Delightful screen time visualizations: A sketching-based exploration

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DELIGHTFUL SCREEN TIME VISUALIZATIONS: A SKETCHING-BASED EXPLORATION

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ABSTRACT

Uncontrolled smartphone usage and excessive screen time are detrimental to people’s wellbeing. Informing people about screen time behavior is one strategy to help them attain digital wellbeing—a pleasurable, efficient, and controlled relationship with smartphones and other everyday technologies. This paper presents a series of sketches that explore unconventional, delightful screen time visualization on smartphones, illustrating an alternative to conventional screen time graphs. By showcasing these design concepts, this paper seeks to promote analog sketching as a valuable off-screen practice for design research, as it involves immersion, patience, and reflection.

INTRODUCTION

The uncontrolled use of smartphones is problematic for many people (Bernroider et al., 2014; Nath, 2018; Geng et al., 2021). Excessive screen time undermines children’s and teenagers’ sleep, cardiovascular system, mood, and behavior (Lissak, 2018). It negatively affects the life quality in adults as well (Davies et al., 2012; Wang et al., 2019). Consequently, design academia and industry are looking for solutions and strategies that help people become aware of their screen time and keep smartphone use under control. That is, to help people attain digital wellbeing (Monge Roffarello & De Russis, 2019; Büchi, 2021; Purohit et al., 2020; Cecchinato et al., 2019; Cecchinato et al., 2019).

Some smartphones—and many third-party apps—employ graphs to inform and educate the user about her screen time and use behavior. This approach is appropriate to display quantities. However, conventional graphs may be ineffective in interesting the user to learn about her screen time, and become more reflective or critical about it. In this regard, alternative, nontraditional approaches to displaying screen time might better appeal to the user.

By considering the role of delight in elevating the aesthetics and persuasiveness of the user experience (Sosa-Tzec, 2022b; Sosa-Tzec, 2022a), this paper explores the application of the design delight framework to conceptualize, through sketching, unconventional, delightful visualizations of screen time on smartphones. This exploration has a research-through-design orientation (Zimmerman et al., 2007), and is concerned with the experience and affordances of analog sketching, particularly for the ideation of delightful design. Due to length constraints, this paper concentrates on briefly describing this exploration’s approach and outcomes, closing with a short reflection.

APPROACH

Design delight is a conceptual framework concerned with how designed objects and their user experiences contribute to people’s happy and flourishing lives. This framework centers on six experiential qualities: engagement, surprise, liveliness, cuteness, serendipity, and reassurance (Sosa-Tzec, 2022b). Engagement occurs when a designed object becomes the center of the user’s attention and sends other stimuli in the context to the periphery. A designed object causes surprise when it appears, functions, or behaves unexpectedly but without minimizing the user’s liking towards the object. Liveliness is a designed object’s quality to convey energy, autonomy, whim, excitement, or dynamism through appearance or behavior, coming...
Cuteness refers to the quality of a designed object’s appearance and behavior that makes it seem vulnerable, tender, innocent, harmless, or helpless, urging care from the user. Serendipity arises when a designed object communicates multimodal information or presents an appearance, behavior, or functionality that results in a fortunate, grateful, helpful, or valuable outcome for the user. Reassurance refers to a designed object’s quality to remove feelings of uncertainty, disorientation, ignorance, or anxiety in the user through multimodal information communicated by the object or conveyed by its appearance, behavior, or functionality.

The decision to conduct the exploration of screen time visualization alternatives through sketching comes from acknowledging it as an archetypical, initial activity in the design process and the power it has to promote and relate thinking, learning, and representation (Buxton, 2011). The central idea of design delight and its six experiential qualities were taken into account during the sketching. These were used as guides rather than as design requirements. Other elements that informed the sketching include literature on digital wellbeing and design, and the personal experience of using the iOS screen time widget for many months. The preference for analog or handmade sketches over digital mockups was

<table>
<thead>
<tr>
<th>ENGAGEMENT</th>
<th>Becoming the center of the user’s attention and sending other stimuli to the periphery.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURPRISE</td>
<td>Appearing, functioning, or behaving unexpectedly but without minimizing the user’s linking.</td>
</tr>
<tr>
<td>LIVELINESS</td>
<td>Appearing alive, charged, cognizant, or able through appearance or behavior.</td>
</tr>
<tr>
<td>CUTENESS</td>
<td>Appearing vulnerable, tender, innocent, harmless, or helpless, and urging care from the user.</td>
</tr>
<tr>
<td>SERENDIPITY</td>
<td>Communicating multimodal information or presenting appearance, behavior, or functionality that is fortunate, grateful, valuable, or useful for the user.</td>
</tr>
<tr>
<td>REASSURANCE</td>
<td>Removing feelings of uncertainty, disorientation, ignorance, or anxiety in the user through multimodal information, appearance, behavior, or functionality.</td>
</tr>
</tbody>
</table>

![Design Delight Table]

**Figure 1. Connections between the six qualities of design delight and the nine sketched design concepts.**

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a consequence of the research topic—digital wellbeing—and the importance of detaching oneself from the screen to engage in activities that not only bring pleasure but also promote concentration, learning, patience, and acceptance (of one’s mistakes and imperfect outcomes).

PORTFOLIO OF DESIGN CONCEPTS

The outcome of the sketching activity were nine design concepts—one sketch per concept. The concepts are intended for the home screen or the lock screen of a smartphone. All concepts have the visualization of the most used app as their primary objective. Some concepts include the visualization of the pickup app, the name given here to the app constantly opened by the user immediately after she unlocks her smartphone. Though design delight guided the overall conceptualization of each proposal, some concepts include design features that are strongly connected with the qualities. Below is an annotated portfolio (Bowers, 2012) of the nine design concepts. A visual synthesis on the connections between design delight qualities and the nine proposals in included in this portfolio as well (Fig. 1).

SCREEN TIME GOO

Screen Time Goo is dynamic visualization for the home screen, which starts the day pristine after midnight. As a result of smartphone use, six colorful streams of goo appear on the screen. Five streams represent the most used apps so far. Consequently, the visualization may vary throughout the day. Each stream uses the most prominent color of the app’s button. The remaining stream is colored gray and represents all the other apps below the top five. The streams slowly start occupying the space on the home screen, including the gutter between app buttons. An app’s goo stream increases based on its screen time. The largest stream of goo refers to the most used app. The viscosity of the pickup app’s stream is different. Unlike the other streams, the pickup app’s goo becomes runny and drippy, reaching and staining the bottom of the screen. The user learns about her screen time behavior at the end of the day by observing the amount of goo occupying the home screen and how stained it is. One could consider surprise as the central quality in this concept and closely connected with engagement and liveliness. The user does not know what to expect to see during the day and may want to contemplate and reflect on how the goo streams take over the screen.

HUNGRY PAL

Hungry Pal is a gamified, interactive widget inspired by the digital pet Tamagotchi. This pal expresses various feelings and states, including excitement, hunger, and stress. The latter states appear when the user spends more time using apps than permitted. The user can define this time in the settings menu. Moreover, it can derive from the past behavior of the user, her friends, or users of a particular app. The hungry pal perishes if the user neglects to feed it by dragging an app’s button into the widget. The hungry pal shows excitement when this event happens. The app button appears garnished and appetizing. This app remains blocked for the rest of the permitted screen time after the little pal devours the app. The user has three opportunities to prevent the hungry pal from starving. These opportunities appear on the widget as heart shapes. Above them is a circular progress bar indicating the percentage of screen time already spent for the current opportunity. If the user knows that she cannot take care of and feed the little pal, she can put it to hibernate—this means the user can use her smartphone freely for whatever period she wants. Independently of the user’s decision, the buttons of the five most used apps always appear chewed off. A little fork indicates the pickup app as well. These are suggestions to feed the little pal. Cuteness is the central quality of this design concept, followed by engagement due to the attention needed by the pal. In this concept, the user connects app blocking with something positive: taking care of the hungry pal.
SCREEN TIME TILES

Time tiles works on the home screen and modifies the width and height of the five most used apps’ buttons to visualize screen time behavior. It uses the same grid applied to arrange the app buttons to determine the size increments, proportions, and position of such buttons. The most oversized tile indicates the most used app. The second and third most used apps appear smaller, and the size of the fourth and fifth most used apps is smaller still. This visualization has no tile or visual cue representing the pickup app. Engagement is a crucial quality of this concept, which seeks to catch the user’s attention by increasing the size of the app buttons. Besides the possible surprise of seeing how the tiles change, the user can quickly realize her screen time behavior and be more conscious about why she has been using the top apps and whether she wants to continue doing it.

SCREEN TIME STRIPES

This dynamic visualization for the lock screen presents screen time as a stylized histogram whose base is at the bottom of the screen and its y-axis is the screen’s height. The stripes represent the five most used apps. Each stripe uses colors that allude to those found in the corresponding app’s button. The segment corresponding to an app’s screen time data appears brighter than the background above the segment. This segment also includes a subtle color-based segmentation to facilitate its reading. A thin white line separates each histogram bar from the background above it. The default range for the y-axis is the 24 hours of the day. However, the user can choose another block of hours, which could refer to a personal goal or a calculation—for example, the median or mean—of previous data from the user, her friends, or users of a particular app. The user might focus on specific goals concerning working hours, leisure, or bedtime through different configurations.

Engagement—the first thing the user sees when she takes her phone—and surprise—through the variations of colors and proportions in the visualization—are evident qualities of this concept. Nevertheless, serendipity could play a crucial role in the experience, mainly when the user defines specific periods she wants to track.

SCREEN TIME BUBBLES

Ten bubbles constitute this dynamic visualization for the lock screen. These float slowly, bouncing into each other, especially when the user shakes the smartphone, though they will always concentrate around the center of the lock screen. Nine bubbles refer to the most used apps. The remaining bubble encapsulates data from all the other apps. Their colors allude to the prominent colors in the corresponding app buttons. A halo around a bubble indicates the pickup app. This halo could appear in the tenth bubble if applicable. The screen starts empty each day. The bubbles start appearing and varying due to smartphone use. The visualization adjusts the proportions of the bubbles to show a hierarchy. The number one app will always appear larger and show the app’s name and current screen time. Only two other bubbles include the app name: the bubbles for the second and third place. Located at the bottom left corner, the variation percentage of screen time concerning the previous day shows. Next to this quantity is a little arrow that indicates whether there is an increase or decrease. Engagement is central in this visualization and relies heavily on the appearance and motion of the bubbles. Nevertheless, the names, screen time of the most used app, and the comparative screen time percentage help the user make a quick reading of her behavior and the app affecting her goals, leading to moments where serendipity arises.
SCREEN TIME LOCKER

This interactive widget blocks five apps for a given period. The user sets the timer—located on the top part—by swiping up or down on its numerals. On the timer’s left side is a button showing a padlock with an open shackle. Tapping on this button locks—the apps for a set time. Immediately, the countdown starts, the shackle closes, and the locker—the widget’s bottom area, where the five apps are—contracts vertically, leaving only the timer visible. The user cannot use those five apps as these are hidden. The locker opens once the time is up—it expands, revealing the apps. By default, the locker shows the five most used apps. The number one app will always appear bigger and display its current screen time. The user can remove apps from the locker and put any other app inside. The number one app of the day will remain fixed unless the user deactivates this default setting. For the free-selection mode, an animation in the visualization will communicate the new hierarchy and which app has the number one position. The user can always reset the widget to its default mode. Engagement and serendipity are qualities that are important for this widget. Showing a large button to catch the user’s attention and providing screen time for that app help the user learn about and reflect on her behavior and decide how she could achieve her goals by blocking specific apps.

SCREEN TIME PLANT

This dynamic visualization for the lock screen shows a plant whose health is affected by the user’s screen time behavior over a given period, which could be days, weeks, months, or up to a year. The period starts with a fresh, healthy plant, which gets sick due to the most used app and the pickup app. The former causes brown leaf tips, whereas the latter produces leaf spots. Linked to each affection is a translucent white label showing the app’s name. Behind the name, a red bar represents the percentage of screen time for that app in its corresponding category—most used app or pickup app—concerning the current day. Three dots on the name’s right side work similarly to a traffic light. Only one at a time and from top to bottom, they change color from white to red, yellow, and green to express the severity of the app’s screen time in its category and concerning the visualization period. The plant will try to heal if the screen time decreases. It might not heal completely, nonetheless. By the end of the period, the user can learn and reflect on her screen time behavior based on how healthy or sick the plant is. Engagement and liveliness are essential qualities in this visualization. They connect with surprise, serendipity, and reassurance when the user gains insight into how her behavior during the period can affect her wellbeing, represented by the plant.

SCREEN TIME WILDFIRES

Screen time appears as wildfires in this dynamic visualization for the lock screen. The wildfires occur in a forest landscape, which occupies the whole screen, conceptually divided into rows representing the hours of the day or of a given period defined by the user, going from the horizon line of this forest to the bottom of the lock screen. Regardless of the visualized period, the landscape will change to reflect the sun’s position and weather. Within a row, a wildfire will show when the current screen time surpasses a threshold defined by the user or calculated from past behavior of the user, her friends, or the users of a specific app. The extension and intensity of a wildfire reflect the time spent using the smartphone. Once the day or period starts, the user cannot turn the visualization off or reset it. All the wildfires will remain visible and only disappear after midnight—if the visualization is in the 24-hour modality—or reset the visualization in the settings—for any other period. Engagement is a vital quality of this visualization, engendered by the wildfires and the changes in scenery. There is a strong influence of liveliness as well. In addition to the surprise that the emergence of the wildfires could provoke, observing the wildfires could help the user identify difficult moments of the day or period and feel reassured about those moments when screen time did not impede her from achieving her goals.
SCREEN TIME HONEY BOTTLE

Like those found in supermarkets, a bear-shaped honey bottle is the central element in this dynamic visualization for the lock screen. The honey in the bottle represents the screen time that the user has available to consume each day. In the settings menu, the user can define the permitted screen time. This time can also derive from the user’s or her friends’ past behavior data. On the bottle, there is a blue line indicating the maximum level of honey, which replenishes as soon as the day begins. There is also a label with an arrow pointing to this line communicating the total screen time available for the day. Using the smartphone depletes the honey in the bottle. The bottle will remain empty for the rest of the day if the user consumes it all. A warning icon and a red rim on the honey’s surface appear if the user incessantly unlocks and uses the smartphone within a short period. The bottle’s label shows the current screen time and the most used app’s icon below the word “Honey.” The leading quality in this concept is cuteness, which closely connects with engagement and surprise. Associated with this cuteness is presenting screen time not in an aggressive or concerning way but as something delicious and pleasurable.

CONCLUSION

This paper presents the analog sketches of nine design concepts exploring unconventional, delightful screen time visualization alternatives that can help a person attain digital wellbeing. Future work involving these sketches includes eliciting and analyzing attitudinal reactions from smartphone users. Takeaways from this exploration revolve around the generative application of the design delight framework and value of sketching as a research-through-design activity and domain. Design delight not only posits delight as significant element in the user experience but connects it with living a happy and flourishing life. This idea suggests that delight—and aesthetic experience, in general—plays an important role in how design helps people attain wellbeing, including the digital kind. As designing for delight is part of the user experience design discourse, the notion of delight seems to be taken for granted. The sketches here presented seek to illustrate that designing for delight is far from merely ornamental and that utilizing a framework centered on delight-related qualities can be useful to conceptualize design alternatives that are still centered on the user’s needs.

Regarding analog sketching, this activity becomes more significant when digital wellbeing is the domain being explored. Working with pen and markers transforms into a kind of mindfulness practice where the lack of copy, paste, and undo urges one to be patient, focused, and embrace imperfection. Sketching entails learning and skills development: rendering techniques, understanding materials interaction and quality, semiotics, visual persuasion, etc. The value of sketching in research-through-design should not be diminished. As the sketches here presented seek to demonstrate, serious sketching can set the scope of the kind of design outcome that a research-through-design project might need to produce.

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Buxton, B. (2011) Sketching user experiences: getting the design right and the right design. Nachdr. Amsterdam, Morgan Kaufmann.


