be cautious with features to disclose users' origin*: Even though (mobile) technological developments make it possible to easily reveal users' origins, as in name and location, a designer should be cautious in deciding whether allowing the application to detail a user name and location automatically at all time. Consolvo et al. (2005) showed in their studies that users are often hesitant to disclose location automatically and that their willingness to disclose is often context dependent. Furthermore, although anonymity is often believed to encourage malicious use and antisocial behaviour, anonymity can also have many positive effects, such as that it can encourage more open, honest and sometimes unexpected forms of communication between people at different levels (Ehrlich, 1999).
7. *Design the application to allow for immediacy in expression, and disclosure at any time and place*: This consideration is important as the conducted studies showed that emotions are often situated. And so ideally, an interactive system should allow the user to share their emotions at any time and place the user wants to do so.

These design considerations that derived from the first two studies, were applied to the design and prototype of a mobile tool, termed PosiPost Me to explore and further investigate how such an implementation affected positive usage.

4.1. System design: PosiPost Me

The above design considerations guided PosiPost's Mobile edition and its underpinning design rationale. The design considerations were implicit to what we were trying to achieve. For instance, the importance of immediacy and situatedness in emotional disclosure, as highlighted by the last design consideration, particularly motivated the design of a mobile tool, as the aspect of mobility was evidenced as being core to (positive) emotion elicitation. In designing using the second and third design consideration, it meant that the specific features of a mobile device had to be taken into account for positive expression, and thus we

needed to consider how its features such as a small screen size and restricted input mechanisms could be best leveraged.

PosiPost Me is a mobile application that allows for the distribution of positive thoughts over long distances at any time and from any place, using a mobile phone. The mobile application was built with Python for the S60 (smartphone) platform and uses a mobile 3G network to send and receive positive recollections. It is a client–server based application that uses PHP and Javascript on the server side.

As guided by the fourth and fifth design consideration, PosiPost Me uses a prefix approach. The application developed lets users create a posiposting by asking the user to finish a sentence starting with the prefix *Today I like* (as shown in Fig. 2) to encourage the expression of (daily) thoughts of positive nature. At any time, users can send and receive posipostings that are anonymously and randomly distributed between users. The user receives just one posiposting each time they request one. Thus, the user is in full control of deciding when and whether to receive and send messages (see Fig. 3).

This system also provides a website (<http://www.posipost.110mb.com>) in which all the posipostings from every (mobile) PosiPost user are collected and randomly displayed.

To ensure a wide variety of postings directly from the outset, the website for PosiPost Me was initially populated with all the posipostings that had been collected during the first and second studies. When people do not have a phone with the PosiPost Me application on it, they can still view other users' posipostings through the website. The website additionally offers free download of the PosiPost Me application for a S60 (smart) phone.

The Internet site functions as a shared public display, while the version on the mobile phone is more private. The public website and its collected positive examples provide people with a framework that they can use to stimulate their own positive use. Led by the first design consideration, all the users' created messages are stored on the phone and accessible any time for personal (positive) reflection. As guided by the second design consideration, making use of mobile technology on top of desktop technology and the Internet has the advantage that the strengths of each can be exploited. Mobile technology brings the advantage that the user can post and receive posipostings from anywhere and at any time, while desktop technology and the Internet bring the advantage of general inclusion and accessibility while harnessing individual mobile experiences into a collective one.

5. Discussion

For some users, and in some cases, a positive expressive application may be more beneficial, and some users might be more motivated to use such a technology. Some research (Smyth, 1998;



Fig. 2. The creation of a posiposting with the PosiPost Me mobile application.

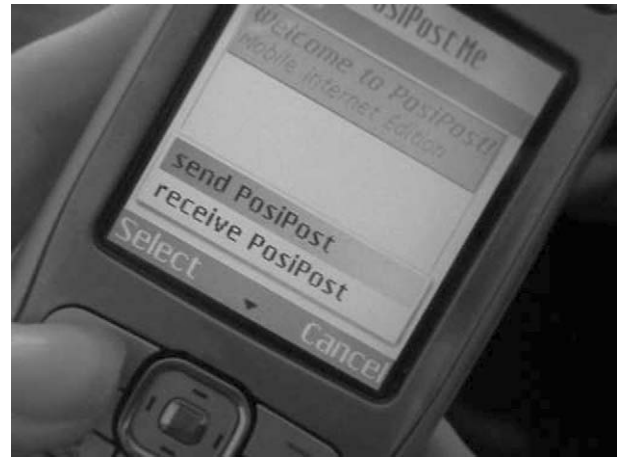


Fig. 3. Choosing to send a posiposting with the PosiPost Me mobile application.

Wright, 2002) suggests that people who naturally do not express their emotional state to a great extent (such as men, alexithymics, and those high in hostility) could be more likely to benefit from a computer-mediated expressive application. However, the success of expressive interventions in general, and with individuals from different backgrounds and ages (Wing et al., 2006), suggests that results from positive interventions might be generalizable to various settings and be beneficial for a wide variety of people. To date, research and practices have been too limited to draw clear conclusions on most effective ways for positive disclosure by technology. Therefore, the technology proposed is initially aimed to give a wide range of users the opportunity to express and share their different positive emotions in daily life and allow investigation for a wide range of settings. In this way also, users will encounter and share the broadest variety of thoughts.

Although it is possible for users to post negative content with PosiPost Me, the application is not designed to encourage this form of use. Based on the design considerations, it incorporates lessons learned from the studies presented here and aims for positive interaction by its use of colours, wordings, the provision of the positive prefix *Today I like* and a shared display on the Internet so that participants can get positively inspired for their own use. Mechanisms to moderate the content of posipostings to discourage any potential future 'negiposts' are in place, and could be used if desired. Until now, however, this has not been needed. Furthermore, the prefix format makes a speedy posting possible as the input constraints for mobile phones had to be taken into consideration. It also incorporates knowledge that the sharing process of pleasurable emotions, reactivates the positive aspects of the emotional experience (Pennebaker et al., 2001). Thus in this way, the use of PosiPost Me creates a possible opportunity to re-experience pleasurable moments through social sharing as in the expression of emotions.

The next focus in this research involves real-world studies of PosiPost Me in use to explore whether positive emotions are communicated by users, as intended, and whether and which beneficial social and mental effects can be promoted by positive expressive applications. To date, in a reported field study (Kanis et al., 2008), 20 participants from mixed backgrounds in The Netherlands and England were given a phone with PosiPost Me and used the application for a working week. Their usage so far resulted in over 125 posipostings created and many more received. Postings created were, for example: "Today, I like, catching my bus, thanks to the nice bus driver" and during dinner time participants posted messages such as "Today, I like having a decent dinner with my fiancée". Interestingly, all the postings created with PosiPost Me so

far have been observed and coded to be of a positive, non-offensive and more situated nature.

While some researchers (Pennebaker et al., 2001) suggest that people usually prefer to share their emotions with their closest intimates, the contributions generated by the study participants and observations of people using the social online tools indicate that people are also willing to share positive emotions with random strangers at a distance. However, the willingness and motivation to share positive thoughts will need to be further verified.

On-going real-world studies of PosiPost Me in use suggest encouraging evidence that the incorporated design rationale for PosiPost Me based on the design considerations appears to have been correct. However, an in-depth investigation and analysis are needed to understand and capitalize on the benefits of PosiPost Me in much further detail.

6. Conclusion and future directions

The studies motivated the deployment of a design strategy that resulted in a mobile tool for shared positive disclosure. Furthermore, the work reported here makes three specific contributions. (1) Analysis of the conducted studies resulted in a set of seven design considerations for the design and development of interactive experiences that aim to actively encourage the sharing of positive emotions. (2) It offers PosiPost Me as an exemplar of this rationale, which used the set of design considerations to underpin its development. (3) The paper-based and online studies showed the potential for a prefix-based elicitation of positive emotions. The data analysis of the conducted studies suggests that the deployment of the prefix *Today, I like* is an effective way to encourage messages of a predominantly positive and non-offensive nature. This prefix also appears to particularly trigger situated expressions that are related to what is happening at that particular moment in time.

The iterative study process of PosiPost is being continued. PosiPost Me has been released as an open source tool so that anyone can use its application for his or her own potential studies, possibly improve the mobile expressive tool and extend the understandings of its potential benefits. In the next phases of this research, the focus is on an in-depth investigation of the real-world use and detailing of the potential effects and benefits of PosiPost Me.

In terms of its implications for design, the study offers design considerations and directions for future studies and communication technologies, but also in the potential role that such technologies might play in interventions and theories to aid mental wellness. Because in the case of PosiPost Me, the user is both the receiver and sender of messages, he or she could benefit in two different ways. In forthcoming studies, it would be useful to determine the impact of this system and the messages according to the person who writes the posipostings; according to the person who is familiar to this posiposter; or according to the person who receives the messages. Further research should then show if lessons learned such as from these can be translated to effective improvements of positive social sharing as mediated by technology.

Additionally, the on-going iterative study process with PosiPost is being continued and different versions of PosiPost are being explored, using the set of design considerations. A Bluetooth edition that allows sharing positive thoughts with people in closer proximity is being studied at the moment in the field. This will further help us to explore the effects of context, location and social wellbeing. Moreover, it will enable further validation and improvement of the set of design considerations presented. Studies and developments will then allow us to improve on design strategies and theories to capitalize on the use and benefits of systems that allow for expression of positive emotions, as, so far, research

and practices of positive expressive disclosure in combination with technology have been very limited in scope and breadth.

Over the last few decades, the fields of human factors and cognitive psychology have achieved a great deal in terms of enhancing the usability of products. Having become used to usable products, it appears inevitable that users will soon want something more than just this (Jordan, 2002): technologies and applications that not only bring functional benefits, but also positive emotional and social benefits. This is a new challenge for human factors and ergonomics and requires understanding of people and their emotions. By moving beyond usability, and building on social and positive psychology to take a more holistic emotional based approach, it seems likely that the field can facilitate the creation of useful, usable and pleasurable applications that could mentally and socially benefit those who use and experience them.

The research presented is just a beginning to develop this understanding in how the field of human factors and ergonomics could move in this direction. More applications and studies are needed to allow the investigation of optimal ways for effective positive disclosure as mediated by technology. This work has shown that it is feasible to design applications that encourage and facilitate the effective sharing of positive emotions, and based on indications in the discussed psychology literature, this could have promising potential. A mobile tool was created, which now enables a detailed exploration of the potential beneficial mental and social benefits – such as reducing feelings of depression, increasing productivity, awareness and positive thinking – resulting from its usage. The work presented showed the feasibility of proposed approach and opens new avenues for the design, development and investigation of technologies aiming for positive communication and concurrent wellbeing.

Acknowledgement

We thank Iftikhar Khan, Robert Macredie, Niall Winters, the two coders, our study participants and the paper reviewers for all their helpful contributions.

References

- Angeli, A.D., Brahmam, S., Wallis, P., Dix A., 2006. Misuse and abuse of interactive technologies. In: Proceedings of CHI '06 Extended Abstracts on Human Factors in Computing Systems, Montréal, Canada, pp. 1647–1650.
- Blunt, C., 2006. Do computers depersonalize personal disclosure? A comparison of typing to longhand disclosure. *SOU McNair Scholars Journal* 2, 82–94.
- Burton, C., King, L., 2004. The health benefits of writing about intensely positive experiences. *Journal of Research in Personality* 38 (2), 150–163.
- Ceaparu, I., Lazar, J., Bessiere, K., Robinson, J., Shneiderman, B., 2004. Determining causes and severity of end-user frustration. *International Journal of Human-Computer Interaction* 17 (3), 333–356.
- Consolvo, S., Smith, I., Matthews, T., LaMarca, A., Tabert, J., Powledge, P., 2005. Location disclosure to social relations: why, when, & what people want to share. In: Proceedings of CHI'05, Portland, pp. 81–90.
- Csikszentmihalyi, M., 1990. *Flow: The Psychology of Optimal Experience*. Harper & Row, New York.
- Danner, D., Snowdon, D., Friesen, W., 2001. Positive emotions in early life and longevity: findings from the nun study. *Journal of Personality and Social Psychology* 80 (5), 804–813.
- Duckworth, A., Steen, T., Seligman, M., 2004. Positive psychology in clinical practice. *Annual Review of Clinical Psychology* 1 (1), 629–651.
- Ehrlich, K., 1999. Designing groupware applications: a work-centered design approach. In: Beaudouin-Lafon, M. (Ed.), *Computer Supported Co-Operative Work*. Wiley, Chichester, pp. 1–28.
- Emmons, R., McCullough, M., 2003. Counting blessings versus burdens: an experimental investigation of gratitude and subject wellbeing in daily life. *Journal of Personality and Social Psychology* 84 (2), 377–389.
- Fordyce, M., 2000. Human happiness: it's nature & it's attainment. Available from: <http://www.gethappy.net/v105.htm> (accessed June 2008).
- Fredrickson, B., Joiner, T., 2002. Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science* 13 (7), 172–175.
- Fredrickson, B., 2001. The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions. *American Psychologist* 56 (3), 218–226.
- Fredrickson, B., 2003. The value of positive emotions. *American Scientist* 91, 330–333.

- Frisina, P., Borod, J., Lepore, S., 2004. A meta-analysis of the effects of written emotional disclosure on the health outcomes of clinical populations. *Journal of Nervous and Mental Disease* 192 (6), 629–634.
- Hassenzahl, M., Tractinsky, N., 2006. User experience – a research agenda (editorial). *Behavior & Information Technology* 25 (2), 91–97.
- House, N.V., 2007. Flickr and public image-sharing: distant closeness and photo exhibition. In: *Proceedings of CHI'07*, San Jose, USA, pp. 2717–2722.
- Jordan, P., 2002. Human factors for pleasure seekers. In: Frascara, J. (Ed.), *Design and the Social Sciences: Making Connections*. Taylor and Francis, London, pp. 9–13.
- Justcurio.us, 2005–2007. <http://Justcurio.us> (accessed March 2007).
- Kanis, M., Perry, M., Brinkman, W.-P., 2008. Minimal connectedness: exploring the effects of positive messaging using mobile technology. In: *Proceedings of CHI '08 Extended Abstracts on Human Factors in Computing Systems*, Florence, Italy, pp. 2513–2522.
- King, L., 2001. The health benefits of writing about life goals. *Personality and Social Psychology Bulletin* 27 (7), 798–807.
- Lange, A., Ven, J.-P.v.d., Schrieken, B., 2003. Interapy: treatment of post-traumatic stress via the Internet. *Cognitive Behaviour Therapy* 32 (3), 110–124.
- Lyubomirsky, S., King, L., Diener, E., 2005. The benefits of frequent positive affect: does happiness lead to success? *Psychological Bulletin* 131 (6), 803–855.
- Lyubomirsky, S., Sheldon, K., Schkade, D., 2005. Pursuing happiness: the architecture of sustainable change. *Review of General Psychology* 9 (2), 111–131.
- Maslow, A., 1962. *Toward a Psychology of Being*. Van Nostrand-Reinhold, New York.
- Pearson, S., Bailey, J., 1980. Measurement of computer user satisfaction. *ACM SIGmetrics Performance Evaluation Review* 9 (1), 59–68.
- Pennebaker, J., Colder, M., Sharp, L., 1990. Accelerating the coping process. *Journal of Personality and Social Psychology* 58 (3), 528–537.
- Pennebaker, J., Zech, E., Rimé, B., 2001. Disclosing and sharing emotion: psychological, social and health consequences. In: Stroebe, M., Hansson, R., Stroebe, W., Schut, H. (Eds.), *Handbook of Bereavement Research: Consequences, Coping, and Care*. American Psychological Association, Washington, DC, pp. 517–544.
- Pennebaker, J., 1990. *Opening Up: The Healing Power of Expressing Emotions*. Guilford Publications, New York.
- Pennebaker, J., 1997. Writing about emotional experiences as a therapeutic process. *Psychological Science* 8 (3), 162–166.
- Picard, R., 1997. *Affective Computing*. MIT Press, Cambridge, Massachusetts.
- Robson, C., 1993. *Real World Research: A Resource for Social Scientists and Practitioner-Researchers*. Blackwell, Oxford; Cambridge, Massachusetts, pp. 340–342.
- Rushinek, A., Rushinek, S., 1986. What makes users happy? *Communications of the ACM* 29 (7), 594–598.
- Seligman, M., Csikszentmihalyi, M., 2000. Positive psychology: an introduction. *American Psychologist* 55 (1), 5–14.
- Seligman, M., Steen, T., Park, N., Peterson, C., 2005. Positive psychology progress: empirical validation of interventions. *American Psychologist* 60 (5), 410–421.
- Seligman, M., 1990. *Learned Optimism*. Knopf, New York.
- Sherry, J., 2004. Flow and media enjoyment. *Communication Theory* 14 (4), 328–347.
- Sklar, A., Gilmore, D., 2004. Are you positive? *Interactions* 11 (3), 28–33.
- Slatcher, R., Pennebaker, J., 2006. How do I love thee? Let me count the words: the social effects of expressive writing. *Psychological Science* 17 (8), 660–664.
- Smyth, J., 1998. Written emotional expression: effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology* 66 (1), 174–184.
- 43Things, 2004–2007. <http://www.43things.com> (accessed 29.05.07).
- Warren, F., 2005. *PostSecret: Extraordinary Confessions from Ordinary Lives*. Katherine Tegen Books, New York.
- Waugh, C., Fredrickson, B., 2006. Nice to know you: positive emotions, self-other overlap, and complex understanding in the formation of new relationships. *Journal of Positive Psychology* 1 (2), 93–106.
- Wing, J., Schutte, N., Byrn, B., 2006. The effect of positive writing on emotional intelligence and life satisfaction. *Journal of Clinical Psychology* 62 (10), 1291–1302.
- Wright, J., 2002. Online counselling: learning from writing therapy. *British Journal of Guidance and Counselling* 30 (3), 285–298.
- Zhang, P., 2007. Toward a positive design theory: principles for designing motivating information and communication technology. In: Avital, M., Bolland, R., Cooperrider, D. (Eds.), *Designing Information and Organizations with a Positive Lens*. Elsevier, pp. 45–74.