

I Just Clicked To Say I Love You: Rich Evaluations of Minimal Communication

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ABSTRACT

In this paper, I present the results of a study of “Minimal Intimate Objects” or MinIOs: low bandwidth devices for communicating intimacy for couples in long-distance relationships. MinIOs were designed to explore the possibility of expressing something as rich as intimacy over a low bandwidth connection. I wanted to build devices that would enable both designers and users to reflect on the relationship, the technology, and the role of the technology in mediating the relationship. Users constructed a complex, dynamically changing understanding of the meaning of each interaction, based on an understanding of their and their partner’s context of use. I suggest that the minimal nature of the device allowed for rich and complex interpretations of an otherwise simple communication, and that this model may be useful for understanding other forms of simple computing.

Introduction

Geographical separation can put a strain on the most intimate of romantic relationships. It is hard to sustain feelings of intimacy without touching, seeing, smelling, and hearing your significant other. Some traditional information processing views see this as problem of bandwidth: without channels with sufficient bandwidth for full haptic, visual, olfactory and auditory communication. Therefore, that to increase feelings of intimacy, all that’s necessary to do is to increase the bandwidth.

In this study, in collaboration with Mariah Levitt, Jeff Nevins, Vanessa Schmidt and Jessica Golden¹ [5], I explored the opposite possibility: adding a single-bit medium of communication for couples in long distance relationships that nonetheless allows each partner opportunities for rich interpretation. To encourage this rich interpretation, we had our users fill out a daily diary that provoked reflection on their relationship, the technology and the study itself.

The experiences of our subjects in our pilot study, as presented here, suggest that the addition of a single bit to a repertoire of existing high-bandwidth communication channels can have a rich and powerful interpretation because it is situated in an emotionally and socially rich pre-existing relationship.

¹ A group herein referred to as *we*.

MINIOs: Tools for Minimal Communication

“Minimal Intimate Objects” or MinIOs are low bandwidth devices for couples to communicate intimacy. These MinIOs are designed to be used in pairs, one for each member of a couple. We designed and implemented two different versions of the MinIOs. Our first design was the PIO, or *Physical Intimate Object*, based on a Rabbit Semiconductor RCM 3710 board in an Altoids box with a large LED and a button, shown in Figure 1.



Figure 1: Physical Intimate Objects, or PIOs

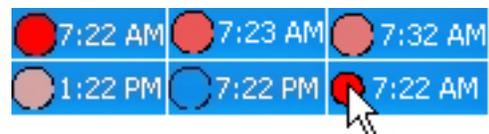


Figure 2: Virtual Intimate Object (VIO) in taskbar, showing color changes over a twelve hour period. Note initial rapid fading in top line. The final image displays the remote partner’s button state on mouseover.

When the button on one PIO is pressed, the LED on the other shines brightly, and then fades over time. To experiment with different implementations of the same basic system, we also designed the VIO, or *Virtual Intimate Object*, which appeared as a circle in the user’s Windows taskbar. The VIO works in a similar way: when the circle is clicked, the other user’s circle turns bright red, and then fades over time. This process is shown in Figure 2.

In both cases it was possible to see the current colour of your partner’s display: the PIO has a small LED that is the same brightness as your partner’s large LED, and the VIO displays your partner’s status on mouseover, as shown in

Figure 2. Both fade quickly initially and then slowly, remaining dim for a long time, finally turning off after twelve hours.

Pilot Study

We recruited ten couples in long distance relationships for a week-long pilot study, in which they used their intimate object and filled out a daily logbook reporting on their experience. Those in the VIO group were given instructions to download the VIO software; those in the PIO group were given a PIO each. Each participant was also sent a package by mail that contained instructions, an informed consent form, pre- and post-test questionnaires, and a daily logbook. They were also provided with a pre-stamped and pre-labeled envelope for returning the materials at the end of the study.

The pre-test questionnaire focused on the current modes, frequency, and initiation of communication with their partner. Participants were asked to subjectively rate the effectiveness and level of intimacy of their current methods of communication, and to define their understanding of intimacy in their own words. Participants were informed that they could choose when and how much to use their intimate object during the course of the study, but that it would be available whenever they were using their computers. At the end of each day, they were to reflect on their experience with the device by answering a series of questions in the daily logbook. Once the couples had used their intimate objects for 7 days, they completed the post-test questionnaire. The post-test questionnaire was nearly identical to the pre-test questionnaire, but also sought overall reactions to their intimate objects, and whether the study had any noticeable effect on the participants' level of intimacy with their partner. When all stages of testing were complete, participants mailed back their test materials. Each couple was then thanked for their time, debriefed about the purpose of the experiment, and supplied with their own log data. Couples in the VIO group were also told they were free to continue using their VIOs after the end of the experiment if they so wished; couples in the PIO group were requested to return their devices to the researchers.

RICH EVALUATIONS

A key part of this study was the use of the logbook, which was a combination of standard Likkert-scale questions exploring user satisfaction and a series of open-ended questions. The Likkert scale questions were the same everyday: three questions about their satisfaction with their relationship and four questions about their satisfaction with their MinIO. When taken in aggregate, we were able to draw no statistically significant data from these questions, which is not surprising given the small sample size (n=10).

However, the open-ended questions turned out to give us a rich understanding of how users experienced their VIOs. These questions were modeled on the type of open-ended queries found in cultural probes[1]. The aim was to engage the users with the experience of using the intimate objects. We wanted to encourage users to reflect on their relationship

and the study itself, as well as their use of the intimate object. The first two questions each day asked the user to explain two of their answers to the Likkert scale questions. After that, the users were asked a daily changing set of open-ended questions.

For example, we asked users what song best represented their relationship, what kind of dance, what TV show, what season.. We asked our subjects what they would change about the VIO, and had them rate how intimate, how embarrassing and how enchanting they found the VIO on a 7-point scale. We also asked them to choose two other metrics and rate the VIO on their chosen metric in the same manner. We wanted to know what users thought about the study: we asked what they would name us, the researchers, what they thought the research was 'really about', and we asked them to tell us a better way to do the study.

Reflections

These three categories – reflections on the technology, the relationship and the study itself – were our own, private categorizations, and this structure wasn't explicit in the selection or layout of the logbook itself. However, as will become apparent, questions designed to be about one form of reflection turned out to give insights into other areas.

We found the results from these questions were extremely useful in designing the next stage of our research: they gave us both a rich understanding of the ways users experienced the current design, and inspiration for what to do next. We were inspired by the kind of open-ended questions found in cultural probes. While our primarily text-based logbook was perhaps impoverished when compared to the rich multimodal variety of cultural probes, we found it a successful evaluation tool, and aim to incorporate richer elements from cultural probes into our next evaluation.

RESULTS

The hardware version was not robust enough for reliable deployment 'in the wild', and so this analysis concentrates on the VIO.

Our aim with the logbook was to produce reflection by the users on the technology, on their relationship, and on the study itself, in the manner of reflective design. [11] The combined results of our ten subjects gave us a rich understanding of our users' experiences using their intimate objects, and we present those results here in detail. We feel that this level of detail gives an opportunity to understand the experience of using the VIO and the accompanying logbook, and demonstrates how we were able to reach some of our insights about our users' experiences and choices we made in the design of the next version of the VIO. However, we've found that presenting aggregate data in this manner can make the responses seem anecdotal, and don't give a full representation of any given couple's experience. To address that problem, we are highlighting the experience of one couple throughout the presentation of the results, Yumi and Sergio.

Yumi and Sergio² have been in a relationship for two and a half years; Yumi is a translator living and working in Japan, while Sergio is spending a year in Ithaca as a graduate student at Cornell, although he usually lives in Italy. They primarily communicate with each other in Italian. Both are in their mid-to-late twenties, and they live apart about 85% of the year. They were the most enthusiastic users of the VIO, once clicking a total of over 700 times in a single day. On average, they clicked 123 times a day over that course of the week: like 2 of our other couples, they have continued to use the VIO for the six months since that time, although with –understandably - lower clickrates. It is not that their story is typical of a couple using VIO; it is rather that it provides a powerful example of the role this simple technology can play in an already rich and complex relationship.

Pre-Test Questionnaire

We started our study by having users fill out a pre-test questionnaire. This asked some basic demographic information, and questions establishing the nature of the relationship: the amount of time couples spent together, and their reasons for being separated. We also asked our subjects what mediums they currently used to communicate with each other: all subjects reported they regularly used telephone, instant messaging and email.

Yumi and Sergio also reported they used Yahoo Messenger with a webcam and a headset as a low-cost and simple way to chat when they were both at home. On average, couples rated the level of intimacy in their communication 6.14 on a 7-point scale: Yumi and Sergio both rated this 6/7. On average, couples rated current methods of communication 5.29 effective in maintaining intimacy; Yumi and Sergio also both rated this 6/7.

All users reported that voice was their favorite means of communication, whether mediated through land lines, cell phone, or, like Yumi and Sergio, through the voice feature of instant messaging. Subjects explained that they felt that phone conversations were more emotionally revealing other media: *“I can convey emotion over the phone”, or “I can actually hear her voice and convey more emotion than thru. the other methods”, “subtleties of tone are impossible to convey over IM or email”.*

Defining intimacy is difficult, even for those who make that the focus of their research. [10] As such, we asked users to define intimacy in their own words as a first step in reflection. Their replies were careful and considered: one user wrote, *“I suppose intimacy is based on mutual sharing and trust. It's a trust unique to the relationship, and those two people alone can understand it. It's also understanding each other, and accepting what you don't without judging them (too much),”* and another saw it as *“The bond people share :personally, emotionally, and*

physically and having a knowledge and respect for a partner and as a couple”. Sergio described his understanding of intimacy as being *“Intimacy is the chance to speak about our deepest enthusiasm and frustration, without fear. Also it shows how we feel to reveal our sentiments towards each other”,* while Yumi wrote *“Well, for me intimacy is spend time together, talking and exchange ideas, laugh.”*

The last question in the pre-test asked users what they missed most about their partner. Two subjects wrote *cuddling, and snuggling.* Another pointed out *“I miss all the sensory aspects, like the way he smells, the way it feels to snuggle, all the mushy stuff. I miss it more when we're talking than when I'm completely alone.”* Yumi felt *“I miss to have a REAL date with him. Go out together, have a dinner and so on.”* while Sergio missed *“Every physical contact.”*

These replies are in line with the results we had gathered as part of our previous work [4] and with Kjeldskov et. al.'s cultural probe [6] exploring intimacy in cohabitating couples. While they are not problems solved by our current technology, they provide insights into possible areas for future research.

Reflection on the technology

Each day, we asked our users three Likkert-scale questions about the intimate object itself:

What is your overall attitude towards VIO today?

What is your overall interest level in VIO today?

How comfortable do you feel with VIO today?

As mentioned above, there was no noticeable trend in these values over time: the aggregate average answer to all three questions in our whole study was 4.3; Yumi and Sergio's ratings were higher, averaging out at 5.8 across the week. Sergio's ratings of the intimate object were consistently high; Yumi's rose from initial fours and threes to sevens across the board as she became more familiar with the technology.

Perhaps more revealingly, we also asked couples to explain their responses to one of the above questions each day. Sergio was comfortable with the VIO from the very beginning: on his first day, he wrote *“After using it a few times, I liked the simpleness of VIO. A very easy and fast way to say ‘I'm thinking of you now.’”*³ Yumi found the new technology more difficult to get used to: on the first day, she wrote *“I feel very strange with VIO installed in my computer. To see this red circle become more red or pink... I think I need more time to get use to it. I feel a little bit excited for this new thing.”* By midweek, the VIO had been integrated into their communication routines: Yumi wrote, *“At the beginning I feel a little bit*

³ This and all quotes are quoted verbatim from the subjects' responses, and are edited only for brevity, not for spelling or grammar.

² Names changed.

uncomfortable with VIO. A new thing to experiment, I was a little bit 'afraid' about a thing I don't really know. Now I feel really comfortable, and I have fun to use VIO."

Yumi also pointed out something many of our subjects observed: the private nature of VIO communication. "It is strange but from when we start to use VIO, we really enjoy our time. [...] Is something we can share only me and him. No one can see it or understand what it is this red circle. Is like a secret code. Often VIO for us is like a game." A desire for this private type of communication had been identified in previous work on intimacy in HCI [4, 6], and other studies of secrecy have suggested that shared secrecy can increase feelings of intimacy and friendship. [9]

Improving the VIO

We asked users what one thing they would change about their VIO. Many of these comments were about the rapid timing hard-coded into the VIO: it faded four levels of red in the first five minutes after a click, and users felt this was too fast. Sergio agreed with this: "I would like to make more evident the difference between colors fading and I would like something more to define the "reddest color" (for ex: a yellow circle)". Yumi was dissatisfied with the VIO being stuck in the taskbar: she wrote, "Well I can see Vio only on the bar down, so I have to see it looking down. It would be nice if vio will be something you can move around your desktop and put it where you prefer to be." Only one user suggested a mobile version: he said he would change "the fact that I can only use it when I'm on my computer cuz if I'm home and want to use it I have to turn it on and if I'm out I have to keep track that I want to click it."

We also asked subjects what was the worst intimate object they could think of. One user proposed "Something that is constantly with you - a button on your cell phone or other device that could be pushed and this signal transmitted to your partner at any time," while their partner wrote, "something you'd have to carry around that was large, cumbersome, and gaudy so it called others attention". It is interesting to contrast these answers to the mobile version of VIO suggested by another user above. Others played with the category of intimate object, answering "a spiky wet fish", "those Japanese man-pillows", and "a table." Yumi didn't answer this question, but Sergio described "One which doesn't stimulate imagination, that doesn't help you thinking that you're closer." We were interested to see this response that emphasized the importance of reflection, which we hadn't stated explicitly in the log book at any point.

We asked the users what sound they felt their VIO should make, were it to make a sound. One user wanted to hear her partner's voice saying "Hi", while he wanted to hear "A cutesy one like a female sigh or a fluttering heart beat or a simple ever so friendly beep to let me know I clicked it." One couple both picked "a moo", although we don't know whether this answer was a topic of explicit discussion or a

trope familiar to their relationship. One user wanted no sound at all, and another wanted a "kiss noise". Sergio requested "a soft whistle", while Yumi wanted "a short song I could pick myself." This diversity of results was significant in our decision to make it simple for users to specify the sound of their choice to accompany incoming clicks in VIO 2.0.

Understanding VIO Use

We wanted to understand under what circumstances users used their intimate object. For about half our users, this was tightly tied to their computer use: one couple both noted they only used it when they were already at the computer, although one of them also added that it was a response to when the VIO was looking washed out, rather than an explicit desire to communicate intimacy to their partner. However, for other users, their use of the VIO was premeditated: one subject wrote "... I try to keep track of the number of times she crosses my mind when I'm away + click it when I'm in..." Yumi was enthusiastic about the circumstances surrounding her VIO use: she wrote "Look down and see my Vio and Vio' partner pink near white. So I click on it and make RED! It makes me feel better and happy." Sergio wrote, "Anytime I was at the computer, because I wanted her to find it as red as it was possible, when she would have awoken."

We asked users to draw what they wished their intimate object really looked like. Yumi, who was our only subject filling out her diary on a computer screen rather than on paper, wrote "A small heart."; Sergio suggested alternate visualizations of the duration since the partner's last click in the form of a continuum between fully alert and sleeping elephants.

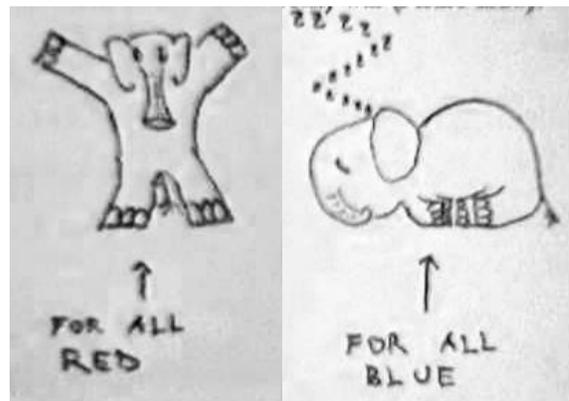


Figure 3: Sergio's proposed Intimate Object, with an alert elephant for the recently-clicked condition and a sleeping elephant for over twelve hours of inactivity. The drawings were subtitled *My Favorite Animal*

We also asked users to name their and their partner's VIOs. One user named both VIOs *George*; another named their VIO *Bethie's Love* and their partner's *Dave's Love*. Other names included *Runner* and *Flipper*, *Elliot* and *Maude*, and *Zit* and *Jacques*. Sergio described his VIO as *The Mouse*,

and Yumi's as *Little Dumbo*, no doubt inspired by his fondness for elephants. Yumi called hers *Topino* ('little mouse') and Sergio's *Pirilla* (a name she made up.)

Enriching Quantitative Evaluations

We also used variations on more traditional quantitative techniques to try and capture our users' experience with the technology: we asked users to rate how enchanting, intimate and embarrassing they felt the VIO was on a 7-point Likert scale, from Absolutely Not to Absolutely. There was wide variation between subjects: on average, subjects found their VIO to be slightly less enchanting than we might have hoped (3.7, with a standard deviation of 1.9). Some found it embarrassing, and some didn't at all (3.2, st. dev. 2.2), and couples found it only moderately intimate. (4.2, st. dev. 1.6). Sergio found the VIO to be absolutely enchanting and absolutely intimate; Yumi rated it 5 and 6 respectively. Neither found it at all embarrassing.

We also gave users the opportunity to pick two of their own metrics and rate the VIO on that scale, from Absolutely Not (1) to Absolutely (7). Yumi rated the VIO funny 7 and useful 6; Sergio rated it innovative 6 and useful 6. Perhaps more interesting is the richness of the feedback we received from the subjects who weren't enjoying using the VIO. One disgruntled subject rated it "*less exciting over time*" 6, while another rated it as "*helping my relationship*" 2. Another didn't see much of a future for the VIO, rating the statement "*going to be a part of every LD relationship*" as Absolutely Not.

In addition, there were a number of subjects who wrote provocative statements but rated them in the middle of the scale: one user wrote that the VIO was "*effecting our relationship positively*" 4, while another felt it was "*healthy*" 4. Another user felt the VIO was "*driving us apart*" 4, and felt like it was "*a requirement*" 3.

These answers encouraged us, the designers, to reflect on the role that such questions play.: At a very minimum it implies that taking the answers and ratings at face value may not give the full impression of the users' experience. The combination of fill-in-the-blank and rating – particularly in the neutral ratings of provocative statements – seems to give a liminal space for criticism, allowing a 'safe' way for the subjects to critique the researchers running the study, a channel of communication usually obscured by the power structure of traditional evaluation techniques. It seems to function similarly to the way that sarcasm and humor can provide a method of power-balancing by the underdog in other hierarchical relationships.

Reflection on the relationship

We asked users questions about their relationship. This is an unusual line of inquiry for what is, after all, a technological system, but one in line with concepts of reflective design and other critically-informed design traditions, opening up questions of what technology can do

and what it's good for. Perhaps the most valuable part of the relationship questions was the way they emphasized the existing strength and richness of the couples' interactions with each other, underscoring the fact that the VIO was at best a limited contribution to a rich and established romantic relationship.

Each day, we asked our users to explain one of their answers to the three Likert-scale questions about their relationship:

How close do you feel to your partner today?

How satisfied do you feel by your relationship today?

How connected do you feel to your partner today?

Many of these answers were reflections on the lived experience of being in a long distance relationship, ranging from feelings of remoteness and separation ("*Having a rather distant day...until we talked, but then it was even more evident that we're really far apart.*"), "*When I think about how connected we are I tend to feel more disconnected by contemplating the reality of our separation alone.*") along with security and happiness ("*He was really there for me when I needed him today.*"), "*Feel connected today because we had a good conversation for the first time in 3 days.*") Again, some of the most interesting responses were more critiques on the form of the survey itself, questioning our wording and assumptions: one user pointed out that "*Satisfaction and closeness aren't as correlated as they seem,*" while another observed that "*satisfaction is a strange way to assess a relationship*"

Many of the relationship questions were perhaps more powerful in giving the user a sense of enchantment, irreverence and novelty in their experience of filling out the survey. For example, on the first day, we asked users *If I were to do a dance about my relationship today, it would be a: Rumba / Samba / Tango / Waltz / Swing.* Of the subjects that answered this question, three of them selected a waltz, while rumba, samba, tango and swing all received a single selection. One user didn't circle any of these, writing "*Dance is too energetic for today.*" Sergio and Yumi selected a samba and a waltz respectively. None of these answers have any particular value to our understanding of the relationship, the technology or the study, but we felt this question's appearance on the first day would set the tone for the rest of the week

As reported elsewhere [5], we also asked the users what season represented their relationship. 7 of our 10 subjects, including Sergio, said the season that most represented their relationship was spring. Yumi described their relationship as summer. Only one subject felt it necessary to explain her choice of *Spring* by writing "*You can sense that good times are coming, but you have to wait a little longer.*" The couple who used their VIO the least reported fall and winter for the answers, and both felt the need to explain their choices: one wrote "*Fall - always changing*", and the other, "*Winter. You love to see the snow falling and fresh on the ground but it's*

pretty damn cold and those slushy freezing rain/wintery mix days are definitely present and really suck."

Similarly, we also asked users what TV show best represented their relationship. For some of our subjects, this produced rich and interesting responses. One user wrote, "*America's Next Top Model, b/c we have all these "experts" (friends who've been thru it) giving advice and we have laughs and drama, whenever we're together we take pictures to remind us plus each week we get closer to being together long-term short distance + whether it'll work out once we get our contract is up to us!"*, while their partner just wrote "*Friends - Monica and Chandler*" Another subject wrote "*Something predictable, yet warm and heartfelt. A gushy romantic show full of dorky characters, I dunno,*" although her partner, who was to show the most dissatisfaction with the use of the VIO over the week, just wrote "*I don't watch TV shows*".

Sergio felt that *Futurama* represented his relationship, while Yumi wrote, "*Is a comic Program in Japan called WANNAI. It is really funny, and even you do not understand Japanese you can understand it. I think that my relationship is really joyful and funny.*"

We were particularly impressed by the level of analysis that users put into their answers to a question that simply asked what color represented their relationship. Users were not explicitly encouraged to explain or unpack their answers, but the vast majority did so at some length. One user wrote, "*Purple - we have a more matured, aged relationship rather than a new, boundless one which would best be described by red. Purple is the more aged, ripened form of red.*", while her partner described their relationship as "*Amber/yellow --> do I proceed w/ caution or speed up to beat the red or slow down anticipating a step.*" This was the same couple who picked winter and fall for their seasons. Other choices were red, burgundy, and "*a medium green*". Sergio saw his relationship as green, while Yumi enthusiastically described their relationship as being "*Yellow! Like a sun, like a summer. I often laugh with Francesco especially in those days. Using Vio is really funny and interesting.*"

Reflection on the Study

Colleague Kirsten Boehner pointed out that we had been referring to the VIO alone as the intimate object, when for our users their experience of the intimate object was the VIO and the survey together. We felt it important to recognize that the study was not merely a passive instrument to objectively record our subjects' impressions, but rather an experience that itself had an impact on the users' experience. This is similar to the Hawthorn effect, in which management researcher Mayo found that the very act of studying subjects in the context of a time-and-motion study had an effect on their productivity. [7]

Reflections on the Study

In addition to the critiques of our method implicit in answers to the fill-in-the-blank Likkert scales enumerated

above, we also provided explicit opportunities for our subjects to comment on the study, as well as trying to understand more about their social context around the study. On the last day of the diary, we asked our users, "Tell us a better way to do this study." Users interpreted this question in a wide variety of ways: while still useful, perhaps it could be better broken out into separate parts in the future. Some users wanted different platforms for the VIO: "*Design other intimate objects with differing qualities and have couples compare and rate which ones seem to promote intimacy best.*", and "*I think this study is done pretty well, maybe a VIO that can be carried around or on a cell phone.*" Users critiqued ambiguities in the the design and wording of the log book ("*I'm a little confused between the difference between feeling "close" and feeling "connected." I decided to assume the former was more geographic/physical and the latter emotional.*," "*The questions are really ambiguous. What are you testing*") and took the opportunity to question the design of the VIO: "*The VIO should give some better indication of when/# of times it was pressed*".

Yumi didn't answer this question; Sergio looked for more context and feedback from us in the course of the study: "*In between the steps, you could give some explanation about some procedures you are using or questions you are making. I'm just guessing. For example: after step 1 and 2 you tell why didn't want to reveal anything on the vio apriori. Or after we finish to write the logbook you hand the envelope with some (not necessarily complete) explanations.*"

We also asked our users how many people they had told about the study, and why. We asked this to try to get at least a summary view of the social context of the experience of being in the study. Most of our users had mentioned it to their roommate, a few friends, to their parents, as it came up in casual conversation. One user explained why they'd discussed it: "*Cause I had fun using VIO, or they asked what it was on my task bar.*" Yumi had only discussed the VIO with Sergio; Sergio had told his parents and his roommate about the study. He explained why: "*I told them because I was really excited to be both experimenting a new technology and be part of an experiment. I only told them because I didn't want to show this as a 'trophy'.*"

We asked the users conducting this research to give names to us, the people conducting the research. Answers varied from "*The Man*" and "*operators*" to "*Match 'sustainers' (like matchmakers)*", the "*Intimacy Dream Team*" and "*mad scientists*". Sergio described us as "*mysterious watchers*", while Yumi saw us as the "*Fathers and Mothers of VIO.*"

We also wanted to provoke our users to question the research itself. Referring obliquely to the deception sometimes common in psychology experiments, we asked users to say what they thought the research was really

about. Most of these responses were of the manner we expected – “*Whether VIO promotes or enhances intimacy for long-distance couples*”, and “*how couples feel about intimacy when they are apart*” – although one user did accuse us of “*Creating computer dependency and spreading and marketing it to the general public*”. Sergio saw our work as being “*Understanding better the needs of long distance relationships by measuring the reactions to the vio prototype. Thus confirming or rejecting the issues thought by the developing team.*” whereas Yumi wrote “*It is a new way for communication.*”

Finally, as a gentle way to poke fun at the 7-point Likert scale questions that subjects had been filling out on a daily basis, we asked the users which of the numbers 1 to 7 was their favorite. In the interest of a complete scientific record, we report here that the mean result was 4.875 with a standard deviation of 2.035. It is not clear if these preferences had any impact on their answers to the Likert scale questions⁴.

Post Test Questionnaire

After the subjects had finished with their logbooks, we asked them to fill out a post-test questionnaire. This was designed to ask similar questions to the pre-test, with the addition of questions explicitly about VIO use. We first asked if the VIO fell short, fulfilled or exceeding their initial expectations, and asked them to explain their answer. All but one of our subjects said it fell short of their initial expectations, which seems reasonable: when told that you’re going to participate in a study about technologies for couples in long distance relationships, it seems like a letdown to be given a single dot to click. Yumi and Sergio’s answers are entirely typical for this question: Yumi wrote, “*To be sincere at the beginning I was thinking about something more sophisticated like a machine or some software. When I see that it was a program to install, in a way I was happy, because it is more simple and fast.*” Sergio was perhaps more positive than most, writing “*For the first 10 seconds I was deluded. I thought “how can this be better than the rest or how can it say something new.” Then I asked myself why it was thought that. By the end of the day, I was totally sucked into I, finding new and good reasons for its existence.*”

We then explicitly asked for the three things the subject liked *most* about using their VIO. Answers were evenly split into two categories: comments about the design – the color, the fading, the position and size on the screen – and comments about the effect on the relationship. For example, Yumi wrote two comments: “*1. Color. 2. I can see my Vio and my partner’s Vio color.*” This was typical of the users who commented on the design itself. Comments about the effect on the relationship praised the interaction possibilities mediated by VIO, as well as the

opportunity for reflection. It was common for the three comments to draw from both of these categories, as in Sergio’s three favorite things: “*1. It is very simple, but effective way to send a thought. 2. Its concept, compared to the other communication needs. 3. Its simple shape*”

We also asked which three things users liked *least* about using their VIO. These were nearly all related to design issues that needed addressing: the rapid fading of the initial bright red and corresponding difficulty in figuring out how long since ones’ partner pressed the button. Users commented on how it can transmit feelings of isolation and being alone, as well as intimacy: “*If it is not pushed and the circle is colorless this only contributes to a feeling of distance or emptiness*”. Both Yumi and Sergio commented solely on the design, noting the absence of sound and difficulty of reading the display. We also asked for general suggestions for improving the VIO, and received a variety of variations on these themes, including replacing the circle icon with photos of the partner. The best example is Sergio’s response: “*The core idea is perfect. Now maybe it could undergo some aesthetic modifications, sounds, and customizable shape and dimension.*”

Seven of the nine respondents filling out this portion of the questionnaire responded that using the VIO had made them think of their partner more often. About half stated that it felt like an optional activity, and half that there was an obligation to use it. This sense of obligation led us to think of VIO use in terms of the notion of a gift economy, with corresponding expectations of reciprocity and relationship-building in the course of the transaction, similar to Taylor & Harper’s understanding of teenagers’ text messaging practices. [13] We also found parallels in Aoki & Woodruff’s observations of feelings of obligation and demands for response in push-to-talk communication technologies. [1] (To ward off a frequently asked question, there were no correlations between gender and responses to this question.) All but one of our subjects said that using VIO had become part of their daily routine.

Finally, we asked users how they would rate the level of intimacy in their communication in general and in the last week.. These were 6.1 and 5.89 respectively, implying a slight drop since the introduction of the VIO, attributable to a single user’s low rating of this response. Users also rated current methods of communication 5.6 effective in maintaining intimacy, slightly up from the pre-test result of 5.29. It will be interesting to see if these results remain consistent on a larger body of subjects.

Post-Study

After the study, we were able to look at the cumulative statistics on the server, and found that over the course of the one-week pilot study, couples used their VIOs on average a total of 35 times a day, although there were wide variations: one couple only used theirs an average of 5 times a day, while another couple clicked the button a total of an average of 123 times a day.

⁴ The average of all the Likert scale questions for all users for all days was 4.815.

Following receipt of the logbooks from our subjects, we wrote each an email to thank them for their participation, and included a copy of our initial paper [5] on the study. Three of our five couples have continued to use their VIOs over six months after the completion of the study.

MINIMAL COMMUNICATION: SO WHAT'S GOING ON?

It was the success of this minimal communication system that led us to try and gain a deeper understanding of the role in a relationship that such minimal communication plays. What is being communicated, and what does it mean to the couple involved?

The minimal nature of VIO-based communication affords, allows and perhaps requires the users to comprehend each act of communication differently based on their awareness of their own and their partner's current conditions. For example, the first the click of the morning can mean "I'm awake! Call me!". Or, as one user wrote, in response to a question about if the VIO had made them feel closer to their partner, "I was surprised to see one morning that my partner had actually turned on his computer just to push VIO and then turned it off again." It's a fundamentally different click to a click in a reciprocating sequence of dozens of clicks, a situation one user referred to as "Clickwars" – in response to a question about what aspects of using the VIO the user had particularly enjoyed.

The key understanding here is the situated nature of these communications. [12] That is to say, the fact that there's a utility to a single bit of communication must be dependent on external factors: by itself, without context, a single bit of communication – like any other communication – has no value. However, when received by a situated individual within a certain context – or, in this case, shared between two people who share a context – that single bit of communication can leverage an enormous amount of social, cultural and emotional capital, giving it a significance far greater than its bandwidth would seem to suggest.

It appears that the simple communication afforded by the MinIOs nonetheless allowed for complex interpretations because of the partners' shared understandings of each other's lives. Building on the culturally and socially embedded nature of communications may serve as a model for understanding other complex uses of otherwise simple computing.

What's also important to recognize about these results in aggregate is their recognition of the VIO as a separate channel of communication for intimacy: the state of the VIO itself prompts clicking it, rather than a specific desire to communicate intimacy. As with all mechanisms for communication, it's hard to separate out the degree to which the mechanism itself prompts its use and the degree to which the desire for communication is already there and merely facilitated by the mechanism. What these responses make clear is that it would be naïve to propose that the VIO merely facilitates an existing, unmet desire for

communicating intimacy: the very presence of the VIO changes the inherent qualities of communication.

We also recognize that this is a pilot study, with a small number of subjects using the technology over a short period of time.. We also recognize that the evaluation instrument itself, the logbook, has an effect on how people understand, experience and feel about the technology itself. As such, our plans are for our next study to involve more subjects, using the technology for several weeks, and looking at the experiences and satisfaction levels of couples using the VIO with the logbook, using the VIO without the logbook, and using the logbook to comment just on their current satisfaction levels with their existing communication patterns.

Our subjects' experiences tell a story about the richness they read from a single bit of communication. By providing for reflection we both encourage and are given are given a window into the process by which the users generate and experience 'more' from the 'less' we give them.

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