GoSlow: Designing for Slowness, Reflection and Solitude

Justin Cheng
Cornell University
Computer Science
Ithaca NY 14850
jc882@cornell.edu

Nikhil Nawathe
Cornell University
Computer Science
Ithaca NY 14850
ngn9@cornell.edu

Akshay Bapat
Cornell University
Computer Science
Ithaca NY 14850
arb327@cornell.edu

Jeremy Crockett
Cornell University
Computer Science
Ithaca NY 14850
jbc244@cornell.edu

Gregory Thomas
Cornell University
Computer Science
Ithaca NY 14850
gmt25@cornell.edu

Gilly Leshed
Cornell University
Department of Communication
Ithaca NY 14850
gl87@cornell.edu

Kevin Tse
Cornell University
Information Science
Ithaca NY 14850
kt328@cornell.edu

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Abstract
We are surrounded by technologies that fuel a fast-paced, at-the-moment, connected life. In contrast, GoSlow is a mobile application designed to help users slow down, contemplate, and be alone. Through serendipitous moments of pause and reflection, GoSlow offers simple ways for users to cut back and relax, provides an outlet for contemplation and reminiscence, and helps them disconnect and get away. Our user study reveals that GoSlow encourages introspective reflection, slowing down, and can help reduce stress with minimal intervention.

Keywords
Slow, reflection, solitude

ACM Classification Keywords
H.5.m. Miscellaneous.

General Terms
Design, Experimentation, Human Factors

Introduction
A fast-paced, high-pressure, high-tech society expects a whole lot from its participants. Speed and efficiency are emphasized in many Western societies, and being constantly busy is a moral value, always better than being idle.

Technologies play a role in this culture: they promise to save us time so that we can do more. For instance, Remember The Milk helps one manage many to-do items (http://www.rememberthemilk.com), and RescueTime logs and analyzes time spent on computer applications and websites to boost one's productivity (http://www.rescuetime.com). These tools are predicated on scientific management principles that treat the use of time as an optimization problem, finding the most efficient and productive action to carry out at any given moment. As one becomes more efficient, in a culture that values busyness over idleness, one is encouraged to fill up the time freed up with even more activities, being caught up in an endless cycle of doing, doing, doing, and never taking a moment to slow down, take a break, and reflect.

At the same time, smart phones and social media applications are playing a role in an increasing culture of being always connected, always on, and always available. More than ever, people are exposed to and bombarded by a wide and endless range of stimuli, from advertisements to email to friend requests. While we have become experts at socializing and interacting with others, we have less time for ourselves.

It seems that today people have less downtime, as they constantly strive to abide by the norm that one has to be constantly productive and busy. Mobile devices ensure that one is never truly away from their computers, always streaming in reminders and tasks they are obligated to do. Further, people today have less time to be alone, even if physically not with others, as these mobile devices keep reminding us of our social surroundings with status updates, text messages, emails, and tweets.

Evidenced by CHI 2011's theme, "Connecting", we generally perceive communication and interaction as something that should be supported and promoted in systems. However, an "always on" and "always available" mode may have negative consequences like increased stress and ironically, reduced productivity. How can technology be used to help people do less, slow down, relax, and reflect on their personal everyday experiences without necessarily connecting to others? GoSlow is designed to fill in this gap, by introducing mini-moments of pause, reflection, and solitude in one's everyday routine. In this paper we discuss the conceptual design assumptions we considered in designing GoSlow, present its design, and conclude with results from a user study that demonstrates its potential.

Design Assumptions

Reduce, not add stress

Technology is a source of stress for many users. There is stress in learning to use a new technology and in being compelled to use it. There is stress in being "controlled" by technology. Once one uses a piece of technology, they cannot do without it, and become reliant on the representations it conveys. Regardless of its impact on our quality of life, factors like network effects or simple convenience compel us to continue using it. There is stress in being surrounded by a plethora of tools and technologies we feel obligated to use and keep up with.

To mitigate stress, we seek to make our design reflective and personal, and introduce moments of pause into a user's everyday life. While GoSlow's existence as an application that itself consumes time might seem paradoxical, we seek to reduce the cost of

use through minimal design and by not obligating formal use. We acknowledge that not every activity has to be formally represented in the system, and that slowness and reflection can happen without leaving digital traces, restoring the user's control of when and how to use the system.

Reflective, not persuasive
Applications can be designed either persuasively, incentivizing the user to perform some actions [5], or reflectively, supporting a user's ability to reflect on technology and its relationship with human life [12].

Many applications for self-improvement are designed persuasively, with an explicit goal of changing user behavior. For instance, UbiFit is a virtual garden that becomes more lush and colorful the more a user exercises [2]. Users are compelled to engage in physical exercise through extrinsic motivation to prettify their virtual garden rather than through intrinsic self-determination.

In contrast, we seek to promote discourse on one's actions and *values* in one's every pursuits by providing suggestions on how to slow down and encouraging reflection. We try to offer users new choices and insight in their lives, but leave them in charge of deciding how and to what extent they should cut back, slow down, and reflect. We avoid making the user "feel bad" about not using an application and impose the minimum possible structure required to achieve our goal of encouraging daily reflection.

Incorporating ludic, or playful elements into applications not only supports multiple interpretations [13], but also makes them more fun to interact with [7]. By providing multiple interaction modes and explaining as little as we can about how GoSlow should be used, we leave it to the user to interpret the application's purpose. As the user interacts with GoSlow, it slowly finds a way into the user's life, settling in a corner; visible but never intrusive; useful, but never coercive. By this, we seek to design reflective technology, in contrast to persuasive technology.

Design for solitude, not for connection
In an age of social media, almost every new application now supports community-driven features. We can share virtually anything with Facebook, Twitter, Flickr, and YouTube. While technology has allowed anyone to become a publisher, this new swath of accessible information has also turned us into insatiable consumers of it.

In seeking out more ways to connect with others, rarely do we take the time to sit down and think about ourselves introspectively. We live in a world where privacy and solitude have become a scarce commodity, yet are invaluable for creativity and for finding inner peace [6].

Turning away from social media brings focus back to the self. A self-contained application allows users to reclaim their own personal spaces, and express themselves with less fear of being judged out in the public. We therefore seek to design an application that emphasizes the individual users and their inner thoughts and feelings away from the front stage of constant impression management.

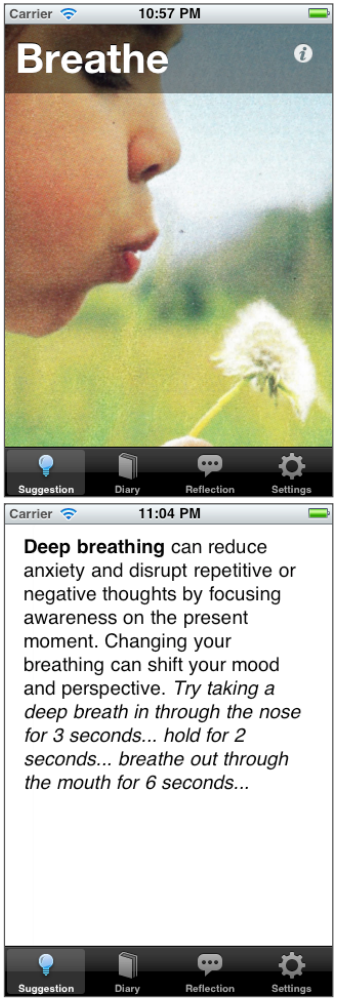

Figure 1. A suggestion screen includes a theme and image (top) and more information (bottom).

GoSlow Application Design

GoSlow is designed around daily suggestions and reflections. It serves as a subtle reminder for the user to reflect on what they can do to reduce stress and cut back. At no point does it coerce the user to do anything – we leave the user to decide how to interpret and incorporate GoSlow's ideas into their lives.

We designed GoSlow for mobile devices because of the significantly lower time cost in using a mobile application versus a desktop application. Applications like GoSlow are not unprecedented – the T2 Mood Tracker for the Android mobile platform allows patients to track their mood throughout the day (http://t2health.org/apps/t2-mood-tracker). By targeting mobile devices we can take advantage of their accessibility, availability, and with the advent of touch computing, their ability to deliver rich interactions. GoSlow runs on the Apple iPhone as an installed application, and makes use of local notifications and the integrated camera.

GoSlow's functionality can be separated into three main parts:

- Suggestion, the creation of awareness and effecting of change in a user's life in a non-intrusive manner,
- Reflection, the provision of multiple methods for users to record their thoughts in the application and
- Reminiscence, a private space for users to look back and think about their past reflections.

While ludic design helps pique a user's interest and supports discourse [7], we designed GoSlow to clearly support suggestion, reflection and reminiscence. We wanted GoSlow to be fun but familiar, and worked towards a consistent design with a minimal feature set. Ludic design was applied within the broad scope of these ideas, like supporting multiple modes of creating reflections (e.g. color) or exploring existing reflections.

Suggestions

GoSlow uses a database of suggestions to be presented to users as they access the application. A suggestion is made up of a theme (e.g., laugh, relax your body, exercise), an accompanying image, and additional information about the suggestion (e.g., Laughter jolts us out of our usual state of mind and can eliminate negative feelings…). The suggestions used in GoSlow, including the themes, images, and texts, were developed by our university's Health Promotion Department. Based on established literature on stress management and on ongoing interactions with students, these suggestions are designed such that anyone could incorporate them into their everyday lives.

At a time the user chooses during application setup, typically in the morning just after the user wakes up, GoSlow prompts a notification about a new suggestion for the user to think about during their day. Every day, the application randomly chooses one suggestion from the set of suggestions to be presented to the user. The "morning notification" includes the theme of the suggestion. The whole suggestion screen is presented if the user follows the notification to the GoSlow application, as well as each time the user accesses the application that day. The front end of the suggestion screen includes the theme and image (Figure 1, top), with the additional information presented by tapping on

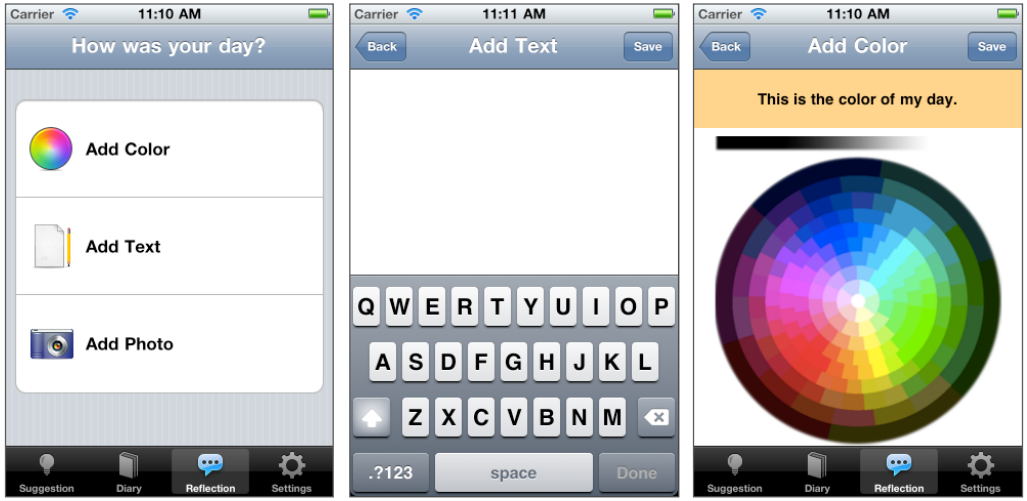

Figure 2. From the main reflection menu screen (left) the user can enter a reflection by adding text (center), choosing a color (right), or taking a photo using the iPhone's built-in camera.

the image as if flipping a card to show the text on its back (Figure 1, bottom).

Reflections

Reflections are how users record information in GoSlow. At a time chosen by the user during application setup, typically at night before going to bed, GoSlow prompts the user via a notification to think about how their day went. Following that notification into the GoSlow application leads the user to the reflection screen (Figure 2, left). Users can then record their reflections in writing, by taking a photograph, or by choosing a color that represents their day. They can access the reflection screen at any point during the day and can record as many or as few reflections they want each day.

WRITING

Like how a person might keep a diary, we allow users to express themselves in words, and provide a standard interface for text entry (Figure 2, middle). Given the input phone interface on a phone, and in order to avoid pressuring the user to write lengthy diary entries, the space for writing is small (although there is no limit on how much the user can actually write).

TAKING A PHOTOGRAPH

Mobile applications like Instagram or Foodspotting already encourage expressiveness through taking photographs instead of writing text updates. Photographs communicate a lot of information about their subjects and contexts with minimal effort to the viewer. This is especially true from the photographer's perspective. GoSlow connects to and uses the existing camera functions on the iPhone for the user to take a photo for recording their reflections.

CHOOSING A COLOR

Another quick way to record reflections is by choosing a color from a color palette that represents the user's day (Figure 2, right). Color is commonly associated with moods and opinions. For example, blue might be associated with calmness and serenity [11]. Although novel, color is a familiar concept for expression, and we thought that people might use color to convey their emotions.

Diary

Diaries help externalize a user's memories, aid in recall of past events, and support reminiscence, an important facet of human life [14]. Previous research has found that people value technology that enables reminiscence [3]. The diary in GoSlow consists of representations for

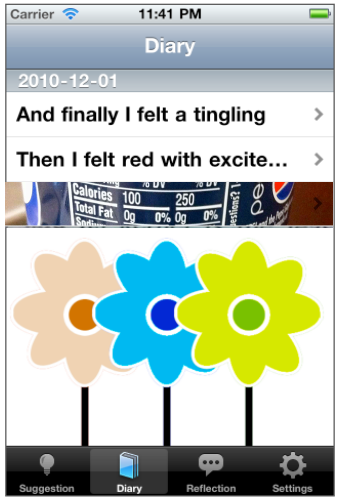

Figure 3. A diary entry for one day consists of all reflections entered that day: text entries, photos taken, and flowers showing the colors the user chose for that day.

each day in which the user recorded one or more reflections (Figure 3). Each day is represented in one screen that shows a list of the writings and photographs that they made in reverse chronological order. Tapping on each entry in the list opens the full text entry or photo. The user can flip back and view other days in which they entered reflections.

In addition, flowers appear in the diary, with their colors corresponding to what a user picked on a specific day. We chose flowers as they have a serene, natural connotation. The presentation of the flowers varies as the number of colors picked in a day grows. They turn from being neatly arranged to randomly filling up the screen. We present this unpredictability as a ludic, playful feature of the application, which users are meant to discover as they experiment with GoSlow.

User Study

We tested GoSlow with seven participants in the United States. All participants were undergraduate and graduate students from across campus (4 male, 3 female) ages 18 to 24 who already owned iPhones. Our choice of students as potential users was deliberate, given that the suggestions were intentionally designed by the university's health promotion department to address students' stress management needs. With our familiarity with students' daily schedules, we set the default times for the morning suggestion and the evening reflection notifications to be 10 a.m. and 10 p.m., respectively.

A prototype of the system was installed on each participant's personal iPhone. Participants then used the system for 7 days. The prototype logged participants' activities with the application, including the screens they viewed, suggestions they received, and reflections they recorded. Over the course of the study, we collected a total of 53 recorded reflections, of which 30 were text entries, 22 were colors, and one was a photograph.

At the end of the 7-day use period, users filled out a survey about their experiences with GoSlow. The survey included scale and open-ended questions about usage habits, ease of use, usefulness, and other positive and negative aspects they found about the system.

Results

In our data we looked at the ways in which participants used the GoSlow application and for evidence that they subjectively perceived it as useful for them. In general, despite the limited scope of the study that we conducted, our findings demonstrate the potential of a tool that is intentionally designed for pause, reflection, and solitude. Participants used the GoSlow application a few times during the study period and their responses to the survey questions were mainly positive. They enjoyed using the application, and all of them found it easy to use. Most of them saw value in using GoSlow to help them reflect, reduce stress and slow down. Below we expand on few themes that emerged in the user study based on both the use logs and on the survey responses.

Conflicting aspects in slowing down

All participants used the application during the study period and viewed the daily suggestions it offers. Six participants reported they enjoyed seeing the suggestions pop-up in the morning, indicating that the

suggestions were helpful and that they looked forward to a new day's suggestion.

Designing a tool to help one slow down and relax is a real challenge: during the design period we were watchful to not create a tool that directly consumes more time from its users. This concern was expressed by some participants when asked whether they would continue to use GoSlow beyond the study period, as one said that it "depends on how free I am". On the other hand, we hoped that by viewing the suggestions participants would mindfully consider their busyness and pace of life. One participant reported that "it was good, it made me slow down."

However, we did not expect users to directly follow the daily suggestions, but instead to use the suggestions as subtle reminders about the opportunity to take mini-pauses during their day. This follows our design goal to not persuade users into behavioral changes but lead to more internal reflective processes. Yet, reading through the text reflection entries reveals that some of them included direct responses to the suggestions, whether participants followed the daily suggestion or not. In the survey, one participant reported that she tried to follow the suggestions and another said that the application reminded her "to do something". This suggests that there exists a fine line between being "reflective" and "persuasive", and that designers should be cautious especially when designing a system with both introspection and behavioral elements.

Reflecting with and without the system

Users recorded their reflections on average about once a day, with a total number of reflections per participant during the study period ranging from 4 to 15. 85% of the reflections (45 out of 53) were recorded in the evening and at night. 25% of them (13 out of 53) were made between 10 and 11 p.m., the default evening notification time that reminded the user to record a reflection. From the large proportion of reflection occurring shortly after a notification, we believe they were instrumental in helping people think about their day, even if they used GoSlow minimally.

Participants often used both color and text entries to record reflections and convey their mood. Examining the valence of the text entries and together with the colors chosen at the same day revealed that users tended to color their day blue and red when they were in a positive mood, and choose dark colors when they were feeling down. One user mentioned: "I wanted to pick black because I was feeling down." On the same day that he picked midnight blue, he also wrote that he felt "tired". In contrast, another participant picked bright blue when he wrote that he felt "good".

Only one user took a photograph during the study as a reflection entry. Since the reminder to reflect appeared in the evening, participants entered texts and chose colors that corresponded to experiences they had throughout the day. However, taking a photo requires recording the reflection at the time that the experience occurs. One user usefully suggested enabling to upload pictures from their phone's photo albums, which we incorporated into a subsequent version of GoSlow.

Based on users' responses to the survey questions, we believe that reflection occurred outside the application as well, without recording it in the system. Using notifications to prompt the user to reflect was seen as useful, as one participant noted: "it helped me to think

about my day for at least 30 seconds when I see "How was your day?" pop up." Success may not necessarily be judged based on logs of system use, but also on subjective benefits users find in the subtle reminders and simple ways in which their daily experiences were affected.

Solitude is valuable
Like tweeting or writing a Facebook status update, users kept their entries short. This can be attributed to the space allocated for typing a reflection entry and to the nature of typing on the iPhone, which does not comfortably support long-form writing.

However, analyzing the text entries reveals that their style differs considerably from tweets or Facebook status updates in how personal they were. We found reflections that were more introspective than what we would have expected if the system connected to social media applications. Participants were candid with their emotions in their reflection entries, for example, "stressful but getting through," and "Pretty shitty. Red eye flight here and one of my so thought best Friends forgot my birthday." Based on the survey responses, users tended to view the application more as a personal diary than as a social media application: "sometimes u need to vent somewhere," and "I could write in my thoughts dat I wanted to share. This app could be my buddy."

Our results confirmed any doubts about whether GoSlow should connect to social networking applications like Facebook. Designers should not automatically assume users always want social elements in their experiences. We liken GoSlow's diary-keeping feature to "Twitter for the soul" – users type not for other people, but for themselves.

It might be ironic that we offer users a chance to disconnect using the very tools that connect them to the world. Still, GoSlow itself encodes values of reflection and solitude. Through the application, we hope to involve users in this ongoing conversation about connectedness versus solitude.

Discussion

The results of our study demonstrate the potential of software that is designed for the solitary user to reflectively reduce, do less and slow down.

Success in HCI is traditionally evaluated using aspects such as efficiency. How do we then examine a tool designed for using time *less* efficiently? Our findings suggest that GoSlow can be considered a successful "reflective tool": (1) rather than encouraging users to do more it helps them *reduce load*; (2) it enables users *critically reflect* on their stress and busyness in their everyday lives; (3) it offers users *utility* rather than simply stimulating reflection; and (4) rather than enforcing an outside imperative to reduce load as a persuasive technology approach might, it leaves *users in charge* of deciding how and to what extent they want to pause, reflect, and disconnect.

While traditional HCI methods are designed for task-based applications, they are less concerned with technology designed for relaxation, reflection, and fun [1]. Despite the difficulty in reconciling utility and reflection, we find that design that is ludic and reflective can still be useful, distinguishing GoSlow from previous efforts to design for slowness [8]. This is

similar to Dunne and Raby's Compass Table, designed to encourage thinking about the electromagnetic waves created by the gadgets around us, but also useful in signaling whether there are incoming calls to phones placed on it [4]. In GoSlow, color for example broadens the vocabulary users can use to express themselves, and randomness of the daily suggestions generates continued interest in what the application has to offer.

GoSlow worked because: (1) users could freely choose when and how to incorporate the simple suggestions for slowing down into their everyday lives, (2) users were pausing for a few seconds and thinking about their everyday experiences of stress and pace of life, and (3) they were looking inward rather than connecting to others. All this happened with a system that was minimally designed, leaving the user in control of how and when to use it, and what happens inside the system and outside of it.

Conclusion and Future Work

Through the design of GoSlow and the study results, we demonstrated the potential of software that is designed for the solitary user to reflectively reduce, do less and slow down. Up to this point, our research with GoSlow has been largely exploratory, and we believe significant work can be done developing and refining technologies to help people slow down, reflect, and disconnect.

Make GoSlow more expressive
There is promise in including ludic elements in applications. Future versions of GoSlow can include image filters for photographs like Instagram has, text formatting for variety in entries, or even simple music composition. However, care has to be taken to ensure that these elements do not overly complicate the application, or make it more difficult to use.

Incorporate GoSlow into productivity tools
What if your calendar offered you blocks of free time? While GoSlow was successful in slowing users down, it does not directly manage a user's time and tasks, and cannot directly replace productivity tools like calendars and to-do lists. Spontaneous moments, dead times, and gaps between tasks in one's daily routine are typically marginalized in such productivity tools [10], but can be leveraged for moments of reflection, relaxation, and solitude. The next step for us would be to integrate the ideas behind GoSlow into these applications and design them to better support reflection on one's everyday experiences and on their time and task commitments.

Test with more users in other cultures
Testing GoSlow with a larger and more diverse pool of users will help us better understand how people relate to technology and slowing down. GoSlow is currently designed based on our understanding of the American culture of busyness [9] and was tested in the context of US college students.

A fast-paced life accompanied with stress is not necessarily the norm everywhere – siestas are common in southern Italy and being late in Latin America is accepted and expected. Running comparative studies outside of the US, in metropolitan areas like Tokyo or London, in suburban areas, and with participants other than students, might yield differing results in how cultures and sub-cultures perceive busyness and idleness and how they might respond to a reflective application like GoSlow.

Consider other ways to design for slowness
GoSlow is an initial attempt at creating an application for slowness and disconnection through suggestion and reflection. We call out for future systems designed for slowness, inviting users to not only take time to reflect, but also slow down in their other interactions. By this we challenge the ongoing "do-more-in-less-time" orientation in HCI and other computation design.

Our preliminary findings are encouraging, and we believe that there certainly is value in incorporating reflection and discourse into the tools that we use every day to manage our lives. And while technology connects us to more people each day, we find increasing value in tools that help us be alone [6]. In doing so, we can better evaluate ourselves, our pace of life and everyday busyness, and how we should and could manage our well-being.

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