“It’s More Like a Letter”: An Exploration of Mediated Conversational Effort in Message Builder

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Designing for Demand: An Exploration of Conversational Effort in Mediated Close Personal Relationships

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Communication technologies used to maintain close personal relationships are often designed to be lightweight and easy to use. While these properties allow for relationships to be maintained with speed and efficiency, they may come at the expense of more effortful messages that are constructed with thought, time and care. This raises the question of how communication technologies might be designed to provoke moments of effortful maintenance from their users. To explore this question, we designed and implemented Message Builder, a text-based communication system that encourages relational partners to send increasingly long messages. We report findings from a field trial in which 14 pairs of participants used Message Builder for everyday relational maintenance. While some of the effort-provoking features of Message Builder were described as problematic, we find that the system had value in guiding users towards authentic and meaningful effort investments that were valuable within their individual relationships.

CCS Concepts:
• Human-centered computing → Collaborative and social computing theory, concepts and paradigms; Social media; Collaborative and social computing devices;

Additional Key Words and Phrases: Effort, communication technologies, relational technologies, social media.

ACM Reference Format:

1 INTRODUCTION

Close personal relationships are maintained by a variety of communications media. Whether by email, instant messaging (IM), video or voice calls, people frequently adopt and adapt technologies to sustain connections with their loved ones [23, 28, 29]. One beneficial property of these technologies is that they can facilitate rapid and lightweight interactions [25], allowing for relationships to be maintained easily and at low cost [39, 41]. These qualities arise from the fact that communication systems are often designed to be easy-to-use, with the minimisation of effort placed as a foremost design goal. This philosophy is evidenced by an increasing number of intelligent or automated tools that alleviate the ‘burden’ of writing in IM applications [22]. For example, Facebook’s Messenger app now includes an interactive assistant that provides automatic Sticker suggestions, and Google’s Allo app includes a smart replies feature, which generates a set of potential responses to conversation by analysing messages that have been exchanged previously.

Researchers in HCI and CSCW have begun to question this drive for effortlessness in the design of communication platforms. In particular, questions have been raised by a body of work that suggests people in close personal relationships appreciate the investment of effort into communication [12, 24, 25, 32, 33] and that effort in the selection and use of communication outlets is interpreted as a sign of mutual affection and care [4, 10, 27, 35, 42]. Correspondingly, there has been an interest

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in designing chat systems that use effort as a foremost driver in the interaction design, thereby providing users with positive opportunities for investing effort into their messages [22].

However, there are currently two issues that hamper our understanding of how to support meaningful effort in communication systems. The first is that there has been no study of how effort could be leveraged within such systems, beyond a selection of initial design concepts [22] and the observation that people may benefit from technologies which encourage effort [12, 32]. This is important because effort could be resented just as easily as it could be valued, depending on the manner in which it arises [14]. There is thus a need to consider how effort can be leveraged productively and in a way that has utility for close personal communication. The second issue is that prior research on effortful exchanges has focused on isolated or one-off acts of communication [e.g. 22]. Although such acts form an important part of the communication landscape, a focus on one-time exchanges ignores the way in which effort might be valued as it accrues over time. If it is truly the case that communication systems could enhance their users’ relational maintenance practices by leveraging effort, then we see a need to explore these issues in practice.

To this end, we designed and implemented Message Builder, a prototype communication system that has a number of features which seek to invoke effort. In particular, the system requires users to send increasingly long messages, a feature that we use to probe the tension between effort in the use of a system versus effort that is seen to be meaningful within a relationship. Through a field deployment, our study draws attention to the ways in which effort can be usefully provoked and structured by mediating technologies, providing a basis for future work on designing with effort in mind. The paper therefore contributes:

- The Message Builder system, a communication platform designed to explore the ways in which users might be guided towards effort investment.
- Findings from a field trial of Message Builder, accounting for values and practices that emerged in use of the system.
- Directions for future work on designing around effort in communication technologies, attending to the need for such effort to be authentic and meaningful.

2 BACKGROUND AND RELATED WORK

In this section, we provide the groundwork for our study by first considering the meaning of effort in HCI vis-à-vis its meaning in close personal relationships. We then consider how effort has been raised as a design property for the development of communication platforms, before examining how one might design to encourage effort in communication.

2.1 Understanding and Characterising Effort

While the term ‘effort’ is commonly used in HCI and CSCW, we note that the literature lacks common ground as to the value of effort in different settings. As such, there is currently no agreed definition of effort in the HCI literature. One early definition by Zijlstra [44] positions effort as work that is required to handle the demands of a task. In Zijlstra’s view, any task imposes a degree of workload on the human operator. Effort describes the work that is done to handle and alleviate the demand imposed by this workload. Such effort may be physical or mental and may be experienced differently in accordance with a person’s aptitude for the task [44].

This perspective on effort has its roots in task-oriented approaches to systems design, where a designer’s emphasis is typically oriented towards streamlining users’ interactions and identifying areas in which effort can be minimised [e.g. 19, 37]. This is often for good reason, and there are many areas of human activity in which it makes sense to reduce user effort, e.g. when designing medical devices for use by older adults [31].
However, this conceptualisation of effort is problematic when it is applied to the arena of close personal relationships [22]. While it is certainly possible to conceive of a relationship as an entity that requires work to maintain, such a view does not reflect the subtle, intimate and enriching qualities of caring connections [18]. As such, effort in this context refers to something quite different, and has been aligned with the notion of relational maintenance, which refers to “efforts to keep a relationship in a specified state or condition” ([9], p. 164). This type of effort is important for sustaining the health of interpersonal connections, and helps to foster feelings of closeness, gratitude and mutual affection [1, 7]. In this sense, effort becomes an entity that is not to be minimised per se, but is rather one to be supported and encouraged through designs that are attuned to the complexities and needs of close relationships [22, 40].

In light of these perspectives, recent work has attempted to articulate the various forms of effort that can arise in the use of communication technologies, and hence how this effort might be differentially valued. Markopoulos [26] delineates two forms of effort: procedural and personal. In his view, procedural effort refers to the work required to operate an interactive system. Example tasks include starting a device or navigating to an application, both of which he describes as not valuable. Conversely, personal effort is described as valuable because it represents work that is done in service of the message recipient. Examples include the selection of particular media or saying things that the recipient might like to hear. Kelly et al. [22] expand on the notion of personal effort by describing qualities of meaningful effort that can arise across a range of communications media. Examples include the investment of discretionary effort, which characterises messages that are delivered through a sender’s own volition rather than through external prompts, and effort that is responsive to the recipient, which refers to messages that reflect the personality, desires or wishes of their intended reader. Their work also highlights that the distinction between procedural and personal effort is not straightforward; procedural effort may in fact be valued if it gives insight into the personal effort that is invested by a sender [22].

While these studies have utility for informing the work of designers, they have not investigated how communication technologies could foster effort when used in real-world relationships. Our field study extends this literature to provide additional insights into the way in which effort can become meaningful in communication, and further explores the dichotomy between effort that is relationally sustaining versus that which is expended in the mere use of a system.

2.2 The Value of Effort in Personal Communication Technologies

Researchers in CSCW have for a long time been interested in designing technologies to support close relationships [36], and a vast number of systems have been designed to support feelings of connectedness between people who care about one another [see 20, for a review]. Within this literature, several studies have recognised that effort in communication is valued by people in close relationships [12, 25, 32, 33]. CSCW research on social media has similarly noted that the selection of communication outlets on platforms such as Facebook can exemplify effort and care [5, 42]. For example, choosing to comment on a user’s post may be regarded as expressing greater affection than low-cost ‘likes’ [35], and a study by Burke and Kraut [4] demonstrated that receiving high-effort messages on Facebook is associated with increases in personal wellbeing.

These findings have led to the suggestion that, rather than deferring to speedy and lightweight exchanges, communication technologies could be designed to prompt moments of effortful maintenance and reflection from their users [38]. King and Forlizzi [24] argue that devices for close relationships should forego lightweight exchanges and instead demand effort in order to foster moments of ‘emotional resonance’. Of course, lightweight exchanges play a valid role in the mediation of relationships, and it is important to recognise that not all social exchanges warrant the investment of time and effort, particularly when messages play a coordinative role [e.g. 15]. Yet
this observation does not preclude the potential for effort to be placed as a foremost parameter in the design of communication systems [22]. The present study seeks to explore this through implementing a system that lends itself to more effortful exchanges, and provides an understanding of how these exchanges were valued by people in real relationships.

2.3 Designing for Valued Effort in Communication

In terms of designing to support effort, some prior research has listed properties of existing communications media that are valued with regards to effort. Riche et al. [32] report findings from design workshops with older adults. Their participants viewed high-effort communications such as cards and letters to be more intimate than digital systems, which were described as ‘less valuable’ and ‘less sensual’ than their analogue counterparts. Similarly, Lindley et al. [25] report the views of older adults who described communication as worthy of time and effort, perceiving these qualities to be lacking in digital systems.

While these insights are instructive in terms of understanding what people value in communication, they do not provide examples of how effort can be utilised by designers in a way that is meaningful and sensitive to the needs of close relationships. One exception is the work of Kelly et al. [22], who proposed two systems (Shake-a-Memory Calendar and CraftBox) that provide outlets for meaningful effort investment. However, it appears that these systems did not progress past the initial design stage, and thus there has been little throughput in terms of understanding how these tools might foster effort in a way that is valuable for real-world relationships.

The question of how effort might be realised through design is currently open. We see this issue as multifaceted, covering not just the forms of effort that can be invested but also the impact of effort on users’ experiences with (and subsequent acceptance of) a communication system. Work elsewhere in HCI is indicative of these concerns. For example, Cockburn et al. [6] examined effort in the context of spatial learning. They found that increasing users’ interaction effort (in terms of the cost required to check the meaning of occluded keyboard characters) led to better spatial memory for keyboard layout. This occurred because users put more effort into committing the characters to memory, after the interaction cost was raised. However, Cockburn et al. also found that users subjectively preferred an easier-to-use interface, even when this interface fostered objectively worse performance. This draws attention to a potential trade-off between effort and user experience, in turn suggesting that effort is a property that needs to be leveraged with care and attention by designers. It is one thing to demand effort by making an interface ‘harder to use’ [32], but there is no guarantee that such an approach will add value in the context of close relationships [14].

The present investigation pushes on this challenge by studying Message Builder, a system that was designed to prompt effort from its users when engaging in everyday conversation. The study allows us to explore the ways in which particular features of the system did (and did not) encourage meaningful effort, providing an initial grounding for future designs that are sensitive to the forms of effort people wish to experience when communicating with close relational partners.

3 MESSAGE BUILDER: DESIGN AND APPROACH

In creating Message Builder, we wanted to develop a system that would allow us to explore:

- How communication technologies might encourage effort in messaging.
- How communication effort might be valued (or not) in mediated close personal relationships.
- How effort is realised across a series of messages in a conversational exchange.

Before describing our system, we emphasise that the artifact we have created is not intended to be a canonical example of how communication systems can realise effort. Rather, it represents one solution within a space of possibilities, and it is therefore not the only possibility. We see our
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Fig. 1. The Message Builder system, showing an example conversation created by the authors (pixellated for review). User 1 appears in green and User 2 in blue. In the example, User 2 has just returned the character count to zero by pressing the Reset button, and is now writing a reply to User 1’s last message.

platform as a point of departure for exploring the plausible design space of effortful communication, and for discovering what is valuable to people in the context of their relationships. The importance of our work is not in identifying precisely how we should design to support effort, but is rather in probing concepts that are meaningful and which are revealing about how effort can be employed in a way that people find useful in their everyday lives [cf. 30, 34].

To develop our application, we began with group ideation sessions in which the members of our research team generated concepts for technologies that could invoke effort in communication. The ideation in these sessions was guided by the findings of previous work on meaningful effort [22]. One of the ideas generated from these sessions was for a system that progressively required greater effort from its users, such that it might encourage the “building up” of effort in conversation to convey each person’s investment. This general idea appealed to us because it seemed relatively straightforward to implement and yet offered a rich set of possibilities for exploring our key issues of concern. For example, how might people engage with such a system and structure their responses when using it? At what point might the building up on effort become resented?

These questions led us to pursue an implementation of the idea, focusing on text-based communication in the style of IM. This is because IM is known to play a role in the maintenance of relationships [16, 17, 29] and is an ongoing area of interest within the literature on communication technologies [e.g. 21, 30]. Moreover, text remains a primary modality for communication in popular systems such as Whatsapp, WeChat and Facebook Messenger. Focusing on text would therefore allow our participants to interpret our design in relation to the features of existing applications.

3.1 Message Builder Implementation and Features

Our developed system, Message Builder (Figure 1), is a text-based chat application. The system supports one-to-one conversations in which messages can be exchanged asynchronously and in real time. Message Builder was implemented as a web-based system to allow users to access it on
Desktop and mobile computing devices. The system did not support the exchange of expressive media such as pictures and audio, but did allow users to send emoji since they are based on unicode. Message Builder was written in PHP and was tested on popular desktop and mobile browsers including Chrome, Edge, Firefox, Opera and Safari. All messages sent through Message Builder were timestamped and saved to a database that was hosted on secure university servers.

Message Builder has a number of design features that are intended to prompt users to invest effort in their communication. The key features of Message Builder are:

- **A requirement that each message sent must be longer than the previous message.** The intention here is to explore how prompting users to write more in each message might translate into a meaningful practice within their relationship. The precise functionality is achieved through monitoring the character count of each message and by preventing messages from being sent unless they are at least one character longer than the last. If a user tries to send a shorter message, they receive a popup notification telling them that the message is not long enough. The character count applies to both users within a conversation, meaning that the chat is continually escalating in terms of raw message length.

- **A Reset button.** Users can press this button to reset the character count and return the tracked value back to zero. This can be done at any time, and affords users the opportunity to choose to reset instead of exceeding the count of the previous message. This aims to prevent frustration or abandonment that could be caused by the character count.

- **A visible record of the character count,** both for posted messages and those under construction (see Figure 1). This feature was initially intended as purely functional, providing a simple cue to make users aware of the length of their current message in relation to the number of characters required by the previous message. However, it also doubled as a means for promoting reflection over the value of the count with respect to effort.

- **A lack of notifications,** which removes a convenient feature of contemporary messaging apps and means that users have to invest effort in checking whether they have received a new message in Message Builder.

Our intention with these features was to be exploratory and provocative, allowing for a range of different opportunities to investigate how different kinds of effort might (or indeed might not) lend themselves to productive relational maintenance. It is therefore not our intention to position these features, nor the Message Builder system itself, as examples of ‘good’ or ‘bad’ effort-centric design. Our intention was to use Message Builder as an opportunity to learn about things that matter to people, and part of our work is to understand how properties of the system shaped participants’ communication practices while provoking or discouraging the investment of effort in messaging.

In terms of design rationale, we saw the features of Message Builder as having the potential to shape participants’ communication behaviour in an interesting way. For example, requiring progressively more text could act as a simple nudge towards the investment of time and thought into communication, and yet it could just as easily be resented for hampering other kinds of exchange. Likewise, the lack of notifications might transform the act of receiving messages into one that is very different from existing IM applications, but might cause people to lose track of the conversation due to limited awareness of what is happening. These and other considerations about the design are unpacked in more detail by the findings of our field study.

## 4 METHODOLOGY

Any understanding of how technology can support relational maintenance is best derived from real-world relationships. As such, we conducted a field deployment to understand how Message Builder might be used in everyday life, and to probe the values that might emerge around its design
and use. Importantly, we wanted to understand how this system might complement the other technologies that our participants used.

Our study employed a mixed-methods approach, beginning with interviews and questionnaires to gain insight into participants’ existing relational maintenance practices. We used post-study interviews to understand how Message Builder was integrated into these practices and to explore participants’ reactions to the design. Finally, log data provided us with information about the number of messages sent, the length of messages, and the frequency of chat resets. All of our materials and procedures were designed in accordance with a local ethics checklist at the authors’ research institution.

4.1 Participants

Twenty-eight people (14 pairs) volunteered for the study. Participants were self-selecting, recruited through adverts on our university noticeboard, through word of mouth, and snowball sampling. The study was advertised as a “trial of a new app for communication”, and was open to pairs of two or more. We did not receive interest from anyone wanting to participate in a group of more than two. Each person was paid £30 for their involvement in the study (£60 per pair).

Our recruited sample was diverse, with 9 countries of origin: 16 Malaysian participants, 2 Pakistani, 2 Indian, 2 Nepalese, 2 Nigerian, 1 Vietnamese, 1 Filipino, 1 Syrian and 1 British. (The high number of Malaysian participants arose through an advert for the study being shared to a society for Malaysian students by a participant.) Eight participants identified as male, 20 identified as female. All were fluent in English. Table 1 provides more detail about each of the pairs in our study. It can be seen that our sample comprises 10 platonic and 4 romantic relationships. Some of these relationships were co-located within the same household or city. Others were separated by greater distance, spanning different cities or even different continents.

A notable feature of our sample is that the average age was 22.6 years (Range=19–33, Median=21). This means that our findings reflect the perspectives of relatively young, tech-savvy individuals. However, this is interesting as it means that our study captures the responses of a user group who make extensive use of mainstream communication apps in their everyday lives, and who might therefore be opposed to the introduction of ‘effortful’ communication technologies.

4.2 Procedure

We deployed Message Builder to each participating pair for a minimum of period two weeks. Deployments were made across a two-month period in early 2017. Each deployment involved the following three phases.

Phase One: Pre-Deployment. Participants enrolled in the study over email and provided informed consent through an online form. Participants received an instruction sheet explaining the research. The instructions were worded carefully to convey that participants were allowed to use the system in any way they saw fit for maintaining their relationship.

Participants then completed an online questionnaire, which requested demographic information and a list of communication technologies used between the participant and their study partner. We also administered the Relationship Closeness Inventory (RCI) [2] and Unidimensional Relationship Closeness Scale (URCS) [8] scales. We used these measures to probe and understand the nature of the relationships between our participating pairs. We also checked for major imbalances in closeness within each relationship, though none were apparent.

After submitting their questionnaire, participants were invited for an individual interview to gather more data about their communication routines. Interviews were one to one between the participant and first author. We did not perform pair interviews due to scheduling constraints and because some participants were distributed across different timezones. Twenty-two interviews
Table 1. Demographic, relational, and closeness information about participants in the Message Builder field study. RCI scale ranges from 3–30; URCS ranges from 12–84.

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<td>19</td>
<td>F</td>
<td>UK</td>
<td>Pre-use</td>
<td></td>
<td>15</td>
<td>76</td>
<td>70</td>
</tr>
<tr>
<td>26</td>
<td>28</td>
<td>19</td>
<td>F</td>
<td>UK</td>
<td>Pre-use</td>
<td></td>
<td>15</td>
<td>78</td>
<td>80</td>
</tr>
</tbody>
</table>

were face-to-face; four were over Skype; and two were conducted via email. Interview questions were tailored to each pair based on their questionnaire responses, e.g. based on activities that they had described completing together. We asked participants which of the communication systems (as listed in their questionnaire) they used most often with their partner. Following earlier work [22], we probed for a specific, recent instance of when they or their partner had invested effort into a communication or relational act. This allowed us to reflect on the level of effort that they considered typical for that particular relationship. At the end of the interview, participants were shown an example of Message Builder and were given a demonstration of its functionality. This served as an opportunity for us to answer participants’ questions about the system.

**Phase Two: Deployment.** After their interviews, each pair was given their own instantiation of the Message Builder application. Each participant was emailed a link that they used to access the system via their web browser. Individuals were only able to communicate with their study partner through this link. In addition, participants in the study were not able to access each other’s Message Builder clients, and nor were they able to access the links of other pairs, meaning that the system became a private channel for use within each pair.

Participants were requested to use the system for a minimum of two weeks. Since we were interested in understanding how the system was adopted into participants’ communication practices, we did not place requirements on where, when, or how frequently participants should use Message Builder. In addition, we did not monitor participants’ use of the system during this time, e.g. by...
checking the logs or visiting the pages hosting their systems. However, participants were emailed midway through the deployment period to remind them about their participation in the study.

**Phase Three: Post-Deployment.** At the end of the deployment period, participants were emailed with a link to a second online questionnaire. This questionnaire administered the URCS to check for changes in relational closeness. We found that there were no statistically significant differences in closeness from before and after the study, \( t(27) = 2.05, p=0.14 \).

Finally, participants were invited for a second interview within 3 days of discontinuing use of Message Builder. These interviews were conducted face-to-face (24 participants), via Skype (one person) or over email (three participants). The interviews went into greater detail about participants’ use of Message Builder during the study period. We probed how, when, and where the system was used; practices around communicating through the system; their opinions about the accumulation of effort; and what they felt about each design feature (the requirement for increasing message length, the ability to reset, the visible character count, and the lack of notifications). Participants were thanked and paid for their involvement at the end of the interview.

### 4.3 Analysis

Our data comprised participants’ questionnaire responses together with their pre- and post-study interviews. We also collected anonymised log data about each pair’s use of Message Builder, comprising message length, date and time of delivery, and the time and number of resets. We did not collect message content to avoid breaching participants’ privacy and to encourage naturalistic use. Participants were aware that their messages would not be monitored or analysed by the researchers before participating in the study. The content of messages was deleted from our database after the deployment had ended.

Participants’ interview comments were transcribed by the first author. The first and second authors performed a thematic analysis [3] in two distinct stages. First, we engaged in independent cycles of inductive, open coding to identify concepts within the data and potential themes that could unite these concepts. We attended to the ways in which Message Builder was used by each pair; how it was interleaved with existing technologies; and whether the system was at all valued in the context of the participants’ relationships. Second, we performed a round of deductive coding using the five high-level categories of meaningful effort identified by Kelly et al. [22]. This allowed us to consider how qualities associated with valued effort were enacted and recognised by our participants, in their role as both sender and recipient.

### 5 FINDINGS

Our research interests are focused on effortful communication. As such, our results are structured around how our participants used Message Builder and how particular features were valued or resented with respect to effort. Quotes used in the results are attributed to specific participants in the study, ranging from 1–28 (see Table 1).

#### 5.1 Patterns of Use and Acceptance

Before detailing participants’ reactions to Message Builder, we first describe participants’ existing communication practices with their study partner so as to contextualise their use of Message Builder.

**5.1.1 Existing Technologies.** Participants in our study described using IM apps including WhatsApp, Facebook Messenger and Telegram to maintain their relationship. Snapchat was popular, with 16 people (8 pairs) reporting use of it. Many pairs also used video and voice calling systems such as Skype, Viber and FaceTime. The use of particular apps was conditioned by participants’
individual circumstances and the closeness of their relationship; for example, Pairs 2 and 10, who
were both in long-distance romantic relationships, described using video calls every day to connect
with their partner. Those in platonic relationships were more casual and described engaging in
sporadic interactions through Whatsapp or Snapchat. Most pairs described interleaving multiple
communication technologies [28], with chat applications used to maintain a thread throughout
the day and then video calls or face-to-face meetings occurring at other times. However, not all of
the participants were in contact every day; pairs 11 and 13 were both comprised of friends who
tended to chat infrequently, using either Whatsapp or Facebook Messenger to primarily discuss
work-related matters a few times per week. These findings suggest that our study captured a variety
of different relationship types, providing an opportunity for Message Builder to be used within
different relational routines.

5.1.2 Message Builder: Contexts of Use. In terms of where the system was used, participants
reported using Message Builder on both mobile and desktop devices. This was done both at home,
at work, or at places of study. Some users established a routine around the system, for example
by checking for new messages at home before they went to bed: “you need some time to refresh
and think about what happened. That’s why I only normally use it at night before I sleep” (P19).
Others described using it on the move, for example while commuting: “I don’t remember using it at
home, maybe once I used it at home. But mostly at work, and in the train.” (P1). This suggests that
people used Message Builder in different settings and its use was not confined to any particular
configuration of time and place.

5.1.3 Message Builder: User Reactions. The provocative nature of Message Builder was reflected
in participants’ reactions to the system. A challenge for research on close relationships is that each
relationship has its own routines and idiosyncrasies, meaning that a technology which works for
one couple cannot be guaranteed to work for another. This was reflected in our data, with some pairs
outright rejecting the design after finding it difficult to absorb into their existing communication
routines. In particular, pairs 3, 8 and 14 did not find a clear role for the application. They described
trying to use it but found that its functionality was in conflict with their expectations for what
messaging applications should do: “It doesn’t have its own app, where you can just tap and you enter,
and you can start talking. Instead I need to wait for it to load, and it doesn’t have notification” (P13).
One reason for the lack of acceptance by these pairs may be because they described attempting to
use it for what Grinter et al. [17] describe as discrete-intensive conversations, i.e. those in which
messages are exchanged synchronously and in rapid, focused bursts. Such conversations may be
comprised of many messages that are relatively short. The escalating character requirement in
Message Builder made such conversations difficult to enjoy, especially when combined with the
need to continually reset in service of short messages: “it’s not as simple to use as many of the other
messaging apps... It wasn’t as fast as the other ones because of the reset thing” (P5).

Despite this, the remaining pairs in the study were more positive about the system and demon-
strated considerable engagement with it in terms of connecting with their partner. The way in
which the system differed from contemporary apps was actually valued by some individuals: “It felt
quite refreshing in a sense because it is something different. I would say it’s something people might
want to explore” (P11). In turn, some pairs described how Message Builder guided them towards
a style of communication that was very different to existing applications. For example, Pair 10,
who were in a long distance relationship, described settling into a routine in which messages sent
through Message Builder became progressively longer and more in-depth as time passed by. Their
style of use was more akin to that of continuous-sporadic exchange [17] in which the sending of
individual messages was distributed over time. They described adopting a routine in which the
system was used by each person once per day, and which complemented their established practice
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Table 2. Data from each pair’s use of Message Builder.

<table>
<thead>
<tr>
<th>Pair</th>
<th>Total number of messages (resets)</th>
<th>Average number of characters per message</th>
<th>Highest number of characters</th>
<th>Lowest number of characters</th>
<th>Average change in message length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>74 (32)</td>
<td>194</td>
<td>1045</td>
<td>8</td>
<td>132</td>
</tr>
<tr>
<td>2</td>
<td>120 (35)</td>
<td>64</td>
<td>178</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>19 (6)</td>
<td>39</td>
<td>71</td>
<td>6</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>77 (33)</td>
<td>105</td>
<td>2038</td>
<td>3</td>
<td>104</td>
</tr>
<tr>
<td>5</td>
<td>211 (40)</td>
<td>87</td>
<td>405</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>6</td>
<td>27 (5)</td>
<td>205</td>
<td>433</td>
<td>8</td>
<td>90</td>
</tr>
<tr>
<td>7</td>
<td>29 (8)</td>
<td>274</td>
<td>1377</td>
<td>7</td>
<td>214</td>
</tr>
<tr>
<td>8</td>
<td>22 (6)</td>
<td>46</td>
<td>87</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>82 (18)</td>
<td>33</td>
<td>100</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>10</td>
<td>40 (5)</td>
<td>503</td>
<td>1503</td>
<td>14</td>
<td>192</td>
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<tr>
<td>11</td>
<td>72 (24)</td>
<td>80</td>
<td>273</td>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>51 (12)</td>
<td>73</td>
<td>289</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>13</td>
<td>45 (15)</td>
<td>67</td>
<td>183</td>
<td>9</td>
<td>54</td>
</tr>
<tr>
<td>14</td>
<td>13 (3)</td>
<td>59</td>
<td>140</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Mean</td>
<td>63 (17)</td>
<td>131</td>
<td>580</td>
<td>5.4</td>
<td>78</td>
</tr>
</tbody>
</table>

5.1.4 Messages Sent and Character Counts. To provide an additional perspective on the use of Message Builder, Table 2 lists the number of messages sent by each pair, as well as the average number of characters within each message. It also shows the number of characters within the longest and shortest message sent by each pair, as well as the average incremental change in message length. On the surface, this data confirms that all of the participants attempted to use Message Builder in some form, with some appearing to use it extensively. Similarly, some appear to have used it in what might appear to be an effortful fashion, given the overall message lengths. However, these figures must be interpreted with caution because it is not necessarily the case that a low number of messages is equivalent to non-use or ‘low effort’. This is especially true considering the statements above in which participants described conversations in which messages became progressively longer—such exchanges might be composed of fewer, yet progressively longer messages, and which therefore involve high effort due to considerable time investment [22]. Similarly, long messages might not be especially effortful if they are the result of simple copy and pasting of text.

This means that it is necessary to interpret the figures in Table 2 by making reference to participants’ interview statements. First, it can be seen that some pairs sent only a few messages using the system, particularly pairs 3, 8 and 14. These messages were relatively short compared to those of other pairs. This makes sense given that these dyads are those who reported finding the system to have little value within their relationships. It is also noticeable that pair 7 sent relatively few messages (29 in total), and yet they achieved a much higher character count on average, indicating that their messages were longer. At interview, they explained a desire to test the system while also testing each person’s willingness to reply: “she put three hundred, and I doubled it, and she doubled it... we literally summarized a day’s worth of stuff that we did into one message, that’s
what we did”. Such an approach evidences the aforementioned style of escalating use, suggesting that the system had value in terms of encouraging users to include more meaningful content within individual messages, rather than spreading them out or writing only a simple and short text. Indeed, one individual from pair 3 noted this; despite disliking the application overall, she observed that “In some cases it actually made me say more in less number of messages. So, usually on Whatsapp, some people type little phrases and every single phrase is a new message, and you open your phone and there are 30 notifications of one sentence. But here sometimes it’s sort of made me say a lot more in one message” (P5).

One of the most common patterns of behaviour that participants reported was using Message Builder as a game, with 7 pairs seeing how long they could use the system without pressing reset: “it’s like a sort of competition, a mini competition to see like who can sort of write, get the most characters without having to reset, so yeah. It was just something like to make it fun, I guess. The challenge also, to see how long we can go on without having to reset ” (P20). “we sort of just challenged each other, to see if we could not reset the word count” (P22).

Four pairs had a different approach, finding that their use of the system was highly contextual and only meaningful when it integrated into their daily behaviour: “It gets pretty fun at first, but not when you are busy, not when you are packed with a lot of stuff” (P21). Such usage was focused more on a letter-writing style approach (“More like letters. It feels like you’re writing a letter” [P1]) where participants described sitting down to put time into the communication, delaying the response until such a time when they could respond properly: “you need a free time. To sit down, and think what you want to talk, what you want to tell, and you need to organize stuff. Because since you are writing a long, quite long passage, you can’t just simply throw out some question in the middle of the line or whatever, you need to organize the whole thing” (P27).

5.2 Experiencing Effort Through Features of Message Builder

Having explored the patterns of use, and noting that these appear to indicate that Message Builder was sometimes capable of encouraging effortful communication, we now turn to explore the interviews and what they reveal regarding our participants’ thoughts regarding particular design features within Message Builder.

5.2.1 Scaffolding Effort and Emotional Impact. The data in Table 2 demonstrates that Message Builder helped scaffold effort through encouraging participants to send longer messages. Some of the pairs wrote significantly long messages, including pairs 1, 4, 6, 7 and 10. Ten people across six pairs discussed how the mandatory increase in character counts encouraged them to think more about the messages they were sending:”I think there was more of an effort to make it detailed and interesting, than just waffling” (P2); “I think you can’t just write a quick message in Message Builder. You actually need to write about something significant…” (P1); “sometimes it would sort of prompt me to write a longer message to avoid resetting” (P11). This was valued in terms of an experience that required time and thought: “I think the whole concept of having to type longer each time is actually quite interesting because it makes you think a lot more of what you actually need to type” [P19].

In many cases this led to the topics of conversation being about more personal and emotional subjects than what participants ordinarily shared with their study partner. While 9 people from 8 pairs said they mainly used Message Builder for general conversation (e.g. “I think it was just general conversation that you’d have on Whatsapp”), for 12 people from 9 pairs Message Builder led them to discuss more intimate topics: “it’s different because in the Message Builder we sort of go more in depth, there’s more like personal thoughts and feelings, rather than general sort of things that’s going on” [P20], “usually the stuff we were talking on [Message Builder] wasn’t something we touched on either Whatsapp or Snapchat” [P19].

In many cases, these more intimate conversations also led people to discover more about their conversational partner, indicating that Message Builder helped some pairs to become more “responsive to the self”, a facet of effort outlined by [22]. For example, P31 discussed their partner, stating “he basically expressed himself more than I’ve ever heard him express himself”.

Exchanges such as these may be indicative of heightened intimacy. This appears to have had an emotional impact on some of our participants, caused by the increase in effort: “we definitely get to know each other more.” [P12]; “Because of how you need to spend more time on it, as well. So yeah, definitely more thought and more care.” [P19]. “I think it’s more serious conversation... whatsapp is easier to have a joke about things... with Message Builder, things become more serious a little bit” [P1].

5.2.2 Interpreting Character Count as a Proxy for Effort. One of our design decisions was to display the number of characters in a message as a way for participants to keep track of message length. At the same time, this was intended to probe our participant’s thoughts regarding how effort is interpreted in the context of text-based messaging. Seven participants across six pairs discussed the value of the number of characters as a proxy, each stating that it was a poor proxy that actually devalued the other forms of effort they had invested into their messages: “you don’t really have to type a long message to show that you put in effort.. like how much thought you put into every message” (P25). This is of concern as it indicates that by designing a system to prioritise certain types of behaviours, one can actively disincentivise other, more positive, behaviours. Such comments were from pairs who were not sending substantially long messages.

This also calls into question what the value of enforced effort is: “I donâĂŹt see whatâĂŹs the significance of the word count, other than just kind of putting a little pressure on you to write a bit more, every time” (P15). This indicates that while the character count may have been useful as a general reminder about the status of the conversation, it was not effective in terms of reflecting the various kinds of effort that users could invest into their messages.

5.2.3 The Meaning of Resetting the Character Count. To explore the limits of acceptable effort investment, we provided users of Message Builder with a ‘reset’ button which set the character count at zero. As part of our probe, we were particularly interested in exploring the meaning of this reset and whether it factored into greater investment of effort.

Six people from five pairs used the reset as a purely functional outlet, imbuing it with no meaning beyond allowing them to send a shorter message: “I believe we pressed reset when we got too annoyed with having to reach the limit every time we said something” [P18].

In contrast, six other people from a different five pairs, did talk about the reset feature in a meaningful way. In this case, people found that sending a message created a social obligation to send a reply, a convention that the reset button broke: “I feel it’s quite irresponsible to press the reset when someone make the effort to write a very long message to you. And you just press the reset and reply ‘okay’. I think that’s kind of rude.” [P19]. “So if she put in a lot of effort then I would probably want to put in as much, so if she wrote a long, a long message. I would want to give that back, reciprocate the message because she’d put that effort in. But if she writes six hundred words, I can’t just write two. So that would feel rude, sort of thing.” [P2].

5.2.4 Channel Exclusivity: The Value of Private Talk. We consciously decided to develop a distinct communication tool rather than adapting a pre-existing technology (for example, a plug-in for Facebook messenger). We decided to do this in order to explore the effort of having to use a distinct system and whether that in of itself engendered any feelings of connectedness. Previous work has indicated that in some circumstances, close personal relationships can benefit from using technologies that only people in that relationship can use [11].
10 of our participants across 7 pairs discussed the value of this one-to-one connection. The first facet of this value comes from having a unique channel of communication which does not involve anyone else: “we have a sort of special application to communicate with each other. Like so that makes our relationship more connected in a way, because we are using a special application to communicate with each other.” [P22]; “While we’ve been friends for a long time we haven’t had very many things that were just for the two of us.” [P9].

The second facet of the value of one-to-one communication comes from the effort of having to use a unique platform. Four individuals across three pairs highlighted that “in Message Builder, if a person goes into that system, it means they went into that system to reply to that person. So it does show that that person made actually an effort, and they do want to maintain a conversation with that person” [P25]. Conversely, three people disliked Message Builder for exactly this reason, that is, the inconvenience of having to log on to a distinct system.

We can characterise the 1-to-1 connection in terms of effort by using Kelly et al.’s concept of “requiring dedicated time” [22]. By having to log-on to a distinct environment that was unique to the participants, there was a need to invest procedural effort in sending the messages. However, the fact that participants attached meaning to this effort exemplifies how procedural effort can reflect a personal investment and thus bring new meaning to use of a system [22].

5.2.5 The Effort of Checking for Messages. One of the biggest shortcomings identified by our participants was the lack of notifications for new messages in Message Builder. 19 people from 12 pairs noted that in the majority of the communication tools they use, particularly mobile apps, each received message produces a notification. However, our participants had to actively check their Message Builder client to see whether they had received a new message. This made the experience more like checking a pigeonhole for letters, or opening an email client to check for new mail. However, this procedural effort was not valued by the participants: "Without the notifications it’s pretty hard to know when he reply or anything, so I have to like constantly check it sometimes” [P25]. In some cases, participants used Whatsapp and other messaging systems to notify one another about MessageBuilder messages they had sent. This indicates that there is value attached to the features of existing systems which people find to be convenient, and which support a degree of awareness about the status of a conversation. The removal of such features may therefore not be valued by users if no clear benefit is derived from the additional work that is introduced as a result of this decision.

6 DISCUSSION
We have presented a study of Message Builder, a messaging platform that subverts current design trends by actively trying to provoke effort from its users. Our study is the first to explore how effort can be factored into the design of communication systems, and builds on previous work that identified the value of effort without probing its value in practice [e.g. 22, 26]. Our field trial has provided insight into how effort can be factored into a design, and has revealed both useful and problematic consequences associated with the use of features that demand effort. More broadly, our study contributes to the literature on technologies for close personal relationships by demonstrating how the notion of effort can be a principal driver within an interaction design. In doing so, it lends support to existing design frameworks which have identified the potential for effort to be used in this way [e.g. 11, 20], but which were lacking first-hand evidence of its potential.

Having positioned our study as a probe to understand how to design for the investment of meaningful effort, we now consider two key design lessons that can be derived from our findings.
6.1 Scaffolding Effortful Investments

Our first main finding was that meaningful effort can be encouraged through relatively minor changes to an interface design, i.e. by altering the requirements for messages to be sent in a chat application. Our intention with this work has not been to position Message Builder as an effective design in its own right, but was rather to understand how its features might shape participants’ relational maintenance behaviours in ways that involved effort. In turn, we hoped for these behaviours to be valued within each relationship.

One of the primary outcomes from our study was the way in which Message Builder sometimes guided users towards effortful exchanges that were described as requiring dedicated time and pause for thought, two qualities have been previously associated with meaningful effort [22, 25]. In our study, such exchanges were valued by users because they sometimes resulted in the discussion of topics that were intimate and in-depth, and which allowed pairs to learn more about each other. These experiences stand in contrast to what participants described as their ‘routine’ behaviours in apps such as Whatsapp or Facebook Messenger, which were typically used for mundane chit-chat [cf. 29] or social coordination [cf. 15]. In addition, Message Builder’s requirement to exceed the length of the previous message sometimes helped to structure the flow of conversation in such a way that the experience was described as more like writing a letter, an activity that has been described as sensual and intimate elsewhere in the literature [25, 32]. The evolving use of the incrementing message length meant that some participants settled into routines in which Message Builder was integrated into the natural ebb and flow of the relationship, creating experiences that involved the dedication of time, thought, and effort into the communication.

We regard these findings as demonstrative of the potential for communication technologies to prompt effort from their users, and to do so in a way that is sensitive and meaningful. While the escalating character count within Message Builder was provocative at first, participants became accustomed to the feature after they discovered what kinds of conversation would naturally emerge as a result of its presence. This suggests that providing a structure to scaffold and guide users towards the investment of effort may be more productive than tools which actively prompt, or even mandate, additional work [22].

It is important to note that participants’ practices and responses to Message Builder were varied, with some pairs finding no use for it. This is to some degree indicative of the challenges of designing for close relationships, where a technology that is considered acceptable for one person might provoke revulsion from the next [13]. However, some of the specific factors that gave participants concern stemmed from the way in which the system sometimes demanded what they perceived to be ‘undesirable’ effort associated with the need to actively check the system due to the lack of notifications. Similarly, some participants did not like the procedural effort introduced by accessing the prototype through a web browser. This suggests that there is some balance to be achieved between the existing qualities that make modern communication systems convenient and enjoyable, and the potential for new features which actively guide people towards moments of effortful maintenance. Part of our exploration was in determining which aspects of Message Builder were more or less valuable to people. Through the study we have seen that effort which was required to access and interact with the system was appreciated far less than that which emerged in the creation of meaningful messages, as prompted by the increasing character requirement. Importantly, the character requirement was not mandated, and participants could reset the count at any time in order to alleviate feelings of burden or annoyance.

We also argue that our results indicate that people have a better appreciation and understanding of the effort people have invested into their messages when that effort is clearly evidenced through the scaffold. In the case of Message Builder, this was achieved through the visible character count:
“you actually see the traces of the things you’re doing” (P1). Although our study drew attention to the limitations of the character count as a proxy for meaningful effort, it still appears to be the case that revealing something about the effort invested in a message can have meaning for interlocutors. This suggests that such mechanisms, if designed as part of a scaffold, would be a rich seam of design inspiration, and dovetails with the claims of Kelly et al. [22] who suggested that systems “could increase the visibility of sender activity in order to signal the amount and type of effort contributed” [p. 79 22].

6.2 The Challenge of Fostering Authentic Effort

A second main finding was that there was a visible requirement to ensure the authenticity of effort in communication. That is, making sure that the effort which arises as a result of particular design features is not invested ‘just for the sake of it’, and instead arises through moments of genuinely effortful relationship maintenance. Some of our participants reported appropriating Message Builder in a manner that was game-like, challenging their partner to write more by writing more themselves. This sometimes occurred in a way that was playful, but at other times arose through participants simply copy and pasting content into the application in order to provoke a response from their partner.

Related literature indicates that authenticity is a key feature of meaningful effort, with actions that are perceived to be inauthentic (such as those provoked in response to prompts and reminders from social networks) rendered as unvalued and unappreciated [22]. Messages are deemed to be authentic when recipients believe that the effort was invested willfully and through the sender’s own volition, rather than as a requirement by the communication system. This points towards a tension in the design of Message Builder; namely, that the character requirement sometimes resulted in effort that was meaningless, yet at other times the feature helped to structure participants’ conversations in a way that was valued.

This is perhaps best seen not as a challenge to be resolved but rather as an issue to bear in mind when attempting to design around effort. Our design proposal is for the effortful interface to include a mechanism for users to open an optional scaffold that can be used when wanting to write something more meaningful. Such a scaffold would be more authentic as it is activated by the choices made by the user. The scaffold would still need to communicate the signals of effort (in this case character count). Additionally, we would argue that if the recipient knows that use of the scaffold is optional, this may increase the value of the received message as the recipient is aware that the sender wanted to construct a particularly meaningful message. We intend to explore such a design in further work.

6.3 Limitations and Future Work

The present study has a number of limitations. First, effort can be invested in a variety of ways and through different media including videos and audio. In particular, the use of audio messages is becoming more popular [43]. In this study, we have focused on text alone. While text is a commonly used messaging medium, we cannot infer how our findings might apply to other media. Furthermore, we used a single proxy for effort – character count – and this is extremely limited in terms of capturing other forms of effort invested in messages. However, we would argue that as the first field trial of a communication system that was deliberately designed to facilitate and support interlocutors to send effortful messages, our results still offer an important contribution and can provide a basis for studies moving forward.

In terms of our study design, our approach was bookended, using pre- and post- study interviews. We decided not to collect participants’ views during their use of Message Builder to minimise the study burden on participants. However, use of the experience sampling method would have given

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us the opportunity to collect data during participants’ use of the system, rather than relying solely on pre- and post-measures. Additionally, for ethical reasons, we decided not to collect and analyse participants’ messages. While such an analysis may have provided additional insight, it does not detract from the findings we have presented.

7 CONCLUSION

In this paper we have contributed the first field trial of a communication system deliberately designed to facilitate and support interlocutors to send effortful messages. Our design is also the first to explore how the investment of effort can be supported over the course of a conversation rather than through single acts of communication. The Message Builder system has allowed us to explore the outcome of our design decisions, as evidenced by the experiences of our study participants. We have explored the tension that scaffolding effort has in achieving authentically effortful messages. Our study indicates that meaningful moments of reflection, and subsequent effort investment, can be fostered by virtue of a communication system’s design. We encourage designers in this field to explore effort as a resource for design, with a view to supporting experiences of meaningful connection within close personal relationships.

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Anonymous for review.

REFERENCES


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