

# Lovers' box: Designing for reflection within romantic relationships

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## Abstract

We present the Lovers' box, a digital artefact designed to engage romantic couples in reflections on their relationship. By adopting perspectives from social psychology and interaction design, the work examines the role of reflection through the use of a non-traditional digital artefact that acts as a site for enduring attachments of personal emotional significance. To this end, we respond to previous research work on reflection through design, in the development of four Lovers' boxes whose purposes and meanings are completed through reflections both by romantic couples and their integration in everyday lives. A field study was conducted involving five couples in new relationships who were asked to exchange video messages (co-created with a digital media artist) using the Lovers' box over a period of five weeks. Our findings demonstrated: (1) that the creation, exchange and display of messages embedded in the digital artefact served as both mirrors and sources for reflection concerning couples' relationships; (2) the rich manner in which the Lovers' box became meaningful to participants, as they perceived it as keepsake or digital storybook of their meaningful experiences, experienced it as an enjoyable shared hobby with their partner and saw it as providing them a snapshot into the beloved person's mind and thoughts; and (3) how the potential for new castings of digital artefacts might support our personal and emotional lives.

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## 1. Introduction

In recent years a shift in human–computer interaction (HCI) has occurred, from a concentration on issues of usability and provision of narrowly appropriate functionality to more holistic and experience-centred perspectives on interaction design (Hassenzahl, 2001, 2004; Jordan, 1998, 2000; Kaptelinin and Nardi, 2006; Picard, 2000; Sas and Dix, 2009; Seligman and Csikszentmihalyi, 2000; Wright and McCarthy, 2010). Considerations borrowed from social sciences, art and design have led to an increased focus on peoples' experiences of technology as a process of acting, feeling, sensing and meaning making (Wright et al., 2008). Thus, current approaches consider not only cognitive and rational aspects of experience, but also sensual, emotional and relational factors (Gaver and Martin, 2000;

Norman, 2004). Accordingly, HCI has not only become broader in its outlook, but also more personal and idiosyncratic, and as such, harder for designers to access or to control (Blythe and Hassenzahl, 2003; Sengers and Gaver, 2006). This offers manifold new perspectives on design and how it can be applied, for example, to open space for rich emotional experience with and individual reflections through technology.

In this regard, the present work focuses on intimacy within romantic couples. Intimacy is not only a valuable aspect of interpersonal relationships, but also a powerful determinant of individuals' health and well-being. A significant body of research and development has sought to support, augment and extend intimate experiences (Brewer et al., 2006; Gaver and Martin, 2000; Vetere et al., 2005). Relevant work in the field of HCI, especially in remote communications, include *SyncDecor* (Tsujita et al., 2007), *ComSlipper* (Chen et al., 2006), *Sensing Beds* (Goodman and Misilim, 2003), an *air-inflatable vest* (Mueller et al., 2005;

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Vetere et al., 2005), the *6th sense* (Tollmar and Persson, 2002), a *feather* artefact (Strong and Gaver, 1996), the *Kiss Communicator* (Buchenau and Suri, 2000), *PIO*- and *VIO*-devices (Kaye, 2004, 2006) as well as the *inTouch* project (Brave and Dahley, 1997). These projects addressed in particular the sensual character of intimacy (touch, hugging, warmth, etc.) and sought to mediate and communicate simple intimate acts, or to make the presence of the beloved apparent. Even though they are either aiming for the expression or evocation of emotions (Gaver, 2002), the set of possible acts of communication is very small (e.g. pressing a button, switching on light) and clearly prescribed through the design. In our work we try to see individuals more as co-creators of their emotional experience by opening space for their creativity, personal preferences and individual reflections on and through technology.

The Lovers' box was created with two objectives in mind: firstly, we aimed to explore how a non-traditional and more open-ended digital artefact designed for appropriation by the owners can play a role in reflection and meaning making in relation to a significant interpersonal relationship (i.e. a romantic relationship). In this context, reflection can be regarded as a process of object completion through the assignment of individual meanings to the digital artefact and its incorporation within a couple's life. Both the physical design and interaction design of the digital artefact are purposeful and seek to create a very personal space for intimate communication between romantic partners. As the Lovers' box gets placed into couple's life, we are interested in finding out how couples think about and relate to the artefact, what meanings might get associated with it, what personal values the Lovers' box and the interaction with it might offer them, and where it gets placed in their homes.

Secondly, we tried to invite couples to reflect on their romantic relationship by offering them through the Lovers' box a personal artefact for the exchange of self-created video messages with their partner. In this context, the messages are more than simply elements of a direct information exchange but contain something about the creator, the partner and the relationship, and allow lovers to engage in an analysis of current assumptions about their relationship. This allows a reconstruction of existing knowledge and integration of new experiences with old ones, and has the potential to supplement an individual's awareness of incomplete or inconsistent mutual knowledge about the relationship. It offers multiple perspectives (e.g. own perspective, partners' perspective) on experiences and makes the same available for critical thoughts too. These are key aspects and activities of reflection (Brookfield, 1988, as cited in Morris, 2009).

## 2. Designing for reflection on digital artefacts

Experience with and through technology is a complex, dynamic and highly subjective phenomenon. As it is a unique combination of elements, comprising of the perception of an object's design, the internal state of the user (e.g. mood, expectations, goals) and the context, we cannot

design a particular experience, but only create a frame for individual experiences with technology (Blythe and Hassenzahl, 2003; Buchenau and Suri, 2000; Dourish, 2001; Hassenzahl and Tractinsky, 2006; McCarthy and Wright, 2004; Overbeeke et al., 2003). In this regard, a number of researchers argue for the design of systems and artefacts that are more open-ended, to allow their appropriation by a wide range of users in different contexts (Gaver et al., 2003, 2010; Höök et al., 2008; Sengers and Gaver, 2006; Sengers et al., 2005). By leaving space for multiple interpretations of what an object's role is, or meaning for the individual might be, reflections on the purpose(s) of artefacts and how they can be incorporated within one's life might be encouraged. For example, Höök et al. (2008) suggest that interactive systems or objects should encourage individuals to negotiate meanings on their own, since meaning "is not something a designer can design for entirely, but instead, is completed, *lived*, by the person experiencing" (p. 649, original emphasis). In completing an object through one's own reasoning processes, the user can become an active protagonist and co-creator of her experiences, and move beyond the passive consumption of an object and its prescribed functionality (Dunne, 2006). In addition, the design of more open-ended artefacts that leave space for multiple and idiosyncratic interpretations have the potential to challenge individuals to resolve their inherent ambiguity through sense-making processes, which themselves can be experienced as pleasurable, liberating (Sengers and Gaver, 2006), evocative (Höök et al., 2008), mysterious, delightful or intriguing (Gaver et al., 2003).

While an artefact whose meaning is too narrowly construed is less likely to engender reflection (Gaver et al., 2010), and might lack the potential to make us wonder (Paulos and Beckmann, 2006) or to enchant us (McCarthy et al., 2006), objects intended to be a 'blank canvas' risk being perceived as instances of poor design and eliciting frustration instead of stimulating meaning making processes. Thus, an effective balance needs to be found between prescription (through form and function) and openness, if we want to create digital artefacts that have the potential to stimulate reflection (e.g. Dalsgaard, 2008; Höök et al., 2008; Sengers et al., 2005). As experiences are as much about what individuals bring to the interaction as about what designers leave there, digital objects intended to stimulate reflection on their meaning should be designed as interpretatively flexible, yet usable, systems that allow their appropriation by the individual (Bell et al., 2005; Boehner et al., 2005; Gaver et al., 2010; Sengers et al., 2005).

### 2.1. Reflection through design

Strategies to design interpretatively flexible systems are manifold. Related work in this regard addresses the stimulation of reflection, for instance through an *open* (Höök et al., 2008; Sengers and Gaver, 2006), *ambiguous* (Gaver et al., 2003), *reflective* (Sengers et al., 2005), *slow* or *expressive* design (Hallnäs and Redström, 2001, 2002;

McCarthy et al., 2006). Making sense of an object affords a close engagement, which enables a more personal and deeper relationship to it (Gaver et al., 2003; Zimmerman, 2009). As we hoped with the design and development of the Lovers' box to create an artefact for more personal and emotionally meaningful communication between partners in a romantic relationship, the object itself needs to: (1) frame a very personal context for this significant interaction through its aesthetics of form and function; (2) allow individuals to embed their own meaningful content within it (see Section 4.2); and (3) be open to the assignment of personal roles and values to it through individuals' own reasoning processes, and as such should facilitate a meaningful appropriation of the digital artefact into a person's relationship and life.

The framing of the personal context relates issues of expressiveness of design and our understanding and experience of artefacts. In this regard, the aesthetics and beauty of a digital object as well as its physicality and the materials of construction are of particular importance (Hallnäs and Redström, 2001, 2002; Höök et al., 2008; Djajadiningrat et al., 2002; McCarthy et al., 2006; Norman, 2004; Overbeeke et al., 2003; Pierce, 2009; Wallace and Press, 2004). Digital artefacts, even though designed as ambiguous objects, are not "infinitely flexible carriers of meanings" (Shove et al., 2007, p. 7), as their shape, functional configuration and materiality frame and evoke expectations of how they could be used or understood (Gaver et al., 2010). Materials have a particular cultural significance with specific properties associated with certain values (Shove et al., 2007).

The materiality of digital artefacts has a significant bearing on their adoption into peoples' lives. The appearance of an artefact and its compatibility with the aesthetic rationale of the home figures in an individual considerations of where the object should 'reside' (Silverstone et al., 1992). In this regard, objects can be seen as an extension of the home. They can also be an extension of a person's self (Belk, 1988; McCarthy et al., 2006), as we build relationships to them. Digital artefacts can be of social significance to the individual through the association of personal values and functionalities with them. This is a fluid relationship involving a continuous and dynamic re-attribution through interaction with or consumption of the artefact. Another important aspect of object appropriation is temporality (Silverstone et al., 1992). Artefacts can be used at different times or occasions and can be incorporated into routines or habits. Thus, if we aim to design for reflection on the relationship with a digital artefact, then through form and function we must afford opportunities for appropriation (Shove et al., 2007; Dunne, 2006).

### 3. Design of the Lovers' box

In order to create a digital artefact that can be personally interpreted and appropriated by couples in romantic relationships, we crafted the four Lovers' boxes. These boxes are identical in form, yet we imbued an uniqueness in

each through the use of a different wood for each box (cherry, beech, apple and walnut). Every box is  $17 \times 19 \times 12$  cm<sup>3</sup> (width, depth, height) in size, weighs approximately 2 kg and consists of two halves connected by brass hinges (see Fig. 1c). Each box is further decorated through an antique escutcheon at the front and surrounding ornate carvings.

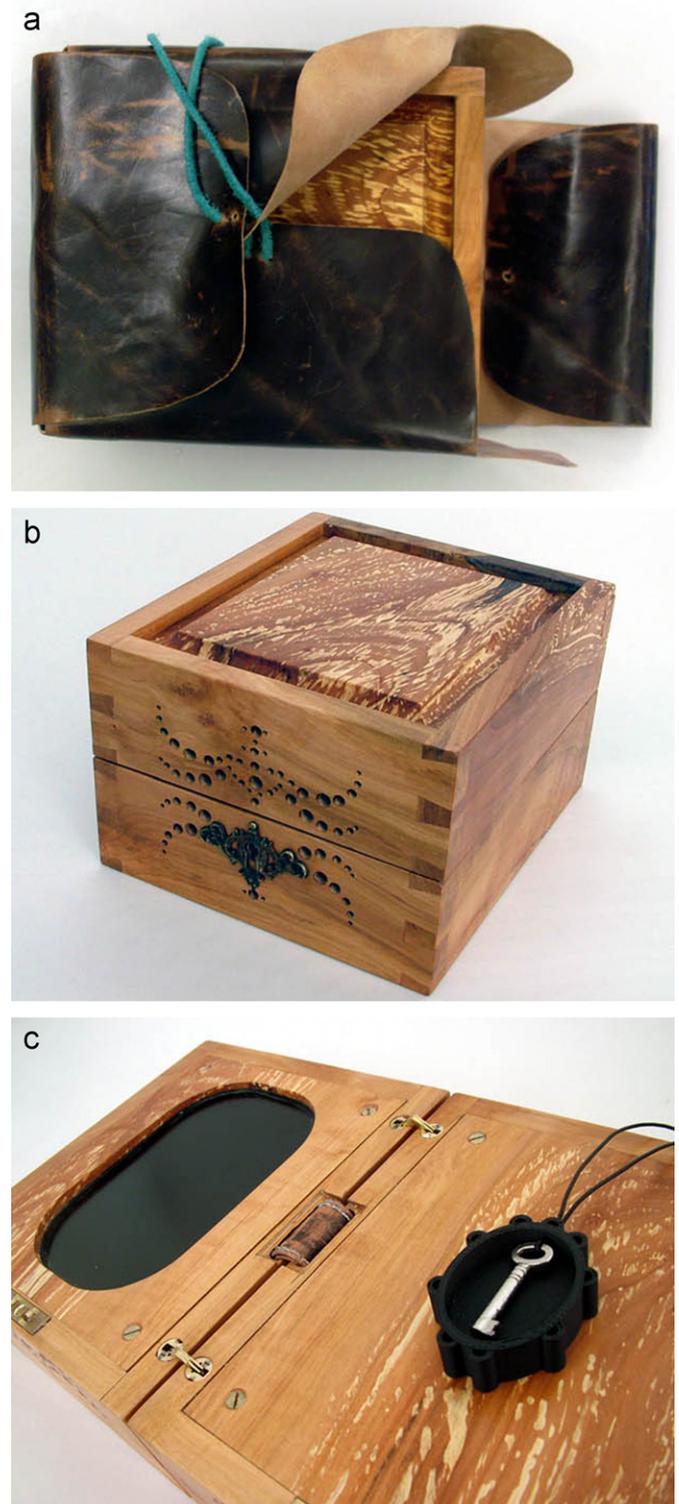


Fig. 1. One of the Lovers' boxes (apple wood): (a) encased in its leather cover, (b) closed, and (c) opened with a key on top.

The square wooden form of the box suggests a number of familiar, but not specific, uses (e.g. storage box, sewing box). The box is unspecific with respect to genre or period, but suggests an object that is a personal possession. A unique leather cover is designed to allow our couples to carry the Lovers' box safely (see Fig. 1a). The box also has a traditional lock and key. When unlocked, the box opens to the left, in a book-like manner and a screen becomes visible (Fig. 1c). A wooden *passé-partout* with rounded edges frames the screen to counter the usual connotations of a digital display.

A PC with an integrated Phidget RFID reader is hidden inside the box under the wooden board in the right half. Other than the screen itself, all visible trappings of digital technology are kept from view, even the wires that connect the two sides are encased in a fine leather channel. Thus, on the one hand, the design tries to make certain parts of the technology invisible (e.g. the computer, RFID Reader, connecting wires) and in this regard follows the 'aesthetics of disappearance' which so often characterises designs in ubiquitous computing. On the other hand, it can be seen as an attempt to craft the relation between the form and materiality of the box and the screen. This material integration seeks to bridge the physical–digital divide thereby supporting the experience of the object as a 'whole' novel artefact (cf. Robles and Wiberg, 2010; Shove et al., 2007).

To further avoid evoking the sense of a wooden laptop-like device, the videos created by participants are not played in a typical 16:9 landscape format on the screen, but rather in a portrait orientation. We chose video as the media format as it allows the scope and flexibility not only to present text and pictures, but also moving pictures and sound, as well as various combinations. Moreover, participants are given further opportunities to personalise their messages by configuring the time window and dates at which it will play, and amount of times it can be played. For example, participants could set the parameters for the interaction such that the video message could be played just once, as often as wanted, on a particular day only, or only in the evenings between 6 pm and 7 pm.

The key to the box (see Fig. 2) consists of a black plastic fob (Fig. 2c) containing an RFID tag (Fig. 2d), a key hoop (Fig. 2a), and the brass key (Fig. 2e) to unlock the wooden Lovers' box. All elements are connected through a fine leather strap (Fig. 2b). The key fob and hoop are simple objects that we hoped participants might customise, for example, by painting on them, putting fabric between them (like an embroidery hoop) or attaching them to their key rings. As an object, the key with its fob and hoop (from herein collectively referred to as the 'key'), is small enough to be worn or carried as intimate object on the body (cf. work on digital jewellery of Jayne Wallace, 2007). When placed on the right half of the Lovers' box, the RFID tag in the key fob triggers the video message stored within. Since the screen remains black until the computer is fully booted up, the software is configured to play a 'start-up sound' to demonstrate to participants that the box is ready to be used.

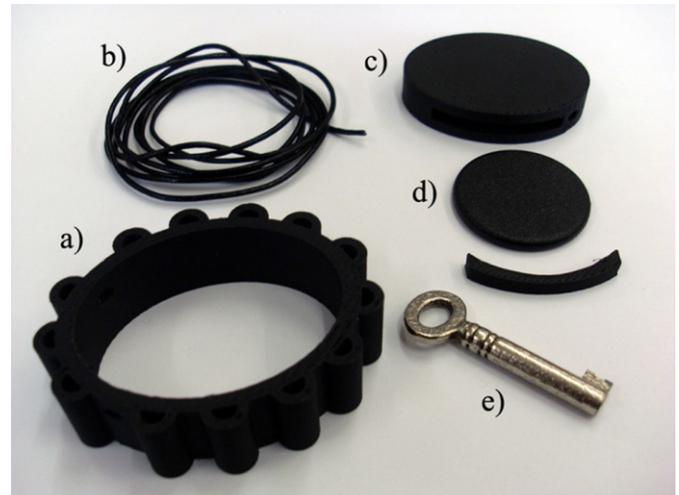


Fig. 2. Lovers' key consisting of (a) key hoop, (b) leather strip, (c) key fob, (d) RFID tag, and (e) physical key to unlock the box.

This sound of the box is again something participants are free to customise.

The Lovers' box and the key are tangible objects intended to be shared between partners in a romantic relationship. Their aesthetics and nature of interaction sought to avoid assumptions and expectations that we might associate with traditional consumer electronics and instead attempts to offer couples a very personal space for intimate communication. Through the open content, the functional scope of the interaction parameters, the opportunity for customization of the key and the start-up sound, and the ambiguity of an individual's relation to the new artefact, we hoped to invite sense-making processes that focus on the Lovers' box.

#### 4. Designing for reflection on romantic relationships

To invite couples to reflect on personal felt life-experience with their beloved partner and to motivate the interaction with Lovers' box and key, we build on fundamental human needs for belongingness and intimacy and consider social norms of reciprocal exchanges. In the following, we explain the relevance of these aspects for romantic couples and our approach to encouraging reflection through the creation, exchange and sharing of video messages.

##### 4.1. Need for belongingness and intimacy

Baumeister and Leary (1995) emphasise the importance of the human desire for interpersonal attachment by defining it as the need to belong. In their hypothesis of belongingness they propose that "human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships" (p. 497). However, mere affiliation alone, without a sense of caring cannot satisfy the need to belong. Thus, in psychological terms, to fully satisfy this need: (1) individuals need to have frequent personal contact with

some other person in a pleasant way; and (2) these interactions have to be perceived as providing an interpersonal bond marked by stability, continuation and affective concerns (e.g. that one feels loved by the other). Ideally, these affective concerns should be mutually apparent in reciprocal feelings about one another.

Intimacy in this regard is one of the most important components and central rewards of close interpersonal relationships – especially romantic relationships – as it enables the experience of warmth, closeness, commonality and caring (Grau, 2003). However, establishing a clear and specific definition of the concept is rather difficult. Moss and Schwebel (1993) identified seven aspects that characterize intimacy: (1) an exchange or mutual interaction between people; (2) an in-depth affective awareness and expressiveness that occurs as partners receive and express affect and emotions from and to another (e.g. feelings of compassion, validation of the partners' worth, providence of assistance; Cunningham and Barbee, 2000); (3) an in-depth cognitive awareness or expressiveness through the reception and expression of cognitive material between partners (e.g. information about beliefs, values, attitudes and goals); (4) physical closeness; (5) relationship commitment and a feeling of cohesion; (6) a general sense of closeness; and (7) communication and self-disclosure.

Self-disclosing behaviour, if appropriate, can facilitate our closeness to others as we unfold our inner life, which might increase interpersonal liking and trust, and offers opportunities for sympathetic and supportive responses (Guerrero and Andersen, 2000; Larson et al., 1998; Schäfer and Olson, 1981; Vetere et al., 2005; Waring, 1984). Communication in this regard should not only be understood as the production and transfer of comprehensible and adequate information between partners to accomplish certain relationship functions. It also provides something that Watzlawik et al. (2003) termed the 'relational level' of communication which is particularly important when it comes to the expression of feelings (Burlinson et al., 2000). This goes beyond self-disclosing behaviour on the content level of a message (e.g. how one feels), but defines the relationship between the partners through the message itself (e.g. as loving relationship). This definition can be accepted through a supportive response of the partner, or rejected (Dindia, 1997; Vetere et al., 2005).

The successful support of these essential needs provides an important contribution to the promotion of individuals' well-being (Brewer et al., 2006), and as such, might motivate the exchange of messages via the Lovers' box, and invite individuals to engage in reflective processes through it. Since romantic relationships in particular provide a rich source of individual experiences and emotions, and do much to fulfil the essential human needs for intimacy and belongingness to a significant other, we hoped from the outset that the couples involved in the Lovers' study regularly interact in an emotionally close, intimate and reciprocal manner through the exchange of positive, personally developed video content. At best, and against the backdrop of interdependence

theory (Rusbult, 1980, 1983) and social exchange theories (e.g. Thibaut and Kelly, 1959), the exchange maximises the joint outcome of the relationship (Levinger, 1980), which is an important determinant of relationship satisfaction (Hinde, 1979). These aspects are just an excerpt of an extensive research literature on belongingness and intimacy, although in relation to the present study they have a particular bearing with regard to how romantic relationships can be evaluated.

#### 4.2. Reflection through creation, exchange and sharing

The Lovers' box is not only a digital artefact, but media as well (Silverstone et al., 1992). Our principal vehicle for promoting reflection on our participant couples' relationships was therefore the creation, exchange and sharing of video messages through the box. The content of the videos can be seen as attempts to convey thoughts and feelings about a partner and a relationship, meaningful shared experiences, or memories. The active process of creation with the digital media artist (see Section 5.1), and the anticipation of these creative sessions, requires subjects to highlight relevant aspects of their relationship. The experiences and emotions incorporated and expressed within the messages, as presented through the Lovers' box, are expected to be the principal stimulus for reflection on beliefs and values concerning the relationship (Sengers et al., 2005). We expected participants in our study to relive shared past and current experiences with their partner, and hoped that through a combination of thoughts and feelings individuals might gain a better understanding of the relationship (Lindström et al., 2006). In summary, the process of creating, exchanging and sharing of self-created messages for a beloved partner was intended to provide a highly personalised and engaging opportunity to express the relationship, to reflect on it, and to examine the identity and importance of it to each partner through the use of technology (cf. Byrne and Jones, 2009; Brown, 2009).

### 5. The Lovers' box in actual relationships

Which topics do individuals invite their partner to reflect on? How do the partners present each other through the messages? What do content and exchange reveal about the relationship? How does the exchange influence their interpersonal behaviour and the partnership in general? And, with regard to the Lovers' box: How do individuals relate to the Lovers' box and which role(s) might they assigned to it? How might the perception and treatment of the box be shaped by its form, weight and given functions? Which values might the Lovers' box offer to the couples? To answer these questions and understand how people would appropriate the Lovers' objects and engage in reflective practices required us to run extended deployments with romantically involved couples.

### 5.1. Procedure

For our study, we recruited five couples in new relationships (from 4 to 8 months at the outset of the study) through posters, fliers and personal contacts. We deliberately chose couples at an early stage of their relationship, as they will typically be more careful in attending to future outcomes of their relationship and are more concerned with the positivity of their exchange balance (Levinger, 1980). Furthermore, early relationship stages are characterised by a particular uncertainty; being less likely to anticipate the other's behaviour correctly leads to emotional experiences (e.g. surprise, disappointment), which invite further reflection. Inevitably relationships are more intense in the early stages, but decrease in intensity over time as both partners become more familiar with each other (Sternberg, 1997). Our choice of early-phase relationships also exploits the observation that they are subject to rules of social politeness (Guerrero and Andersen, 2000), with partners generally displaying more positive emotions.

All couples who expressed an interest in taking part were invited to an initial meeting for which they were remunerated (£20 each). During this meeting they were given a detailed description of the study and were shown mock-ups of the box and key. Following this, all couples were selected based on the interest and motivation they demonstrated to the interviewer. The mean age of the final participants was  $M = 21.4$  ( $SD = 4.427$ ,  $min = 17$ ,  $max = 30$ ), and their median educational level was 10 post-16 GCSEs ( $min = 6$ ,  $max = 12$ ) and 3.25 post-18A-Levels ( $min = 0$ ,  $max = 5$ ).

During the course of the study, over a period of five weeks, participants were asked to come to a meeting once a week to create a message for their partner. The creation of expressive and personally significant video messages, even when highly motivated and using one's own content, is challenging. Thus, to facilitate the realisation of their ideas that might be beyond their technical capabilities, participants collaborated with a digital media artist. Her skills provided both the technical and aesthetic expertise that allowed participants to develop content in video that matched their ambitions. Of course, the process of working with the artist had the additional benefit of eliciting reflection through the causal, non-leading interaction that occurred. As such, we consider the media artist to occupy the place of an unspecified (and very likely rather complex) component of a complete reflection system.

On average, the creative sessions took 1½ hours and were audio recorded. After each session, participants were questioned about their intentions with regard to the message they created. The sessions were scheduled such that one partner had her/his session at the beginning of a week and the other one at the end of the same week, thus giving the couples some time to make the exchange, reflect about the received message, and to reflect on the message that they wanted to create in response. To avoid retrospective bias we developed diaries (see Fig. 3) to capture how subjects immediately evaluated the messages received from their



Fig. 3. Lovers' diary.

partner. Participants were encouraged to reflect on the messages through three questions: (1) *Tell me about your thoughts and feelings regarding the piece this week* (participants' emotional or cognitive responses); (2) *Please share with me how personal the message felt for you this week* (perceived level of intimacy concerning the content); and (3) *Please share with me how much you liked the message in general* (encompasses the individual outcome of the message, cf. Rusbult, 1980, 1983).

To assess if interaction with the Lovers' box had an impact on couples' relationship and emotional well-being, several quantitative measurements were applied before and after the start of the project. These are the subscales emotional and intellectual intimacy of Schäfer and Olson's (1981) Personal Assessment of Intimacy in Relationships inventory (PAIR), the Relationship Assessment Scale of Hendrick (Hendrick RAS, 1988; Hendrick et al., 1998), which is a brief and well-established 7-item scale of general relationship satisfaction, as well as items of Sternberg's (1997) Triangular Love Scale addressing the dimensions intimacy, passion and decision/commitment. Due to the small sample of the study and the lack of statistical significance these are not included.

Participants did not receive financial compensation over the course of the project, but were allowed to keep their box's key as well as a DVD with all the messages they had

created for one another. Of the five couples, three reported technical problems that mainly appeared in the first week of the project and were fixed immediately. After the first week of our study, of the five couples involved, one couple ended their relationship and another withdrew due to an unforeseen employment restriction. After the second week, a third couple announced that due to job-related requirements, they were not able to maintain the content creation sessions and so also could not continue with the project. The study concluded with a paid final interview of the 6 participants that took part beyond the first week of the study (£20 each). Only two couples stayed in the project for the full duration of five weeks.

## 5.2. Results

As our study was explorative in nature we used the abbreviated version of grounded theory (Glaser and Strauss, 1967) as a qualitative method to analyse and understand participants' experiences and interpersonal relationships (Howitt and Cramer, 2008; Willig, 2008). The recorded concluding interviews as well as the informal discussions during and after the creation sessions with the media artist were transcribed and coded. To identify meaningful categories from the data, the coding was conducted sentence-by-sentence. In a first cycle, the data was given descriptive labels and first low level-categories were created. Resulting low-level categories were checked for overall consistency and fit with other labels using constant comparative analysis. Some sentences, if addressing several different aspects, were assigned to multiple low-level categories. The identified low-level categories were then integrated into more abstract higher-level categories, and were modified in relation to existing theories and approaches. Key extracts of the main

themes that arose from the data are presented, and are in part discussed in the following. Numbers of occurrences are indicated in parentheses. All names of participants have been changed.

### 5.2.1. Messages of the Lovers

Since it was left open to participants as to what kind of content they wanted to develop, they reported that they were initially unsure what to create for the partner, but that their ideas improved over time, and that, as the study progressed, they increasingly thought about both the activity and the content during their daily lives.

**5.2.1.1. Intentions.** When asked about their intentions with regard to the content, statements by the participants' revealed manifold and positive intentions (see Table 1). This agrees with the findings of Vetere et al. (2005) with regard to experiences in the context of gift giving processes: "Having fun, being creative and using humour is something we like to do" (p. 476). However, the underlying thoughts behind the videos did not only centre on pleasing a partner through a funny or light-hearted communication of feelings, but are also accompanied by a certain fear of disappointing. Ana for instance says: "(...) because with comedy, with something funny or with a joke, then you know that you're going to get a positive reaction out of it. Where I didn't want to do something that was more serious or more sentimental and then get a negative reaction out of him. I wanted him to like the message no matter what I did kind of thing". Ana wanted to create a 'safe' message, something that is likely to be liked and accepted by the partner. In particular, partners in young relationships, like those of our participants, are uncertain in their predictions of their partners' motivations and emotions. This uncertainty allows rich positive

Table 1  
Intentions of participants for the content of their messages.

Category of intention	Number of occurrences	Example
<i>To make the partner laugh</i>	29	Jim: "Some things that I know will make Lucy laugh, like the Blackbird, like the Snoopy"
<i>To create something that is liked by the partner</i>	15	Sarah: "I'll try and get some photos from, and videos from a night out 'cause I think he'll like that"
<i>To respond to the partner's message or a shared theme</i>	13	Lucy: "Yeah, it was very much kind of creative by the message that Jim gave to me"
<i>To give social and emotional support</i>	9	Julia: "I was thinking of interviewing all our mutual friends and saying 'What are the nicest things about Phil?' so that he knew that it wasn't just me that thought these nice things about him that it was also his friends"
<i>To communicate the personal relevance of the message well</i>	6	Lucy: "It's kindalike a hidden message in it and I don't know if he spot it. I hope he does"
<i>To surprise</i>	6	Nico: "To surprise her"
<i>Not to disappoint</i>	6	Jon: "Not to disappoint Sarah"
<i>To stimulate with something new, interesting</i>	5	Ana: "I think it was just to see what else we can do really, just to be different from the normal (...) instead of the usual"
<i>To communicate affection in a light-hearted way</i>	5	Julia: "I just thought I'd combine trying to tell him, that he does mean a lot and um, I feel lucky but without, [laughs] being all serious about it"
<i>To present something about oneself</i>	5	Phil: "(...) where you're just trying to like show her like a little bit more of yourself"
<i>To have a nice memory</i>	1	Joey: "A nice little memory of like, who she was, because it was like her entire personality on there, so it's going to be a nice thing to keep hold of, and I can look at it whenever I want"

experiences, but can also give rise to feelings of anxiety, fear and embarrassment, though these decrease over time as they get to know each other better (Berscheid, 1983; Guerrero and Andersen, 2000; Levinger, 1980; Sternberg, 1997; Walester et al., 1978).

**5.2.1.2. Personal content.** Over the course of the project 27 videos were created: some were *slide shows of static images* (8), some were *videos* (8) of either the participants (e.g. female partner singing while playing the piano) or taken from different media databases, some were *montages of pictures and videos* (8), and some videos were *self-creations* (3) such as an animated stick man or a stop motion video. The duration of the videos was on average  $M=155.07$  s ( $min=7$ ,  $max=513$ ).

According to participants' own declarations, of all videos made 21 were meant to be personal, 3 were not personal at all, and 3 could not be clearly classified. The videos showed, for example, shared experiences of the couple (e.g. joint visit to a wedding or festival, a reminder of the first date), personal moments, things anticipated being done together in the future (e.g. moving in together, travelling), something humorous, or things that the receiving partner likes. In some videos "there were very personal things" (Jim), they were even "very intimate" (Phil), as subjects tried to tell each other how much the partner means to them. How personal created messages were, differed between couples: whereas one couple merely made funny videos (e.g. Ana and Nico), another couple made very personal messages and sought to show their partner that "she is always a thought in my head" (Phil) or to give the other one "a greater insight to how I feel about him" (Julia).

That many messages were indeed personal or intimate was apparent in the creation and use of *personal common codes* (12) (e.g. private jokes and language, like 'blackbird' as reference to the partner, or 'Friday Club' as anticipation for shared weekends) and *individual meaning systems* (2) that are shared and only understood by the couples; these are typical of close interpersonal relationships (Clark, 1996; Hopper et al., 1981; Vetere et al., 2005; Wood, 2000). Lucy for instance said about a message she got from Jim: "(...) it felt very personal as the ideas that were in it were quite significant for us, but they're unlikely to have been understood in the same way by anyone else watching it". Burleson et al. (2000) emphasise that personal idioms, as they cannot be understood by outsiders, can be used as secret code for communicating in a highly expressive, intimate and meaningful way while in the presence of others (e.g. media artist, investigator), and thus, can be seen not only as a sign of intimacy and mutual knowledge, but also as a good and plausible trade-off between couples' relational privacy and the public display required by the study.

**5.2.1.3. Perception of messages.** All participants expressed a significant sense of *anticipation* in advance of receiving the Lovers' box each week, and that they were always looking forward to seeing new messages from their partner. None of

the participants told their partner in advance what the content would be about and instead considered it a *present* (3) that stays covered until it gets unpacked by the receiver. Ana for instance described her experience when she received the box from her partner as: "(...) curiosity and I was excited to see, like I always looked forward to seeing what he did". Most videos were *liked* (23), described for instance as *funny* (10), *very personal* (5), *sweet* (4), *interesting* (1), and *enjoyable* (1). Three participants even said they *felt understood* by their partner through the message. The rewarding experience of receiving the message is apparent in Ana's statement: "You'll watch it again, if you're feeling a bit low or whatever and you think oh that makes you laugh, then it's nice to have that little pick me up". In addition, simply the receipt of a personal message from a beloved person "felt like a nice quite warm experience" (Phil) and was described as "like having the person there with you" (Phil).

Even though all the messages stemmed from positive intentions, were mostly personal and appreciated, of all 27 videos made 4 were not liked. If participants were disappointed about their partners' messages they excused this by attributing it to external constraining factors (e.g. lack of time). Lucy says for instance: "I assumed that he was quite busy". Others strengthened the positive aspects of the message. Jim explains: "I think some people are unhappy when they get presents that they don't like. But usually you've just got to think it's the thought that counts". If Nico was disappointed about a message of Ana, it was his partner trying to downplay the negative experience by showing understanding for his disappointment. She says: "(...) try and be like oh, yes, well I didn't think it was that good either, trying to agree". This underlines the positivity of the exchange but also indicates that partners in satisfied relationships tend to strengthen beneficial experiences through positive internal partnership-related attributions (cf. Hinde, 1979; Kalicki, 2003; Kelley, 1967).

#### 5.2.1.4. Communication through, about and beyond messages.

Through the messages, individuals communicated something about themselves, their partner and the relationship. They highlight certain shared experiences, or disclose what they know about the other. That the videos did indeed present something about 'oneself' is apparent in a statement by Ana where she says that she watches videos she made for the partner on her own, like "a sneaky preview", before she handed over the box.

All couples reported that they talked about the messages. They did not discuss the content in detail, but rather explained "different bits and bobs" (Phil), parts of the videos that were maybe not understood by the other, clarified the relevance of special things or how things were intended, said where they found the media material, and, in particular, discussed if the partner liked the message (in most cases). For example, Nico said that talking about the messages "was helpful because next week you could improve", and his girlfriend mentioned: "(...) sometimes we'd give each other pointers and be like oh you should have

put that in the box not that, like trying to give each other a critique”.

Phil described how communication about the messages led to other topics of discussion. He said: “cause talking about the messages, we’ve been a lot more -um- communicative with each other. (...) it’s led on to them kind of conversations like along that where we’re just getting to know each other a bit better”. Nico talked about the frequent contact and the personal videos he and his partner made for each other: “[It] brought us together more (...). I think it, like, let us understand our personalities more because we both realized that we’re quite humorous because we always made humorous videos”. The messages reveal information about the partners’ thoughts and reflections, and highlight what is prominent in the mind of their partners (see further Section 5.2.3.5 on ‘personal functions of the box’). Thus, the messages indeed express parts of the relationship, and afford its definition (e.g. as humorous couple; Bursleson et al., 2000; Lindström et al., 2006; Watzlawik et al., 2003). The exchange in general stimulated communication, and thus, provided further support for mutual understanding. This not only makes it easier for individuals to meet their partners’ needs (Prager, 2000; Grau, 2003; Dindia, 1997), but brings them personally and emotionally closer (Moss and Schwebel, 1993; Cunningham and Barbee, 2000). In addition, the deeper insight achieved into the partnership and the improved understanding of each other, can inform future decision making processes (Fleck, 2009).

*5.2.1.5. Reinforcement or relationship mirror.* Two of the participants mentioned that the message exchange through the box “enforces what was there” (Phil) in the relationship, that it maybe “reinforced” (Lucy) what both partners already had in common, and what they shared. Even though the exchange was experienced as something positive and enjoyable, they could imagine that the presentation of messages could have the opposite effects on the relationship too. Phil reflected on this: “(...) if we hadn’t been suited to each other and just generally like that would’ve like, I could see that [the box] curtailing somebody’s relationship, not in a bad way just literally because it’s like kind of would like, highlight aspects”. This might also explain the behaviour of the couple that ended their relationship after the first week. The female who initiated the break-up of the relationship created her first message after having received her partner’s first video. During her creation session, she complained about his previous message: “I mean it’s obvious, he couldn’t think of anything (...) it was just photos of him (...) it showed how vain he is (...) I thought it would be about us, and he was just like, no it’s about me”. Her message in response was a slideshow of pictures highlighting their interpersonal differences: he was visualised as a tall, but lazy and sleepy giraffe, whereas she presented herself as a small penguin that loves music and enjoys the sun. In contrast to him, she felt that she thought deeply about the content and put considerable effort in the video-creation, to the extent of preparing media material for

the creation session in advance. This matches findings on intimate relationships, where inequity in investments in the relationship (e.g. Baumeister and Leary, 1995; Guerrero and Andersen, 2000; Hinde, 1979; Larson et al., 1998; Rusbult, 1980, 1983; Walester et al., 1978) as well as the assignment of negative partner behaviour to internal stable factors of the person can be seen as indicators for dissatisfaction in a partnership (Kalicki, 2003).

### 5.2.2. Perception of the Lovers’ objects

*5.2.2.1. Leather cover and key.* The leather cover of the box was described as a “nice casing” (Ana) and “beautiful in touch” (Julia). Even though participants liked the general idea of a shared individual key to their Lovers’ box and that they could customise or wear it, none of the couples changed their key’s appearance, and only Lucy mentioned that she wore it around her neck “for a bit”. When asked about it, participants said they “never got around [to] doing it”, and that it was hard to find something that is related to the couple as a whole and that matched both partners’ tastes. In addition, participants expressed a desire to concentrate their attention on the creation of the video content.

*5.2.2.2. Lovers’ box.* All ten participants expressed appreciation for the *beauty* of their Lovers’ box. The design of the box – with its *pretty carvings* (4), *beautiful colour* (1), the *cool escutcheon* (1), the *fancy lock* (1), and *good looking rounded screen* (1) – was liked. The appearance of it reminded participants highly of a *jewellery box* (5), a *nice storage box* (2) or *sewing box* (1), and referred to it for instance as a piece of jewellery and keepsake. They further compared interaction with the box to that of a *book* (6), as the opening of the box to the left, “felt like a book cover opening” (Phil). The position of the hinge did *confuse* two participants at the beginning, as it is an unusual way of interacting with a box. What was further liked is the *tactility* (4) of the box and the possibility to *lock* it (4). Phil said in this regard: “(...) that was nice about the locking and the key thing, it wasn’t just a radio wave or not something that sets something off, it actually felt like it was mechanical and a quite old fashioned safe kind of feeling”, and Ana states: “It’s being able to shut it away and keep it private between you two without other people being able to invade it if that makes sense”. Thus, in the results on the perception of the Lovers’ box as a beautiful, tactile jewellery box, we agree with Gaver et al. (2010) that the materiality and physicality of technological artefacts has an important bearing on their interpretation and acceptance.

The combination of old materials (wood, leather, metal) and new technology (screen, RFID key), was difficult for participants to grasp. Many described it as mixing *old* (e.g. old fashioned interaction, traditional, tactile, archaic look) (6) and *new* (e.g. modern idea; visual & sound, video, plastic key) (6) together in one box. The appearance of a screen within a wooden box and the usage of a ‘sensor’ key was experienced as *unexpected* (2), *strange* (1) or *quite weird* (2). In this sense, Lucy describes their box and corresponding

key: “So it’s like they are related but it doesn’t seem like they should be”. Ana says about her shared box: “(...) it doesn’t look like it should be a digital object if that makes sense, because it’s wooden and it locks and stuff”. In this sense, digital technology wasn’t the first thing participants thought about when they saw the box, and even later some stated that the box “isn’t like a new visual media thing” (Lucy). Thus, the Lovers’ box was perceived as a novel artefact composed of analogue and digital materials (Robles and Wiberg, 2010), felt unfamiliar to participants, and thus seemed to support individuals’ reflection on its purpose and meaning (Bell et al., 2005).

However, participants criticised the weight and size of the box as *quite heavy* (3), *cumbersome* (2) and sometimes *uncomfortable to carry* (3); and suggested *improving the sound quality* (2) of the incorporated speaker. The interaction with the box (e.g. triggering of the video) was described as *easy* (8). Interestingly, the evaluation of the time it took the box to turn on was polarised: whereas Jim and Ana said the start-up time could have been shorter, Phil described the delay as increasing his anticipation. He described it like “waiting for an event”, or: “(...) for me it means you’re actually thinking about it more and you’re looking at it more. If you wait for something to happen you may as well make sure you actually watch it properly”. This notion fits quite well to what Hallnäs and Redström (2001) term ‘slow technology’. In their approach on designing for reflection they suggest giving individuals indeed time to think and reflect on technology instead of focusing on efficiency in performance.

### 5.2.3. Personal interpretation and appropriation of the Lovers’ box

5.2.3.1. *Physical placement.* Most participants stored their Lovers’ box in their bedroom, either on the bedside table or on their desk. Phil placed it above his fireplace in the living room and watched the videos on the kitchen bench, as “it probably is like kinda... a place where I’m happiest in the house maybe or something like that, (...) it’s a place where I do enjoy doing things “. He is a passionate cook.

5.2.3.2. *Start-up sound.* Start-up sounds that played to signal to participants that the box is ready to be used, were on average  $M = 6$  s ( $min = 2$ ,  $max = 12$ ) in duration and mainly unrelated to the video messages although these were used by participants as an extra “surprise” for the partner. The sounds chosen were either snippets of a comic nature, songs, animal sounds, a jingle or something to welcome the partner in a personal way (e.g. ‘Hey Nico’). Kate, Lucy and Nico found it “funny” to add new sounds, whereas Jim preferred not to change the sound too often and to treat it more like a “ring tone” for the box, where just certain sounds would be appropriate, so that “it makes a specific sound and you know that sound means (...) that the box is going to open”.

5.2.3.3. *Box parameter.* Through the box’s parameters participants had the chance to individually determine when

the video could be watched by the partner. Moreover, it was open to them how many videos they created and how they would schedule them. Participants used this feature five times: twice to set the video that it can be played only on a particular day, once such that it plays only between 9 am and 12 am on a certain day, once such that it plays once anytime on a particular day, and one participant made a two-part message where one half of the video was available only in the morning and the other one only in the evening of a particular day. Even this facility to set the time that a message could be played was intended to foster creativity, and was appreciated as a “good idea” (Nico, Lucy, Ana), they also considered it to be a somewhat undesirable restriction. All participants liked and preferred it most, when the partner was allowed to see the messages whenever they wanted. Jim ascribed this to the requirements of his work life as Lucy explained, “I didn’t change the timing-um-cause Jim is working so I don’t know when he gets time to watch it”. Similarly, Julia states “He can see it any time, ‘cause, don’t wanna say he can only see it on an evening ‘cause he’s got such a busy schedule”. In those couples who used these box parameters participants expressed a wish to be able to see the video more often (e.g. Ana, Nico). At the same time, this property was described by Ana as an “intense” experience: “I think that adds to the sentimental value of it, being able to just keep it for that little moment kind of thing. You have to put your full attention on it and appreciate it for what it is”. Over time, participants increasingly customised the features offered through the box. A longer study is required to explore how this would affect individuals’ experiences and their appropriation of the artefact.

5.2.3.4. *Routine of watching.* The two couples that fully participated in the project over the course of five weeks reported that the exchange became a kind of a “routine” (Nico) since they had to see each other regularly. Ana, Jim and Lucy described how the handing over of the box, was the first thing they did, when they saw each other after a new video had been created. After the handover, the receiving partner either watched the new video alone (but in the presence of the partner), or watched it together with the partner. The co-located nature of the exchange, where the giver of the box is present while the partner ‘opens’ the box adds a very significant quality to the experience. However, no ritualistic habits in addition to the exchange as it was pre-defined by the study design or around watching the box evolved. Indeed, the exchange rather resembles the giving of a gift (Mauss, 1997) to a beloved partner each week.

5.2.3.5. *Personal functions of the box.* Since participants’ conception of the Lovers’ box was more open-ended at the beginning of the study, participants were asked in the concluding interview if they assigned it a role, and what kind of purpose the box had for them personally. For Lucy and Nico the exchange “added something” (Nico) to their

relationship, like an additional shared activity between them, “almost like a hobby” (Nico). Lucy said in this regard: “It was almost like something that we both did, I guess it was something, it was like another thing in common maybe. (...) Even though I suppose we made the messages apart it was something that we did together”. For Jim, the Lovers’ box was another way of saying something to his partner, like “a different form of the same message”. He describes the box in this regard as “a box of tricks”, and associates it with “magic”, since “there’s all sort of things going on in there that you just don’t know until you actually open it”. Julia and Phil interpreted their box as a keepsake whose “function really is to keep something safe and precious” (Julia) like “something [that] you would hide under the bed and put away somewhere really, really carefully” (Phil). Ana also saw her Lovers’ box as “a digital storybook, because it is like playing a little message that is part of your life”. She further associated the box with certain positive values, achieved through the videos and the positive experiences evoked and displayed through them; “When I do look at the box I think of the funny videos. You know how you can assume, you can associate things. I associate it with laughter and nice messages and closeness and personal intimacy and stuff. So I do view it as a very personal and positive,... I look at it as a very positive thing for me” (Ana).

Another perceived role of the box was the provision of a sense of what a partner is thinking about. For Nico, the shared box is “a gateway to Ana’s mind” because whenever he looked at it, he saw something humorous that she made. Equally, Ana “always looked forward to seeing what he did. I’m trying to put it, like curious about his ideas kind of thing. Because it is like putting a little idea of yourself into the box and then giving it someone really isn’t it?” Jim mentioned for instance: “I can tell that other things are on Lucy’s mind though”. Phil said about a message of Julia: “(...) it gives you like a snapshot into that person”. Collectively these comments demonstrate that the messages indeed seemed to make aspects of a partner, her or his thoughts, feelings and views on the relationship, more apparent (Fleck, 2009; Sengers et al., 2005).

*5.2.3.6. Meaningful relationship to the Lovers’ box.* Of the six participants that engaged in the study beyond the first week, five reported that the Lovers’ box became in some way meaningful to them. One couple (Lucy and Jim) ascribed the meaning mainly to the messages that were passed using the box, seeing the meaning of the Lovers’ objects in “their purpose and what they do and what’s inside them really” (Jim). Whilst, one partner of another couple (Nico) reported that the five weeks of the study, and the fact that they got used to the box and integrated it in a routine of watching the videos, made the box meaningful to him. Thus, the relationships between objects and individuals are not only informed by the materials, but also of meanings and competences assigned to the artefact (Shove et al., 2007). Moreover, this result echoes findings of both Overbeeke et al. (2003) and

Zimmerman (2009) who claim that people get more attached to objects they repeatedly use in activities that give their lives significance, that they incorporate into relationships, and around which they develop certain routines.

Most interestingly, when participants were asked if they would have liked to continue with the message exchanges, all responded positively. Julia for instance said: “I was thinking about it constantly, and I’m, in fact I’m still thinking about it, I’m thinking ‘Oh what would we have done?’ or ‘What would I have done next?’”, and Lucy stated: “Oh, we wish we could spend longer on it”. In addition, five of the six participants mentioned that they showed the box to friends or family members (e.g. sister, mother). Just one person showed a video as well, as most felt that the content should only be shared between the partners. Four participants also said that they will *miss* their box and the interaction with it, which demonstrates that some participants were indeed very engaged in the project (cf. Gaver et al., 2009).

### 5.3. Limitations

Even though participants said they liked working with the media artist, and saw in her a support for the creation of their content, the inclusion of a third person between the dyad is a disturbing and restricting factor on the degree of intimacy and creativity that can be realised in the video content (cf. Höök et al., 2008; Kaye, 2004; McCarthy et al., 2006). In future designs, alternative ways for the creation and transfer of the Lovers’ messages should be considered, to allow even more personal and private communication between partners. During the project, participants also articulated the wish to have access to all created messages at any time. Within the Lovers’ study, the box was set up to play only the latest video. Accessibility to all messages could further facilitate the building of a history around the Lovers’ box. Such an amplification of the history and relations between individuals and artefact could serve as additional source for reflection (Hallnäs and Redström, 2001; Lindley et al., 2009; Pierce, 2009).

Even though we aimed to provide with the Lovers’ box a very personal object and space for personal, intimate and meaningful communication between partners, we did not systematically investigate in how far the reflective values of this novel artefact compare to other more common means of interpersonal communication (e.g. emails, text messages via phone; cf. Taylor and Harper, 2003) within romantic relationships. A final limitation of the study is the small and rather narrow group of participants. Consequently, we therefore have to be careful with regards to claims as to the transferability of results. Romantic relationships in particular are idiosyncratic and differ highly in the extent to which intimacy and interpersonal closeness grows (Levinger, 1980). However, we firmly believe that the explorative character of the study has provided a valuable lens onto reflection on meaningful personal relationships and digital design.

## 6. Conclusion

The aesthetic of the Lovers' objects, the mix of the antique wooden box that has to be unlocked with a physical key and the digital screen whose content is triggered through an atypical interaction, opens a new space for individuals to explore and reflect on, but also enables multiple interpretations of what the digital artefacts can be or mean to them. The appearance and perception of the Lovers' box as an interactive storybook or jewellery box, to be treated carefully and stored safely, distinguishes it from more traditional and function-orientated media such as mobile phones or laptops. Even though Taylor and Harper (2003) showed that text-messaging (via mobile phones) between young people is used to cement important social relationships, and that these texts can be of significance and considered as gifts (Mauss, 1997), the Lovers' artefact is intended as a more appropriate and expressive context for the exchange of intimate messages. The box frames the content (literally and metaphorically) for a very personal and perhaps more meaningful communication between lovers, is less restricted in the extent to which multi-media formats can be displayed (compared to text only), and allows further customizations. In addition, the Lovers' box, as a private object shared within the dyad, enables individuals to lock their personal content and, as results show, give it a place within their relational lives by integrating it in a routine of mutual exchanges, and by assigning roles of individual value to it (Dunne, 2006; Shove et al., 2007; Silverstone et al., 1992). Although for some participants the significance of the Lovers' box was not on par with the meaning of the messages themselves and the new shared activity of the couple; others described a relationship with the digital artefacts, and reported that they will miss the interaction with them.

As we hoped, participants indeed created messages of positive and personal content for each other. Thus, the exchange of the Lovers' objects was not only an opportunity for more frequent interaction with the beloved person (*need to belong*; Baumeister and Leary, 1995; Grau, 2003) but also a process of giving and receiving significant content through which one may feel loved, understood or emotionally supported by the partner (*need for intimacy*; Cunningham and Barbee, 2000; Larson et al., 1998; Moss and Schwebel, 1993; Schäfer and Olson, 1981). The fact, that all participants anticipated the receipt of messages underlines the positive qualities of the exchange as a satisfying and rewarding experience. The beneficial potential of the Lovers' objects within these exchanges became even more apparent as they were not only passed between partners as singular material gift, but provided the opportunity to watch and experience the meaningful content together and whenever wanted, since it was 'embedded' in their Lovers' box (cf. Hallnäs and Redström, 2002; Olivier and Wallace, 2009).

The Lovers' box and the co-creation of video messages with the media artist, motivated couples to reflect on their relationship (e.g. how to delight the partner personally).

Some of the videos created indeed displayed elements of participants' lives, aspects that they felt to be significant, that had personal meaning to them. Reflection on the relationship rendered certain important aspects conscious, for instance beliefs, values or thoughts of each partner, or significant events and shared experiences from individual perspectives, and as such, provided new insight into the partnership (Fleck, 2009; Norman, 2004; Sengers et al., 2005). Following Galloway (2003), presenting oneself to another, becoming more familiar with each other, means to be intimate (cf. Cunningham and Barbee, 2000; Moss and Schwebel, 1993). In addition, mere engagement with another person as well as stimulated talks or questioning further encourage reflective processes (Morris, 2009). Thus, the creation of video messages required and stimulated reflection, but its consumption also served as source for reflection (Sengers et al., 2005). Results of the Lovers' study show that the videos made seemed to mirror parts of the couples' relationship (cf. relational level of communication: Dindia, 1997; Watzlawik et al., 2003; Wood, 2000), and as such allowed a definition of the partnership (Burlison et al., 2000). Furthermore, individuals might reflected on the degree to which they are satisfied with the partnership, and in how far it meets their needs. This can strengthen a satisfactory relationship and reinforce what exists between the partners, but it can similarly highlight deficiencies, that could for instance stimulate an adjustment for the better (cf. corrective action, Clippingdale et al., 2009), or, in some cases, also lead to a dissolution. Thus, the Lovers' box can also be seen as a qualitative evaluation method to observe, in part through the videos, individual behaviour and social interaction within a partnership (Allen and Walker, 2000).

Our work presented several ways in which reflection can be stimulated. The combination of different yet familiar materials to create the novel Lovers' artefact, made participants initially struggle to understand its place in their lives. This ambiguity of relation (Gaver et al., 2003) and the unfamiliarity of the object (Bell et al., 2005; Hallnäs and Redström, 2001; Sengers and Gaver, 2006) led participants to reflections on the objects' meaning and its personal purpose for them. Moreover, within the study, reflection on personal experience within the romantically involved couples was stimulated through an effortful creation, sharing and display of video messages. This gave participants reason and time to reflect on their relationship and the beloved partner, but also led them to determine for themselves the content and starting point of the reflective activity. We see this as a particular strength, especially when compared with life logging approaches, where designers and developers seek to extract of "relevant" content and represent it back to the user (Byrne and Jones, 2009; Lindley et al., 2009; Shove et al., 2007).

In summary, the Lovers' box can be seen as a primarily self-related, intrinsic artefact designed to frame a very personal context for intimate, meaningful interpersonal communication and reflection within romantic relationships. The individual interpretation and appropriation of

the Lovers' artefact is informed by its form, materials and given functions. The relationship between the Lovers' box and the couple evolves through interaction with it and its incorporation into individuals' relational lives. Thus, the box can become a valuable extension of the relationship, as it enables reflection on embedded personal intimate and meaningful experiences of the past, the display of relevant topics of the present, and allows the anticipation of shared future events. Related reflective processes both support individuals in evaluating their relationship and increase their mutual knowledge. A better understanding of each other, in addition to the positive shared activity of exchanging significant gifts, provides the potential to bring partners in satisfied relationships personally and emotionally 'closer', and thus, to support their well-being.

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### References

- Allen, K.R., Walker, A.J., 2000. Qualitative research. In: Hendrick, C., Hendrick, S.S. (Eds.), *Close Relationships*. Sage Publications, Thousand Oaks, London, New Delhi, pp. 19–30.
- Baumeister, R.F., Leary, M.R., 1995. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin* 117 (3), 497–529.
- Belk, R.W., 1988. Possessions and the extended self. *Journal of Consumer Research* 15 (2), 139–168.
- Bell, G., Blythe, M., Sengers, P., 2005. Making by making strange: defamiliarization and the design of domestic technology. *Transactions on Computer–Human Interaction* 12 (2), 149–173.
- Berscheid, E., 1983. Emotion. In: Kelley, H.H., Berscheid, E., Christensen, A., Harvey, J.H., Huston, T.L., Levinger, G., McClintock, E., Peplau, L.A., Peterson, D.R. (Eds.), *Close Relationships*. Freeman and Company, New York, pp. 110–168.
- Blythe, M., Hassenzahl, M., 2003. The semantics of fun: differentiating enjoyable experiences. In: Blythe, M., Overbeeke, K., Monk, A., Wright, P. (Eds.), *Funology: From Usability to Enjoyment*. Kluwer Academic Publisher, Norwell, MA, pp. 91–100.
- Boehner, K., DePaula, R., Dourish, P., Sengers, P., 2005. Affect: from information to interaction. In: *Proceedings of the Conference on Critical Computing Conference: Between Sense and Sensibility*, pp. 59–68.
- Brave, S., Dahley, A., 1997. In touch: a medium for haptic interpersonal communication. *Extended Abstracts on Human Factors in Computing Systems*, 363–364.
- Brewer, J., Kaye, J.J., Williams, A., Wyche, S., 2006. Sexual interactions: why we should talk about sex in HCI. *Extended Abstracts on Human Factors in Computing Systems*, pp. 1695–1689.
- Brown, T.J., 2009. Self-informatics: considerations for designing technology which supports user reflection. *CHI Workshop on Designing for Reflection on Experience*, from <http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/Brown.pdf>.
- Buchenau, M., Suri, J.F., 2000. Experience prototyping. In: *Proceedings of the Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, pp. 424–433.
- Burleson, B.R., Metts, S., Kirch, M.W., 2000. Communication in close relationships. In: Hendrick, C., Hendrick, S.S. (Eds.), *Close Relationships*. Sage Publications, Thousand Oaks, London, New Delhi, pp. 245–258.
- Byrne, D., Jones, G.J.F., 2009. Creating stories for reflection from multimodal lifelog content: an initial investigation. *CHI Workshop on Designing for Reflection on Experience*. Retrieved January 8th 2009, from <http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/Byrne.pdf>.
- Chen, C.-Y., Forlizzi, J., Jennings, P., 2006. ComSlipper: an expressive design to support awareness and availability. *Extended Abstracts on Human Factors in Computing Systems*, 369–380.
- Clark, H.H., 1996. *Using Language*. Cambridge University Press, Cambridge, GB, pp. 92–251.
- Clippingdale, B., Newman, M.W., Pollack, M.E., Fauman, M.A., 2009. Reflecting on mood and movement. *CHI Workshop on Designing for Reflection on Experience*. Retrieved January 8th 2009, from <http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/Clippingdale.pdf>.
- Cunningham, M.R., Barbee, A.P., 2000. Social support. In: Hendrick, C., Hendrick, S.S. (Eds.), *Close Relationships*. Sage Publications, Thousand Oaks, London, New Delhi, pp. 273–285.
- Dalgaard, P., 2008. Designing for inquisitive use. In: *Proceedings of the Conference on Designing Interactive Systems*, pp. 21–30.
- Dindia, K., 1997. Self-disclosure, self-identity, and relationship development: a transactional/dialectical perspective. In: Duck, S. (Ed.), *Handbook of Personal Relationships*, Vol. 2. John Wiley & Sons, Chichester, pp. 412–426.
- Djajadiningrat, T., Overbeeke, K., Wensveen, S., 2002. But how, Donald, tell us how? On the creation of meaning in interaction design through feedforward and inherent feedback. In: *Proceedings of the Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, pp. 285–291.
- Dourish, P., 2001. *Where the Action is: The Foundations of Embodied Interaction*. MIT Press, Cambridge, MA.
- Dunne, A., 2006. *Hertzian tales: electronic products, aesthetic experiences, and critical design*. MIT Press, Cambridge, MA, pp. 1–81.
- Fleck, R., 2009. Supporting reflection on experience with SenseCam. *CHI Workshop on Designing for Reflection on Experience*. Retrieved January 8th 2009, from <http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/Fleck.pdf>.
- Galloway, A., 2003. Tracing technological intimacies: UbiComp assemblages. *UbiComp Workshop on Intimate Ubiquitous Computing*, pp. 19–22.
- Gaver, B., 2002. Provocative awareness. *Computer Supported Cooperative Work* 11, 475–493.
- Gaver, B., Martin, H., 2000. Alternatives: exploring information appliances through conceptual design proposals. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 209–216.
- Gaver, W., Beaver, J., Benford, S., 2003. Ambiguity as a resource for design. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 233–240.
- Gaver, W., Blythe, M., Boucher, A., Jarvis, N., Browsers, J., Wright, P., 2010. The prayer companion: openness and specificity, materiality and spirituality. In: *Proceedings of the International Conference on Human Factors in Computing Systems*, pp. 2055–2064.
- Gaver, W., Bowers, J., Kerridge, T., Boucher, A., Jarvis, N., 2009. Anatomy of a failure. How we knew our design went wrong, and what we learned from it. In: *Proceedings of the International Conference on Human Factors in Computing Systems*, pp. 2213–2222.
- Glaser, B., Strauss, A., 1967. *The Discovery of Grounded Theory*. Adline Publishing Company, Chicago.
- Goodman, E., Misilim, M., 2003. The sensing beds. *Ubi-Comp Workshop on Intimate Ubiquitous Computing*, pp. 23–25.

- Grau, I., 2003. Emotionale Nähe [Emotional closeness]. In: Grau, I., Bierhoff, H.-W. (Eds.), *Sozialpsychologie der Partnerschaft [Social Psychology of Partnerships]*. Springer, Berlin, Heidelberg, pp. 285–314.
- Guerrero, L.K., Andersen, P.A., 2000. Emotion in close relationships. In: Hendrick, C., Hendrick, S.S. (Eds.), *Close Relationships*. Sage Publications, Thousand Oaks, London, New Dehli, pp. 171–183.
- Hallnäs, L., Redström, J., 2001. Slow technology – designing for reflection. *Personal and Ubiquitous Computing* 5, 201–212.
- Hallnäs, L., Redström, J., 2002. From use to presence: on the expressions and aesthetics of everyday computational things. *Transactions on Computer–Human Interaction* 9 (2), 106–124.
- Hassenzahl, M., 2001. The effect of perceived hedonic quality on product appealingness. *International Journal on Human–Computer Interaction* 13 (4), 481–499.
- Hassenzahl, M., 2004. The interplay of beauty, goodness, and usability in interactive products. *Human–Computer Interaction* 19 (4), 319–349.
- Hassenzahl, M., Tractinsky, N., 2006. User experience – a research agenda. *Behavior & Information Technology* 25 (2), 91–97.
- Hendrick, S.S., 1988. A generic measure of relationship satisfaction. *Journal of Marriage and the Family* 50, 93–98.
- Hendrick, S.S., Dicke, A., Hendrick, C., 1998. The relationship assessment scale. *Journal of Social and Personal Relationships* 15, 135–142.
- Hinde, R.A., 1979. *Towards Understanding Relationships: Exchange and Interdependence Theories*. Academic Press, London, pp. 211–232.
- Höök, K., Ståhl, A., Sundström, P., Laakolahti, J., 2008. Interactional empowerment. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 647–656.
- Hopper, R., Knapp, M.L., Scott, L., 1981. Couples' personal idioms: exploring intimate talk. *Journal of Communication* 31 (1), 23–33.
- Howitt, D., Cramer, D., 2008. *Introduction to Research Methods in Psychology, Vol. 2*. Pearson Prentice Hall, Gosport, UK, pp. 318–332.
- Jordan, P.W., 1998. Human factors for pleasure in product use. *Applied Ergonomics* 29 (1), 25–33.
- Jordan, P.W., 2000. *Designing Pleasurable Products: An Introduction to New Human Factors*. Taylor & Francis, London.
- Kalicki, B., 2003. Attribution in Partnerschaften [Attribution in partnerships]. In: Grau, I., Bierhoff, H.-W. (Eds.), *Sozialpsychologie der Partnerschaft [Social Psychology of Partnerships]*. Springer, Berlin, Heidelberg, pp. 377–402.
- Kaptelinin, V., Nardi, B., 2006. *Acting with Technology: Activity Theory and Interaction Design*. MIT Press, Cambridge, MA, pp. 1–116.
- Kaye, J.J., 2004. Intimate objects: a site for affective evaluation. *Workshop: Innovative Approaches to Evaluating Affective Interfaces*, pp. 1–4.
- Kaye, J.J., 2006. I just clicked to say I love you: rich evaluations of minimal communication. *Extended Abstracts on Human Factors in Computing Systems*, 363–368.
- Kelley, H.H., 1967. Attribution theory in social psychology. *Nebraska Symposium on Motivation* 15, 192–238.
- Larson, J.H., Hammond, C.H., Harper, J.M., 1998. Perceived equity and intimacy in marriage. *Journal of Marital and Family Therapy* 24, 487–506.
- Levinger, H., 1980. Toward the analysis of close relationships. *Journal of Experimental Social Psychology* 16, 510–544.
- Lindley, S.E., Randall, D., Glancy, M., Smyth, N., Harper, R., 2009. Reflecting on oneself and on others: multiple perspectives via sensecam. *CHI Workshop on Designing for Reflection on Experience*. Retrieved January 8th 2009 from <<http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/lindley.pdf>>.
- Lindström, M., Ståhl, A., Höök, K., Sundström, P., Laakolahti, J., Combetto, M., Taylor, A., Bresin, R., 2006. Affective diary – designing for bodily expressiveness and self-reflection. *Extended Abstracts on Human Factors in Computing Systems*, 1037–1042.
- Mauss, M., 1997. *The Gift: The Form and Reason for Exchange in Archaic Societies*. Routledge, London.
- McCarthy, J., Wright, P., 2004. *Technology as Experience*. MIT Press, Cambridge, MA, pp. 49–130.
- McCarthy, J., Wright, P., Wallace, J., Dearden, A., 2006. The experience of enchantment in human computer-interaction. *Personal and Ubiquitous Computing* 10, 369–378.
- Morris, R., 2009. Supporting collaboration and reflection with digital tabletops. *CHI Workshop on Designing for Reflection on Experience*. Retrieved January 8th 2009, from <<http://www.comp.lancs.ac.uk/~corina/CHI2009Workshop/Papers/morris.pdf>>.
- Moss, B.F., Schwebel, A.I., 1993. Defining intimacy in romantic relationships. *Family Relations* 42, 31–37.
- Mueller, F.F., Vetere, F., Gibbs, M.R., Kjeldskov, J., Pedell, S., Howard, S., 2005. Hug over a distance. *Extended Abstracts on Human Factors in Computing Systems* 1873–1676.
- Norman, D., 2004. *Emotional Design*. Basic Books, New York, pp. 63–98.
- Olivier, P., Wallace, J., 2009. Digital technologies and the emotional family. *International Journal of Human–Computer Studies* 67 (2), 204–214.
- Overbeeke, K., Djajadiningrat, T., Hummels, C., Wensveen, S., Frens, J., 2003. Let's make things engaging. In: Blythe, M., Overbeeke, K., Monk, A., Wright, P. (Eds.), *Funology: From Usability to Enjoyment*. Kluwer Academic Publisher, Norwell, MA, pp. 7–17.
- Paulos, E., Beckmann, C., 2006. Sashay: designing for wonderment. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 881–884.
- Picard, R.W., 2000. *Affective Computing*. MIT Press, Cambridge, MA.
- Pierce, J., 2009. Material awareness: promoting reflection on everyday materiality. *Extended Abstracts on Human Factors in Computing Systems*, 4459–4464.
- Prager, K.J., 2000. Intimacy in personal relationships. In: Hendrick, C., Hendrick, S.S. (Eds.), *Close Relationships*. Sage Publications, Thousand Oaks, London, New Dehli, pp. 229–242.
- Robles, E., Wiberg, M., 2010. Texturing the “Material Turn” in interaction design. In: *Proceedings of the International Conference on Tangible, Embedded, and Embodied Interaction*, pp. 127–144.
- Rusbult, C.E., 1980. Commitment and satisfaction in romantic associations: a test of the investment model. *Journal of Experimental Social Psychology* 16, 172–186.
- Rusbult, C.E., 1983. A longitudinal test of the investment model: the development (and deterioration) of satisfaction and commitment in heterosexual involvements. *Journal of Personal and Social Psychology* 45, 101–117.
- Sas, C., Dix, A., 2009. Designing for reflection on experience. *Extended Abstracts on Human Factors in Computing Systems*, 4741–4744.
- Schäfer, M.T., Olson, D.H., 1981. Assessing intimacy: the pair inventory. *Journal of Marital and Family Therapy* 7 (1), 47–60.
- Seligman, M., Csikszentmihalyi, M., 2000. Positive psychology: an introduction. *American Psychologist* 55 (1), 5–14.
- Sengers, P., Boehner, K., David, S., Kaye, J.J., 2005. Reflective design. In: *Proceedings of the Conference on Critical Computing: Between Sense and Sensibility*, pp. 49–58.
- Sengers, P., Gaver, B., 2006. Staying open to interpretation: engaging multiple meanings in design and evaluation. In: *Proceedings of the Conference on Designing Interactive Systems*, pp. 99–108.
- Shove, E., Watson, M., Hand, M., Ingram, J., 2007. *The Design of Everyday Life*. Berg, Oxford, pp. 2–152.
- Silverstone, R., Hirsch, E., Morley, D., 1992. Information and communication technologies and the moral economy of the household. In: Silverstone, R., Hersch, E. (Eds.), *Consuming Technologies: Media and Communication in Domestic Spaces*. Routledge, London, New York, pp. 15–31.
- Sternberg, R., 1997. Construct validation of a triangular love scale. *European Journal of Social Psychology* 27, 313–335.
- Strong, R., Gaver, B., 1996. Feather, scent and shaker: supporting simple intimacy. In: *Proceedings of the Computer Supported Cooperative Work*, pp. 1–2.
- Taylor, A.S., Harper, R., 2003. The gift of the gab?: a design oriented sociology of young people's use of mobiles. *Computer Supported Cooperative Work* 12, 267–296.

- Thibaut, J., Kelly, H., 1959. *The Social Psychology of Groups*. Wiley, New York, pp. 9–50.
- Tollmar, K., Persson, J., 2002. Understanding remote presence. In: *Proceedings of the NordiCHI Conference on Human-Computer Interaction*, pp. 41–48.
- Tsujita, H., Tsukada, K., Siio, I., 2007. SyncDecor. Appliances for sharing mutual awareness between lovers separated by distance. *Extended Abstracts on Human Factors in Computing Systems*, 2699–2704.
- Vetere, F., Gibbs, M.R., Kjeldskov, J., Howard, S., Mueller, F., Pedell, S., Mecoles, K., Bunyan, M., 2005. Mediating intimacy: designing technologies to support strong-tie relationships. In: *Proceedings of the International Conference on Human Factors in Computing Systems*, pp. 471–480.
- Walester, E., Walester, W.W., Berscheid, E., 1978. *Equity: Theory and Research*, Allyn and Bacon, Boston (MA), pp.1–185.
- Wallace, J., 2007. *Emotionally charged: a practice-centered enquiry of digital jewellery and personal emotional significance*. Doctoral Thesis, Sheffield Hallam University, United Kingdom.
- Wallace, J., Press, M., 2004. All this useless beauty. *The Design Journal* 7, 2.
- Waring, E.M., 1984. The measurement of marital intimacy. *Journal of Marital and Family Therapy* 10 (2), 185–192.
- Watzlawik, P., Beavin, J.H., Jackson, D.D., 2003. *Menschliche Kommunikation: Formen, Störungen, Paradoxien* [Human Communication: Forms, Disruptions, Paradoxes], Vol. 10. Hans Huber, Berlin, pp. 1–170.
- Willig, C., 2008. *Introducing Qualitative Research in Psychology*, Vol. 2. Open University Press, New York, NY, pp. 34–51.
- Wood, J.T., 2000. Relational culture: the nucleus of intimacy. In: Wood, J.T. (Ed.), *Relational Communication: Continuity and Change in Personal Relationships*, Vol. 2. Wadsworth, Belmont, CA, pp. 76–100.
- Wright, P., McCarthy, J., 2010. Experience-centered design: designers, users, and communities in dialogue. *Synthesis Lectures on Human-Centered Informatics* 3 (1), 1–123.
- Wright, P., Wallace, J., McCarthy, J., 2008. Aesthetics and experience-centered design. *Transactions on Computer-Human Interaction* 15, 4.
- Zimmerman, J., 2009. Designing for the self: making products that help people become the person they desire to be. In: *Proceedings of the International Conference on Human Factors in Computing Systems*, pp. 395–404.