

Time Mindfulness:

*Designing a Process Model and Prototype
Application to Create a Preferred Future*

by Brandon Laird

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of the requirements for the degree of
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Abstract

Evolving technologies are continually changing our constructs of time. There is an increasing need for parallel performance in virtual time-space resulting in expanding expectations from us. Thus, we need innovative tools to proactively create the lives we want rather than reacting to demands placed upon us. Moreover, existing tools based on traditional representations of time and tasks are not inclusive of diverse chronotypes. In search of an inclusive design solution to this challenge, I examined the time management strategies of 65 participants of an online workflow design course ([skillshare.com](https://www.skillshare.com)). Informed by user requirements derived from the research described above, and from my own experiences as a technology user, I developed a process model for future planning and a prototype smartwatch with an innovative spiral representation of time and tasks to help visualize the day and establish an inclusively designed task flow and routine.

Acknowledgments

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Dedication

I dedicate this paper to my family: my wife Cynthia for her support through my time at school, and my boys, Jackson and Austin, for their sacrifice of time with their father.

Thank you for allowing me to complete this pursuit!

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1. Design Context

“Work hard when it’s time to work. Play hard when it’s time to play. Enjoy listening to Grandma’s old stories while she is still alive. Meaningfully connect with your friends. View children through the eyes of wonder with which they see the world. Laugh at jokes and life’s absurdities. Indulge your desires and passions. Save for a rainy day, and save enough to spend when it is sunny. Recognize the way in which your social and sexual behaviour complements your rational self. Take fuller control of your life. These are all the benefits of learning to achieve a balanced time perspective and are key to unlocking personal happiness and finding meaning in life despite the relentless, indifferent ticking of life’s clock.”

—Phillip Zimbardo & John Boyd in *The time paradox: the new psychology of time that will change your life*.

1.1 Background

Time is a popular concept that permeates our daily existence. Yet, philosophers and scientists alike remain intrigued by its unfathomable characteristics (Adam, 2013).

Traditionally monitored by individuals through watches and calendars, time has always governed our lives. Furthermore, since the arrival of the digital age, the construct of time has changed rapidly with the advent of continually evolving technologies.

According to Kimberly Fisher, a sociologist who studies time at Oxford, time researchers from around the world are reporting increasing levels of overload for both women and men (Fisher, Egerton, Gershuny, & Robinson, 2007.) There is a sense that life is ‘speeding up’ and people are finding fewer moments for peaceful

contemplation. This speeding up refers to our perception of time in contrast to realist or 'more objective' notions of time ordinarily associated with, for example, the physical sciences.

Within this noncognitive perspective, time is a subjective experience that can seem murky, porous, or without increments, that can be decomposed to units with sharp boundaries, as implied by everyday artefacts such as watches and calendars. Schulte posits that an individual's perception of time, (or their 'construction' of time within their subjective experience), relies on, or is a function of, their artifacts, (such as watches and calendars), and schemas, (such as linear time metaphors), that enable conceptualization, measurement, and organization of activities in time (Zimbardo & Boyd, 2008, p. 23.)

Technology influences an individual's perception, (or subjective experience), because, in 21st century society, our smartphones, tablets, computers, televisions and other digital devices are interconnected through networks. Duncheon and Tierney (2013) suggest that 'traditional' theoretical and methodological approaches to time research can no longer describe how time is experienced in our digitally mediated world.

1.2 Problem Statement

We currently apply a one-size-fits-all approach to time, without understanding individual time preferences or chronotypes and cultural practices around time.

Research conducted around chronotypes address “social jetlag” to create an understanding of people with different rhythms of sleep (Wittmann, Dinich, Merrow & Roenneberg, 2006.) In addition, there are two major internationally recognized time systems that influence society: monochronic and polychronic—which stand, respectively, for a preference for doing one thing at a time versus doing two or more things simultaneously (Bluedorn, Kaufman & Lane, 1992.) These are illustrated in Figure 1.

Monochronic/Polychronic Time Use Continuum

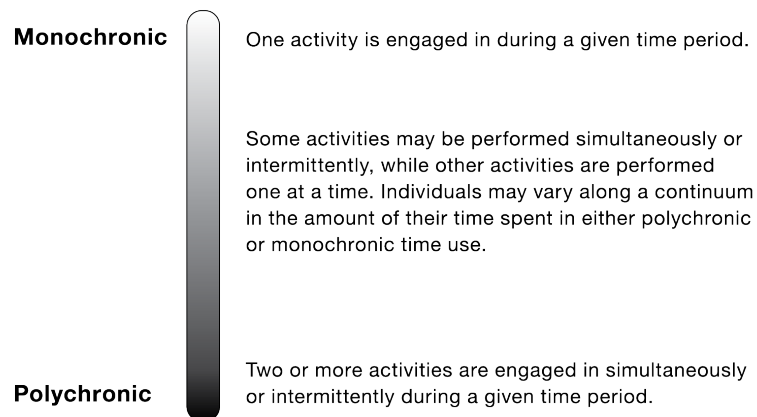


Figure 1: Monochronic/Polychronic time use continuum (Bluehorn, Kaufman & Lane, 1992.)

This might imply that the strategy people use for managing tasks and time could be different based on where they fall in the continuum. These differences beg the need for a new design approach that is inclusive of such diversity.

There is a gap or a problem to solve in western society. Most of the tools and techniques around time management and scheduling relate to workdays from

Monday to Friday. These tools do not include family goals, life goals, and daily routines to start and stop certain behaviours, and planning and tracking sleep. However, digitally mediated time also creates an opportunity for inclusive design to intervene and to introduce new metaphors, models and frameworks that could lead to an individual's preferred future. Rushkoff (2013) suggests that the opportunity offered to us by digital technology is that it can help us reclaim our time by programming our devices to conform to our personal and collective rhythms. The felt need, therefore, is for an innovatively designed digital tool that could make this possible.

1.3 Design Challenge

The design challenge I undertook for my major research project, (MRP), is to create a process model that inclusively designs new interfaces for time planning tools, calendar tools and smart watch interfaces, and that establishes a daily flow/routine that helps visualize the day. In order to do this, I worked on developing a richer understanding of the diverse metaphors used by individuals to conceptualize time and the tools, artefacts, strategies, and schemas they use to organize tasks in time. While such tools could be of use to everyone, the primary user group might comprise those who are interested in using technology for time planning as well as for managing their work efficiently. While designing and implementing these processes, I also kept in view the three dimensions of inclusive design (Treviranus, 2014):

1. Recognizing diversity and uniqueness of end users and fostering self-awareness in end users;
2. Using inclusive processes and tools; and
3. Expanding the design focus to encompass awareness of the systemic impact of the design to aim at a broader beneficial impact.

1.4 Approach and methods

I adopted a design thinking approach (Brown, 2008) to find a solution to the challenge noted above. This involved imagining a future situation where people will, firstly, understand their personal time preferences, and, secondly, recognize what is most important to them, to be able to work within the connected digital present environment. Design thinking progresses through three stages: “inspiration,” in which an opportunity is identified; “ideation,” in which solutions are conceived/considered; and “implementation,” where a solution is developed.

Inspiration: Section 2 of this report elaborates on the sources of inspiration that led me to identify a design challenge and to formulate a conceptual framework for use during the next stage.

Ideation: Section 3 describes how user requirements were gathered and how a process model and design components were derived for a solution.

Implementation: Section 4 describes the application of design components to arrive at a process model that allows for future planning, and a prototype smartwatch that establishes a daily flow/routine to help visualize the day.

Contributions made by the project, their implications for inclusive design, and how the work could be developed further are discussed in Section 5. The outcomes from this project could potentially help users to take a more active role in their relationship to time and create the lives they want rather than merely react to incidents throughout the day. It could popularize a sense of Time Mindfulness¹ where people go from ‘I don’t have time for that’ to ‘I would like to spend my time doing this.’

¹ Mindfulness denotes “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally, to things as they are” (Williams, Mark, Teasedale, Segal & Kabat-Zinn, 2007, p.54). I have extended the concept to the awareness and management of time through the term ‘Time Mindfulness’.

2. Inspiration

“This is the first paradox of time: Your attitudes toward time have a profound impact on your life and your world, yet you seldom recognize it.”

—Phillip Zimbardo & John Boyd, *The time paradox: the new psychology of time that will change your life*.

2.1 Introduction

The aim of this project is to explore how design can alter current practices to enable individuals to plan for preferred futures. This requires us to recruit a provisional ‘language’ for talking about how time is currently managed at an individual and cultural level. Thus, Section 2.2 provides a review of recent work on the subjective experience of time, how time metaphors that are shared among individuals enable coordination, and how these cultural time metaphors are inscribed in our designed world as artifacts such as time measurement devices that facilitate group coordination.

Using these key ideas, Section 2.3 examines contemporary time management practices to reveal how contemporary material artifacts such as watches and calendars inscribed with outmoded time metaphors fail to acknowledge the vast diversity among individuals. This section also highlights the impact of this mismatch between artifact and individual through a discussion of ‘social jetlag’, or the misalignment of biological and social time. Section 2.4 builds on the problems

described in Section 2.3 to review proposals for improving time management practices to enable individual planning of preferred futures.

A contemporary time management strategy: The Getting Things Done framework (GTD) is described next in Section 2.5, to set the stage for an empirical investigation focusing on how individuals make use of the GTD framework to plan for preferred futures where pain points are identified to inspire new design ideas that could empower individuals to plan for preferred futures.

2.2 Time Metaphors and Constructs

A substantial amount of research has examined the link between money and happiness; far less research has gone into the examination of the link between time and happiness (Aaker, Rudd & Mogilner, 2011.) Our cultural ideas and vocabulary about time relate to how we think and talk about money more than how we experience life as an individual person. The devices we use to monitor time, such as watches, clocks and calendars, are constructs from past periods of human development. These analog devices are used to structure our moments within a day.

In Western culture, time is often treated as a valuable commodity. For example, it can be treated as a purchasable resource for accomplishing work and for achieving life goals. In addition, the commodification of work that has emerged in 20th century 'business culture' requires the measurement and quantification of time. Lakoff and

Johnson (1980) characterize these as metaphors that are more present in modern societies that have a history of industrialization.

Synergistically with Lakoff and Johnson (ibid), other researchers have observed a diversity of perspectives that people use to conceptualize time within a single culture. Three perspectives relevant to this project are what Duncheon et al. (2013) refers to as: 'clock time', 'socially constructed time' and 'virtual time'. *Clock time* refers to the measure of time in objective, linear units (for example, as represented by watches and calendars). *Socially constructed time* is experienced subjectively according to cultural and social contexts. *Virtual time*, a new digital expression of time, speeds up the pace of daily life. Virtual time also blurs traditional distinctions between work, school, home, and leisure (Duncheon & Tierney, 2013).

2.3 Time Structures Disrupted

The contemporary culture of digital media that is “always connected but never present” (Young, 2012 p. 85) tends to dissolve the human experience of linear time. A majority of digital communication being asynchronous in nature results in a disruption of our understanding of time. Our rising ubiquitous perception that time is somehow “speeding up” and its management is getting more complex might be due to the inability of our existing devices to accommodate the changes brought by the additional, parallel dimension of “online” in our lives.

What governs the simplicity or complexity of a device is not the number of dials or controls or features it has; it is whether the individual utilizing the device has a reasonable mental model of how it works (Norman, 2011, p. 40.) Complexity is the consequence of two expansive mental methods: differentiation and integration. Differentiation intimates a development to uniqueness, to disconnecting oneself from others. Integration is the opposite: a union with other individuals, with thoughts and substances past the self (Csikszentmihalyi, 1990 p. 41).

The example of the steam train from the nineteenth century in Timothy Scott Barker's book, *Time and the digital*, talks about the fear of the new technology in trains and how people thought it caused new ailments from the sound of the brakes and the rough movements of the rail cars. These were imagined effects, but the effects on perception of the world changed as the passengers moved through time and had a large window to see the relation of their movement to the world outside. The train window became a framing device and changed the way they thought about their visual reality and about movement and time (Barker, 2012). Likewise, I see the digital devices that we currently use and the smart devices of the future as new framing tools that will change our perception of time and help create our future realities.

What's to come in future generations is really a mystery, yet one thing we might be reasonably certain of is that our relatives will know a great deal more than we do. By meeting expectations inside our communities, we can accomplish significantly

more than we can as individuals, but advancement requires people to go out on a limb to invent, create and test new ideas (Smolin, 2013).

2.4 Time for a New Design Paradigm

As the digital world has developed we have adopted the time technologies from the past and tried to make them work with our now digitally-connected 24 hour/7 day/52 week world. How we represent and create meaning about time needs to be looked at outside the traditional models of dials, grids and numbers. This new cultural construct entails moving away from imposing an abstract concept of time dictated by clocks. The pace of society as a whole is in need of transformation and a sweeping change; this demands a rethinking of social frameworks (Klein, 2006 p. 266).

A serene approach to time is conceivable on the off chance that we recognize that individuals can set their own pace and time markers. We can quit seeing meetings and calendars dates as a box we need to fit into, and think of them as assets for planning out our lives. (Klein, 2006 p. 277).

Stefan Klein (ibid) suggests that this new culture of time is possible in a six-step process. 1. Sovereignty over time; 2. Living in harmony with your biological clock; 3. Cultivating leisure time; 4. Experiencing the moments; 5. Learning to concentrate; 6. Setting your priorities. This 6-step process is a helpful guide in developing and creating a meaningful representation of time and the preferred future.

Much of our daily lives are experienced as a fractured and stressful existence. The absence of coordination between systematically planned frameworks and our own analog experience of life might be seen as the essential purpose behind the current levels of angst and longing in people—there appears to be a developing desire for a more integrated, meaningful, and holistic life experience. A test for the designer is to exploit the benefits of analytics in the outline of design methodologies, while also incorporating these components into a general compositional approach that works for the human analog experience (Nelson & Stolterman, 2012 p. 74). Creating an integrated application for the user, we have the opportunity to not only help people organize their tasks to complete, but also help them visualize their behaviours and help plan the future.

Among contemporary tools produced to help collect, plan and organize people's daily routine, two systems appear promising: 'Spiraldex' and 'Bullet Journaling method'. Spiraldex (<http://kentfromoz.blogspot.ca>) offers a way of visualizing the day. The 'Bullet Journal' (<http://www.bulletjournal.com>) offers an effective way of organizing tasks and open loops. Some Apple iOS apps Tick, Climate Clock and Yahoo News Digest are found to have interesting features. Climate clock (<http://climateclockapp.com>) is a weather app that presents the weather data mapped to a clock interface. This solves a complex problem with a bunch of data being presented in a chart. It communicates the weather data through an icon and a number to communicate the temperature, wind direction and chance of

precipitation. The Tick app (<http://www.taphive.com/tick>) is a todo list and productivity app that also allows sharing of lists with others. The Yahoo News Digest (<https://mobile.yahoo.com/newsdigest>) provides news digests two times a day – morning and evening – as an alert. This avoids constant interruption and is simple to use.

2.5 Conceptual Framework

David Allen, in his book “Getting Things Done – The Art of Stress-Free Productivity” (Allen, 2002) provides a framework for task management that has been popular for over a decade. He outlines five stages for dealing with workflow:

1. **Collect:** Record all items that require action.
2. **Process:** Decide what action is required for each of them.
3. **Organize:** Create meaningful categories for different action priorities; assign items to them.
4. **Review:** Periodically assess items for their completion stage and reassign to appropriate categories.
5. **Do:** Take action based on the context, available time and energy and assigned priorities.

This framework provides a useful way to start thinking about the process flow while attempting to create new design.

2.6 Summary

In this section, we reviewed literature on the metaphors and constructs of time and how they get disrupted by everything digital, and we examined how our understanding changes as the tools and environment around us change. We saw the need for an inclusive design, keeping in mind the diversity in individuals and cultures while designing these routines and their user interfaces. We examined current time practices, theories and past work that sought to improve the use of these new internet-connected devices to document, plan and help realize future goals by creating routines that can enable them to happen. The next section describes the ideation based on user requirements research.

3. Ideation

“Most people’s productivity system consists of incomplete lists of unclear things.”
—David Allen, *Getting Things Done*.

This section reports, and integrates, outcomes from two processes: (1) analysis of secondary user data; and (2) insights from my personal experience as a user experience designer and as a user of emerging technologies and devices. Four user requirements emerged from each of the above, which are listed below, and dealt with in detail in Sections 3.3 to 3.4. Together, the eight requirements helped in the

formulation of a process model for future planning, as represented in sub-Section 3.5 and in deriving design components for the solution, as described in Section 3.6.

3.1 Research Process

As a means to gathering user requirements for design, I collected and examined secondary data from participants of the ‘Get Stuff Done Like A Boss: Design Your Workflow and Double Your Productivity in 21 Days’ course by Tiago Forte, workflow designer² on [skillshare.com](http://www.skillshare.com) to understand participant’s personal behaviours around workflow design and time management processes and how they effectively plan their routines and tasks. The course objectives are to understand the principles of the ‘Getting Things Done’ method created by David Allen and to a create a personalized workflow using digital tools (Allen, 2002).

Skillshare.com describe themselves as “a community marketplace to learn anything from anyone” (<http://www.skillshare.com>.) The privacy statement (<http://www.skillshare.com/ss/privacy>) clarifies that all information on the website is “publicly available and can be collected and used by other users for any reason.” All referencing in this report has been done in aggregated fashion.

3.2 Examination of Secondary Data

The skillshare.com website was helpful to make observations and understand how people are managing their time and how they are developing strategies to use time

² <http://tiagoforte.com>

to lead a more fulfilling life because people were posting personal stories, workarounds that they found to be effective in their lives and open questions that received course community responses. Their stories were documented and screen shots of their design solutions were taken. This provided rich information for deriving user requirements as described in the next section.

At the time I accessed the course website during May 2014, 1500 people had taken the course and 187 students were maintaining open public profiles. Of these, 65 had collectively contributed approximately 60% of the course discussion content. I gathered the contributions of these 65 students, which included comments, screenshots, pictures and questionnaire responses.

The course provided students with a questionnaire (as in Appendix A) to assess how well they applied the 'Getting Things Done' (GTD) methodology to their current routines. It consisted of 20 questions that helped the students gauge their productivity and workflow design. The questionnaire also contained a feedback section at the bottom, where the students could see, based on their responses, how their current workflow practices mapped across the following five phases of GTD:

- Phase 1: Collect every single thing you have to do in one place;
- Phase 2: Process each item by clarifying the outcome you want next;
- Phase 3: Organize reminders of these actions in a system you trust;
- Phase 4: Review these reminders regularly;

- Phase 5: Do the actions.

Based on the responses, the feedback also gauged where each student was situated among the categories Good, Okay, Not so good, Warning and Danger with respect to each phase.

Of the 65 students, 52 had shared online the feedback portion of their responses to the course questionnaire at Appendix A. I aggregated this information into Table 1. Section 3.3.1 interprets Table 1 further.

DESCRIPTION	GOOD	OKAY	NOT SO GOOD	WARNING	DANGER
Phase 1: Collect		1	7	28	16
Phase 2: Process		4	8	20	20
Phase 3: Organise		9	12	15	16
Phase 4: Review	1	1	12	18	20
Phase 5: Do	1	4	6	19	22

Table 1: GTD phase-wise aggregation of diagnostic questionnaire (Appendix A) responses from 52 participants.

3.3 User requirements from Secondary Data

Four user requirements, as listed and described below, emerged from the above research.

1. Managing overwhelmment³
2. Collecting and controlling open loops
3. Managing tasks across multiple locations
4. Creating routines to complete tasks

3.3.1. Managing Overwhelment.

The descriptive information collected about participants showed that the default pattern for many of them was to use their brains to remember tasks and goals for the day. This is supported by the numbers in Table 1 in Section 3.2 which point to participants feeling consistently overwhelmed throughout their day with the amount of information and tasks, across the five phases from *collecting* through to *completing*. This was found to cause problems with knowing what to do next and, if an interruption happened, this caused other important tasks to be delayed or even forgotten, as stated by one of the participants: “Overall, my main goal is to eliminate and organize all the open loops in my brain. I tend to use them as distractions and procrastinations, not working on what I really need and want to for my creative biz.

³ The word 'overwhelment' represents the noun form of 'overwhelmed.' The urban dictionary features it, but not the traditional ones. The state of being overwhelmed is a recent, urban phenomenon (brought about by the demands placed on people due to their parallel lives in individual, social and virtual time-spaces.) There is a need for this word to be included in the glossary of time research.

If I can clear a good deal of them off my overall list, then there would be less excuses for me to not start new creative projects and experiments.”

The first inference is, therefore, that participants were uniformly overwhelmed by the unfinished tasks that they carried in their heads. This stresses the need for a design solution to reduce their feeling of overwhelm and highlights one of the unmet user requirements to be addressed in the proposed design.

3.3.2. Collecting and Controlling Open Loops.

Open loops are tasks that we need to take action on in some way but haven’t quite decided how (Allen, 2002). In some cases they are simple tasks that we are reminding ourselves to do. They could also be placeholders for a whole series of actions within a small or large project.

These open loops can be problematic to our mental wellbeing. They spin around in our minds, popping into our thoughts at the most inopportune moment. A method for getting open loops under control is to collect them all in one place, to get them out of one’s mind.

The participants in the online course were given an ‘Open Loop Triggers’ sheet to aid them in collecting all the tasks they had in their mind. The participants revealed that they had between 75 and 200 open loops in their heads. Here’s an excerpt from the response of one of the participants: ““At the get-go, 108 open loops.”

Once the open loops were gathered together, participants could see why they were anxious about all the things that needed to be done. Having assembled all the tasks, they could now devise a plan to complete them, remove items, and schedule others for a later date. Collecting and controlling open loops thus emerged as an important user requirement.

3.3.3. Managing Tasks Across Multiple Locations.

People gathered their open loops using analog (pencil and paper) and digital (tablets, laptops, mobile phones and desktop computer) tools. Many people tried apps and desktop computer software but found that having the information in only one digital or analog tool made it difficult to manage, creating yet another task to process and manage. Several students reported 'Evernote' as the tool that helped them overcome this difficulty. The reason why this became the preferred tool was that they could access their 'Evernote' open loops lists on any device. The application was available for all platforms and lists were in a cloud-based environment. Information updated in one location got updated on all other devices, avoiding the necessity to manage yet another set of lists. Further, the software was simple, yet powerful enough, to create containers not only for all types of lists but also for short-term and long-term goals.

Figure 2 and Figure 3 indicate two examples picked from among the workflow models created by the course participants to illustrate a workflow for collecting the

open loops and organizing each of them based on the GTD method, but applied to their digital workflow as an actionable or non-actionable task.

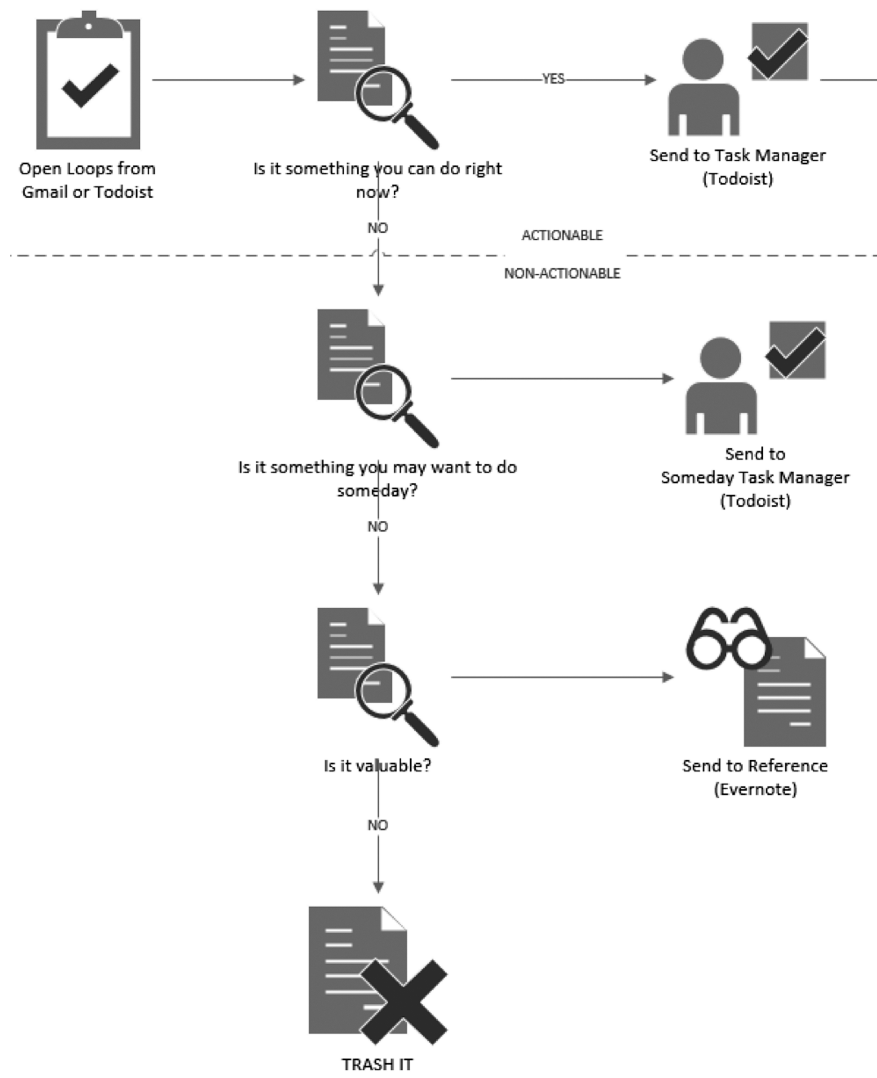


Figure 2: Workflow model to take open loop to actionable or non-actionable task as created by one course participant.

(<http://www.skillshare.com/classes/entrepreneurship/Get-Stuff-Done-Like-A-Boss-Design-Your-Workflow-and-Double-Your-Productivity-in-21-Days/1524940083/projects/19140>)

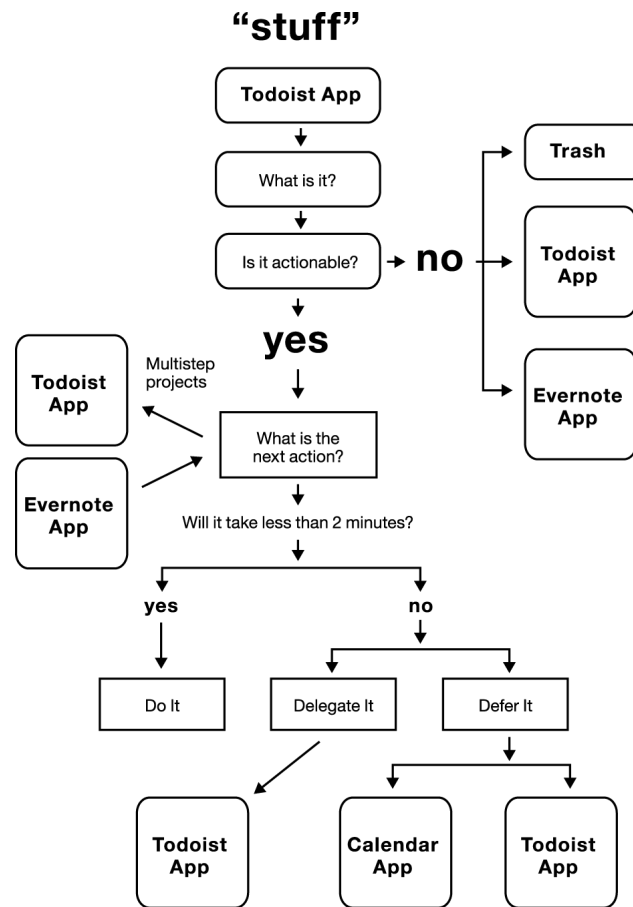


Figure 3: Process model based on the ‘Getting Things Done’ method to take open loop to actionable or non-actionable task with Evernote and Calendar app, created by one of the course participants (<http://www.skillshare.com/classes/entrepreneurship/Get-Stuff-Done-Like-A-Boss-Design-Your-Workflow-and-Double-Your-Productivity-in-21-Days/1524940083/projects/28332>)

It was interesting to see how the participants chose digital application tools to complete tasks. While these two solutions have similarities, there are differences in the way processing and completion of tasks were planned.

3.3.4. Creating Routines to Complete Tasks.

The idea of a routine was a new concept for some of the participants. They didn’t understand that they were more productive at certain times of the day. They also

struggled with what to do first. Many times people described a chain reaction of events where they started with a plan in their mind but became distracted and missed key and important tasks within the day. This added stress and created more second guessing of what needed to be done.

The process of a routine or the day having a rhythm where they would be engaged fully in a task and then take a break or do other tasks related to personal or life goals was new for most. This meant most people struggled through the tasks in their head, then would check out for a bit using a social media site or game, and then get back to work. The only problem with this strategy is that other goals like planning for the evening, weekend or next day were not factored into the routine. Many people talked of hitting the pillow at the end of the day exhausted and feeling more needed to be done. Some of the participants started looking online for options to mapping out the day and collecting their open loops.

Two interesting findings that have the potential to solve the problem of gaining a visual overview of how to plan your day are Figure 4, the spiraldex (<http://kentfromoz.blogspot.ca>) way of visualizing a day and Figure 5, the 'Bullet Journal' (<http://www.bulletjournal.com>) method of organizing your tasks and open loops.

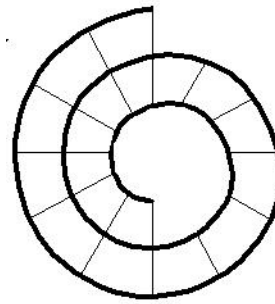


Figure 4: The Spiraldex Visual Mapping Organizing System, source: <http://kentfromoz.blogspot.ca> .



Figure 5: Bullet Journaling Website, (source: <http://www.bulletjournal.com>.)

I envision people using the Bullet Journal method to capture tasks and open loops so they can be together in one space. Next the tasks can be categorized and placed into a timeframe to complete. Lastly the tasks could be mapped to a smart watch interface design that is customized for the user.

3.4 User requirements from Personal Insights

The following user requirements were identified from my own personal research into solving the design problem of visualizing my daily use of time and adopting a new routine.

1. Clock metaphor for task management interface
2. Collecting tasks in customizable containers
3. Enabling creation of daily routines
4. Representing and sharing daily routines

3.4.1. Clock Metaphor for Task Management Interface.

I check the weather often in the day and I have experience with different weather apps. I use Climate clock (figure 6) the most because it presents the weather data mapped to a clock interface. This solves a complex problem with a bunch of data being presented in a chart. The numbers of a clock are not present but it is the proximity of the icons that communicate the weather data through an icon. A number is used to communicate the temperature, wind direction and chance of precipitation. The use of colour in the background and the classic typography makes this application informative and pleasant to look at.



Figure 6: Climate Clock App: source: <http://climateclockapp.com>

This could prove useful in mapping tasks and routines for users using my proposed design solution to present the daily routine and tasks as a meaningful model.

3.4.2 Collecting Tasks in Customizable Containers

When I started thinking about solving the problems of the open loops and how to visualize a day of tasks I looked at apps on my mobile phone that solved similar problems. My wife and I have been trying out multiple todo list apps and productivity apps to help with tasks in our own lives. Of the several we tried, we both like Tick app the most (Figure 7).

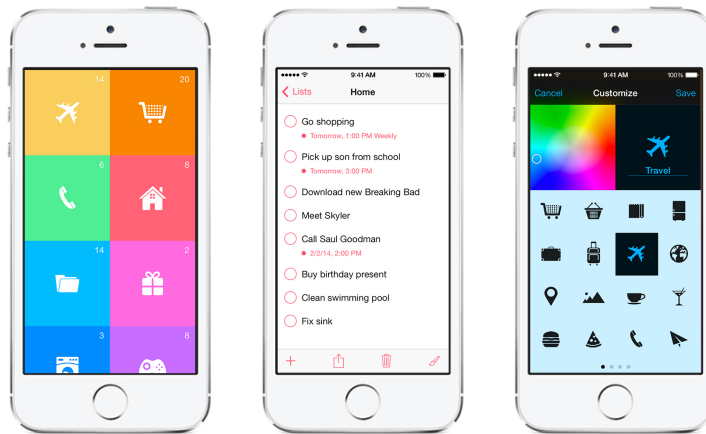


Figure 7: Tick app. (source: <http://www.taphive.com/tick/>.)

With that app, multiple categories can be created for the todo lists. Once a container is created with a custom colour and icon, items can be added into it. Items so added could be left as a simple 'click to complete' or can be assigned a time by which they should be completed. The Tick app also allows sharing of lists with others. This makes it very helpful with items that both my wife and I need to complete. The interface is colourful and intuitive to learn.

3.4.3 Enabling Creation of Daily Routines

A recent addition to the apps on my mobile phone is Yahoo News Digest (Figure 8). This application solves three interesting problems that are common to news apps in general. The first is consistent interruptions throughout the day. This application collects news from the web and presents it two times daily: the first in the morning around 8am and the second in the evening around 6pm. The second problem it solves is wasting time endlessly reading and searching news sites. The news articles

are curated and a summary of the article is presented. If the article is on the Internet, a link is provided to the actual source site. The third problem it solves is that nothing needs to be learned for using the app. The daily alert for news becomes a delight after a few days. The routine becomes a seamless addition to your day, and you don't need to read through articles you are not interested in. The categories are thought out and a colour system is used to help denote if you have read the article or not.

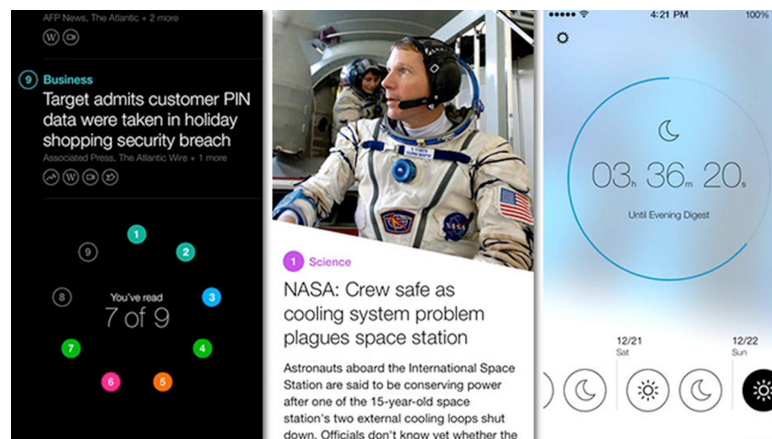


Figure 8: Yahoo News Digest. (source: <https://mobile.yahoo.com/newsdigest/>)

Having an app present timely and useful information in a format that is well-designed provides an engaging experience. For my design solution process model, I derived an idea from this app to provide the user a morning and evening rhythm to reflect on the tasks ahead at the beginning of the day and to ruminate on how the day went at the end of the day. This could help with focusing the user and aiding them in becoming more mindful of the events in their day, from start to finish.

3.4.4 Representing and Sharing Daily Routines

An information graphic of historical peoples' creative routines (Figure 9) made the rounds on a social network site during early 2014 while I was doing some informal research and reading about routines. It is interesting to see these historical people through the lens of their daily routine. Each person sleeps, eats and produces work, but all the routines differ. They allow for the personalization of the day to sync with the lifestyles, and possible chronotypes, of the individuals.

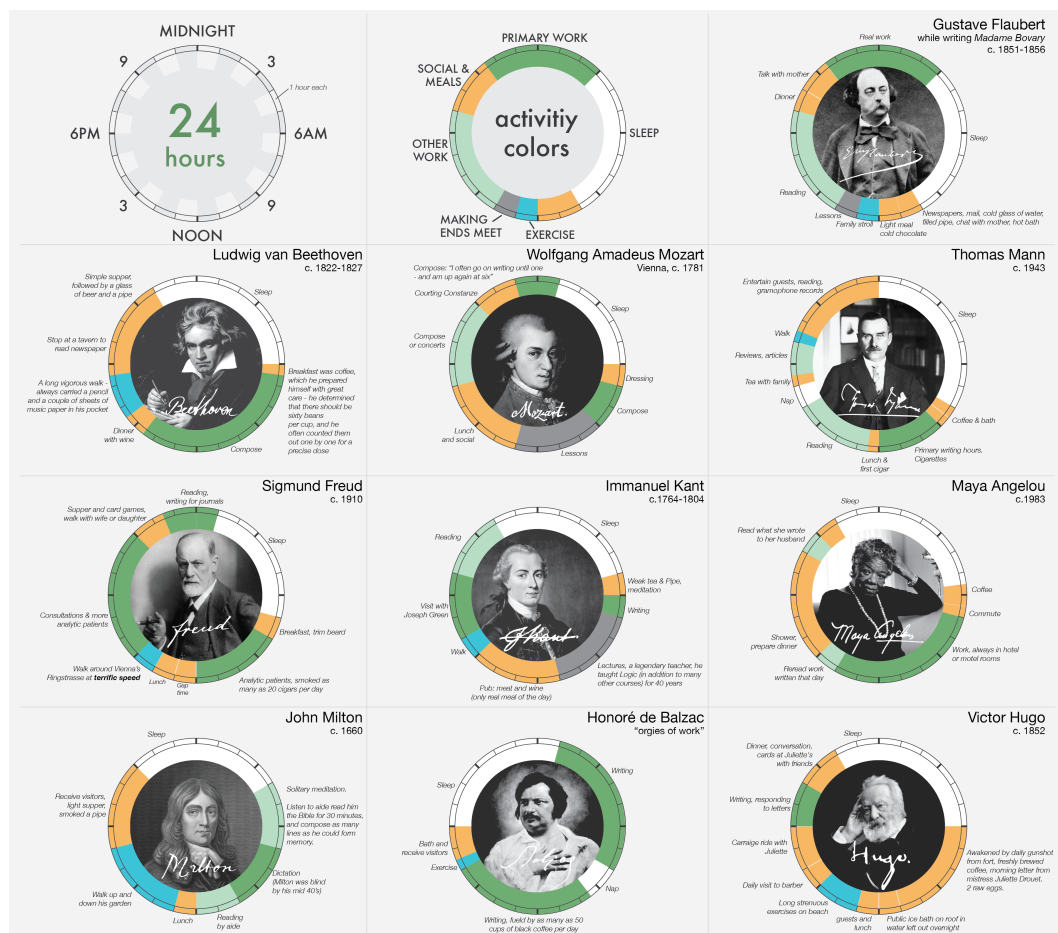


Figure 9: Creative Routines of historical people. Shows a variety of daily routines
[\(http://infowetrust.com/2014/03/26/creative-routines/\)](http://infowetrust.com/2014/03/26/creative-routines/) inspired by Mason Currey's book *Daily Rituals*
<http://masoncurrey.com/Daily-Rituals>.

Observing these examples of routines allowed me to visualize the diversity in how people live their day. I found that it gave me permission to think about other types of routines that I currently do not document and also made me think about dropping some others. Going forward with the design solution I think showing users other peoples' routines could prove useful. I also like how the graphic communicates information about what is being done at what time interval. Representing time to go to bed at night and awake in the morning is also helpful from this information graphic.

3.5 Process Model

The discussions in this Section were geared towards addressing the problem identified in Section 3.3.1 that carrying open loops (or thoughts about unfinished tasks) in one's head could be overwhelming. Based on the user requirements discussed in Sections 3.3 and 3.4, I constructed a workflow as given below:

1. There is a need for a trusted system for people to *collect* their open loops and free up their head to focus on more productive pursuits.
2. This system should be able to *process* the user's open loops into tasks, goals and routines.
3. It should also *organize* and present to the user a view of their daily doable tasks plan every morning.
4. During the day, the system should *monitor* the user's behaviour and periodically update the tasks, goals and routines.

5. In the evening, the system should present to the user an updated view of the morning's plan for *review*.
6. This process should *repeat* every day.

While David Allen's Getting Work Done (GTD) framework (Allen, 2002) discussed in Section 2.5 was targeted at people doing tasks (direct,) my workflow is targeted at a tool that assists people in doing their tasks (indirect.) The first three stages of my workflow are similar to that suggested by GTD. While the GTD suggests 'review' and 'do' as the last two stages, my workflow suggests 'monitor', 'review' and 'repeat' as the last three stages. The tool will monitor the performance, enable review and also provide for daily repetition.

To express the above workflow in a structured format, I envisaged three levels of open loop aggregation: 'task', 'goal' and 'routine'.

- Task: a fundamental unit of activity that completes an open loop at the lowest level.
- Goal: a set of tasks required to be performed to close open loops occurring at a higher level.
- Routine: a group of tasks to be performed daily to address open loops that recur every day.

This workflow will assist a person in collecting, processing, organizing, monitoring, and reviewing open loops repeatedly every day till tasks/goals/routines are completed. Figure 9 below expresses the workflow stages listed above as a process model. This model is used in the development of a prototype solution as described in Section 4.

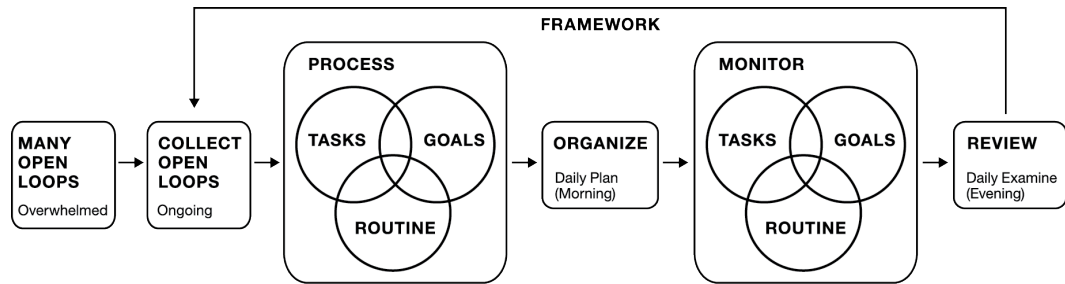


Figure 10: Process model developed as a precursor to application design.

3.6 Design Components

The user requirements identified in Sections 3.3 and 3.4 were reviewed to identify design components for building a prototype solution. Table 2, gives the user requirements and the design components derived from them.

	User Requirements	Response in Design Components	Referenced process / app / tool
1	Managing overwhelmment	Collecting open loops in a simple application for user categorization and organization	Analysis of online questionnaire responses (www.skillshare.com)
2	Collecting and controlling open loops	Using the concepts of the 'bullet journaling method' within the process model	The 'bullet journaling method' (www.bulletjournal.com)
3	Managing tasks across multiple locations	Having the ability to enter and interact with tasks, goals, routines from desktop computer, tablet or smart phone	The 'Evernote' application (www.evernote.com)
4	Creating Routines to complete tasks	Using the concepts of the 'spiral dex' within the application user interface	The 'spiral dex' (http://kentfromoz.blogspot.ca)
5	Clock metaphor for task management interface	Organizing information according to a watch information graphic	The iOS 'Climate Clock' application (http://climateclockapp.com)
6	Collecting tasks in customizable containers	Enabling user to create custom icon containers to group tasks, goals and routines	The Tick iOS app (http://www.taphive.com/tick)
7	Enabling creation of daily routines	Morning and evening application alerts	The 'Yahoo News Digest' iOS application
8	Representing daily routines	Showing a daily routine that persists so users keep visually connected with their daily routine.	(http://infowetrust.com/2014/03/26/creative-routines)

Table 2: User requirements generated through research and the derived design components.

The next section on Implementation describes how the process model and design components were used to create a smartphone prototype application and interface for a smartwatch.

4. Implementation

“The future is not a result of choices among alternative paths offered by the present, but a place that is created—created first in the mind and will, created next in activity. The future is not some place we are going to, but one we are creating. The paths are not to be found, but made, and the activity of making them, changes both the maker and the destination.”

—John Schaar, in *The Berkeley Rebellion and Beyond: Essays on Politics and Education in the Technological Society*.

This section describes the prototype of a smartphone application that will interconnect to a smartwatch interface that will support users in managing their relationship to time as a way of creating the lives they want rather than reacting to demands placed on them throughout the day. The design of the app is based on the process model (described in sub-section 3.6) developed based on research findings collating data from Skillshare.com online course participants and my personal insights through experiences of using smartphone application tools. This design prototype attempts to translate the process model into a functional and delightful experience for the user.

4.1 Goals and Objectives

The first and primary goal is to get the ‘open loops’ captured for the user. Once the items that need completing are gathered in one place, it is much easier to visualize a solution to complete. The goal here will be to design an interface that compels the user to want to enter all the items one wishes to complete, both short-term and

long-term.

Three types of groupings to enter are: 1) tasks, 2) Goals, 3) Routine. The task group items are individual items that need completing. They can have a repeat function for daily, weekly or monthly. An example daily repeat could be for an individual that wants to make sure they drink 6 glasses of water. A weekly repeat could help with remembering what needs to be put out for garbage and recycling. A monthly repeat could be paying a bill or gathering receipts for accountant and billing clients. The goals category connects items that have multiple steps to complete over a defined time period. For a student it could be components due for a term paper, for a person working on training for a marathon, it could be a workout schedule with the date of the race as a completion date. This category helps the user understand there are multiple steps to complete in order to reach this goal. The third category is routine, how do you get through your day, what is the rhythm of work and play? The goal of this category is to help the user understand a functional structure for organizing the day. Time for meals, sleep, exercise, work, social activities are arranged in a background frame that allows the user to see how the day unravels.

You can see from the groupings of tasks, goals and routine (as defined in Section 3.5), that we are already helping the user to begin a process and also starting to sort out the complexity of when would, and do, these tasks get done.

An important item to highlight here is, the user need not identify and fill out each

item in its respective area. At first it is enough to just enter the items into the application after which, moving an item from one goal area to another is simple. This is where the daily reminders in the morning and evening come in handy. The goal of the reminders will be to assemble the undefined tasks, goals, and routines of the user in order to have them look at what is next. In the morning the goal will be to tackle a big item and schedule some more simple items. Slowly on a day-to-day basis the user will spend less time entering in information as the routines flow and the tasks and goals become more focused based on what the user defines. This morning and evening alert is to help focus the user on what needs to be done and also review what has been accomplished. This will reduce the sense of overwhelm, and also help with connecting meaningful information to habit-forming behaviour.

The final goal will be to visualize the day using the spiraldex representations as seen in Figure 14 both in the smartphone application and smartwatch interface. This graphic should represent the whole day and also allow the user to see their routine, tasks and goals for the day.

Long terms plans for further development of the app would be to create other visuals for representation of the day and have the user choose a preferred graphic.

4.2 Process Components

In this section I will describe how the proposed design prototype will work. Figure 11 is an application flow chart that factors the information from the goals and objectives into a functional application map.

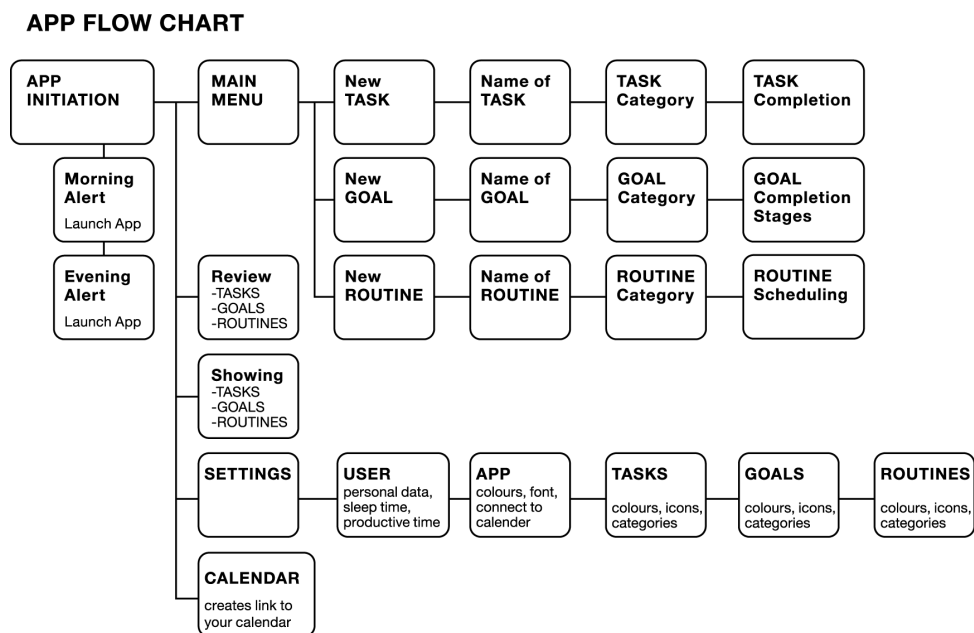


Figure 11: App flow chart for smartphone application that shows the process of how the application will work.

The user can initiate the application at any time for easy addition of new tasks, goals or routines. I see the routines being used the least after the user establishes a functional routine, but it is always there in case the user's preferences change and routines need to be added or changed. Once installed, the application will give daily alerts to launch and plan the day in the morning and review the day in the evening. This can create a mindful environment to help focus in the morning and reflectively review the day and moving items onto the next day in the evening.

From the main menu the user can create new tasks, goals, or routines. The user can see a graphic of the spiraldex in the middle of the screen with links to settings for the application as well as a link to the home calendar on the phone. The main screen spiraldex can be toggled to show tasks, goals and routines for the day. This segregation is so as not to confuse the user with too much information at any one time on the screen.

4.3 User Experience Components

The spiraldex is the primary graphic representation of time for the application and on the smartwatch. I have expanded on the initial graphic from the findings section to allow representation for full 24 hours in a day.

Figure 12 shows variations on placement of numbers to help indicate hours in the day. In the middle of the spiraldex the current time is displayed.

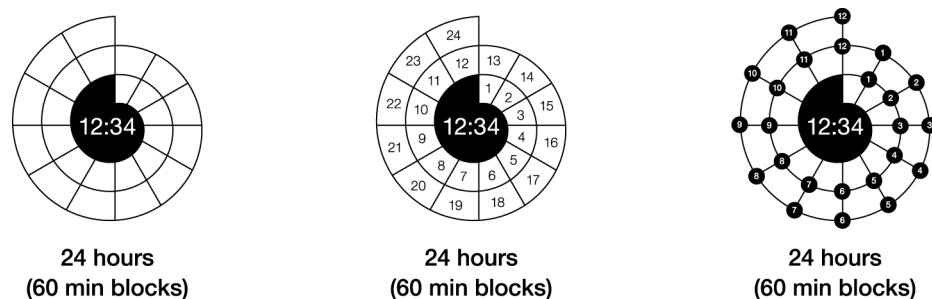


Figure 12: Spiraldex variations that show complete 24 hour day with various ways to indicate hours.

Figure 13 helps communicate a bunch of information in a simple graphic. The background of the spiraldex represents a possible user daily routine with the time

for sleep (red), meals (green), work (blue) and other items (purple and grey). The dark line indicator with the circle at the end shows the user where in the day they are in relation to their planned routine and the time is displayed in the middle to communicate the current time numerically.

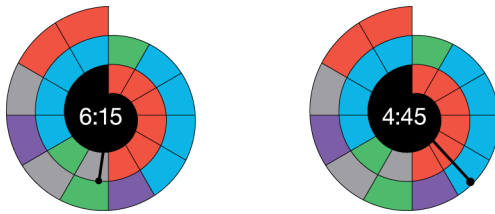


Figure 13: Spiraldex demonstrating current time in am and pm with a daily routine in the background.

Having the user desire to input all their open loops into the application is the key element of the user experience. The application needs to allow the user a simple input for the tasks, goals, and routines, which can be revisited for full completion or change in the future. Figure 14 demonstrates the wireframe screens from after initial application launch to the addition of a new task.]

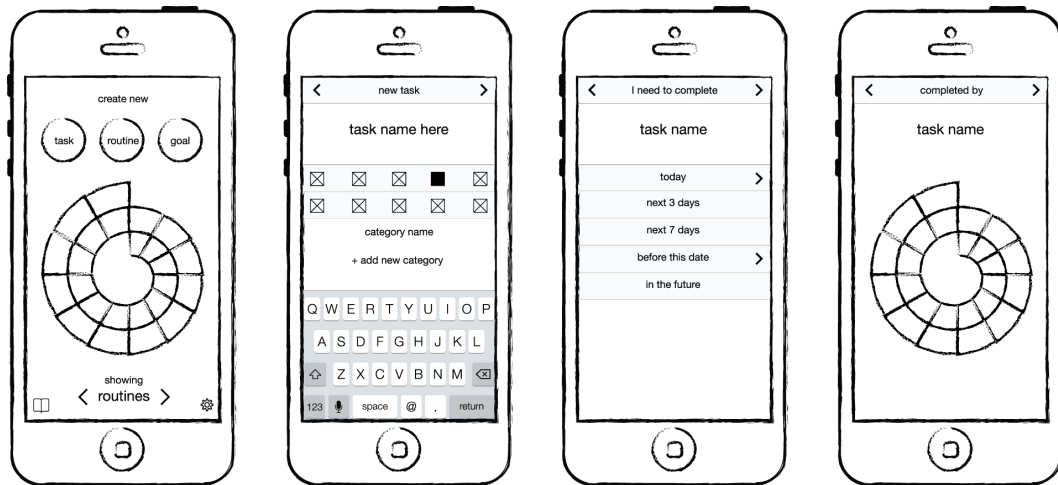


Figure 14: Wireframe process for adding a task from beginning to end. User only needs to complete task name.

The user experience from the smartphone application to smartwatch interface will have a similar visual representation. Figure 15 shows a screen shot of the smartphone application and how the spiraldex is visualized on the smartwatch. Separate screens display tasks, goals, routines and the final watch graphic demonstrates an alert on the watch for a reminder to complete a specific task.

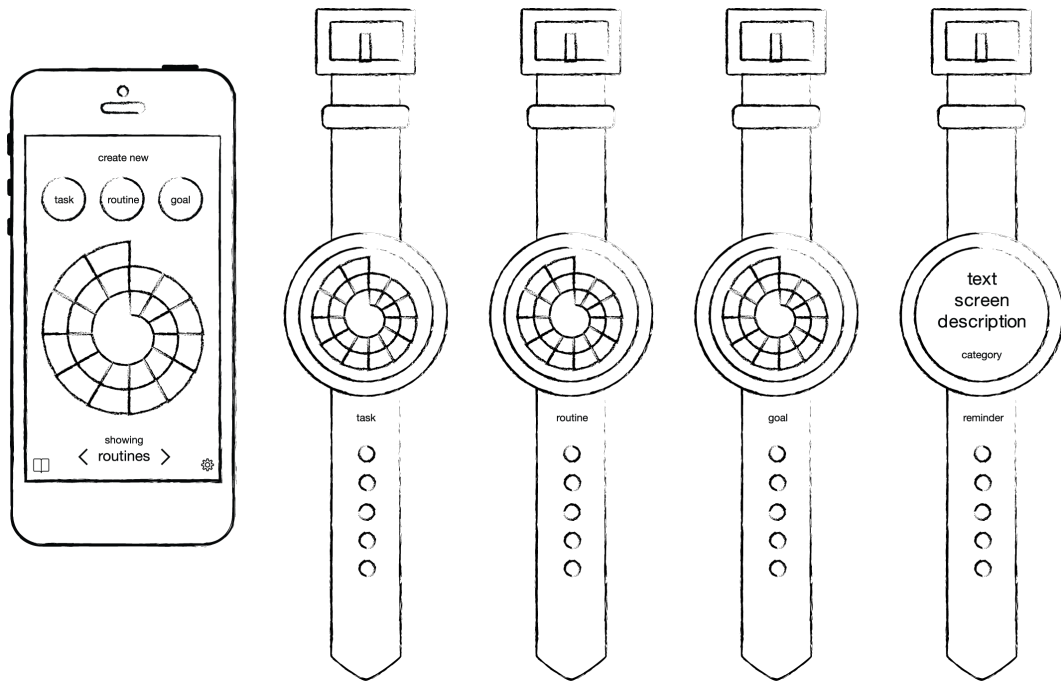


Figure 15: Shows the representation of the spiraldex on the smartwatch that is connected to the smartphone application.

This section communicated the overall structure and experience of how the design prototype application and smartwatch will interact with each other. Contributions made by the project, their implications for inclusive design and how the work could be developed further are discussed in the next section.

5. Conclusion

“Attention is like energy in that without it no work can be done, and in doing work is dissipated. We create ourselves by how we use this energy. Memories, thoughts and feelings are all shaped by how we use it. And it is an energy under control, to do with as we please; hence attention is our most important tool in the task of improving the quality of experience.”

—Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience*.

This section summarizes the contributions of this work, discusses the implications for inclusive design, lists some limitations and indicates directions for future research.

5.1 Contributions

To date, inclusive design scholarship, research and practice has not focused on diverse approaches to time and how to design for this difference. Relationship to time, conception of time and responses to time management are important aspects of human difference and should play a central role in design that considers this human difference. This project initiates this critical addition to the field.

To that end, my proposed design provides a personalized designed routine to the user that collects, plans and reviews daily tasks along with planning short-term and long-term goals. As well, I designed a prototype smartwatch interface for reflecting those personalized routines.

Furthermore, my research examined participants' relationship to time as it relates to completing tasks in their daily lives. Drawing insights from the data, as well as my own experience, I built a process model for creating a mobile application and smartwatch interface, noted above, to help people plan and accomplish short-term and long-term goals. In today's digital economy, where the tools for production at work and home are also the avenues through which people are distracted, the design I am proposing will help individuals design their own personal routine, thereby, in turn, helping them organize tasks and protecting time, or 'flow', from being compromised with disruptive technology alerts resulting in cluttered minds. Together, I believe, these tools will help the user in visualizing and creating a state of mindfulness during their day and by providing temporal space to reflect on what they find most meaningful.

5.2 Implications for Inclusive Design

Currently, the emerging discipline of inclusive design has not examined time within the context of designing inclusive user experiences. Reflecting on the three dimensions of inclusive design mentioned in section 1.3, in the context of this project, I see implications for all three:

1. Recognizing diversity and uniqueness - the design is oriented towards personalization, enabling users to work with an understanding of when they are most focused, (or 'in flow'), and to visualize their own daily routine with

tasks and goals based on their own preferences. No specific pattern of time or task management is imposed on the user. The design provides a framework that enables users to advance their understanding of their own personal relationship to time.

2. **The inclusion of process and tools:** the process model in section 3.6 is an example of a novel and inclusive process that will assist users with organizing and managing tasks, goals and routines within the day. The application and smartwatch interface are designed to assist the user in capturing all the 'open loops' and providing a place to organize, categorize and schedule tasks, goals and routines. This information is then presented in the smartwatch interface based on the spiraldex information graphic. The proposed process enables end users to develop tools and strategies to visualize and manage their goals. While the design proposed relies on visual presentation of time and tasks, future work can explore ways of presenting the information in non-visual modes.
3. **Broadening of beneficial impact:** the benefit of this project goes beyond the prototype smartwatch, which gives users the knowledge and ability to be more mindful of their time experience and, thereby, contribute to living a more fulfilling and happy life. The process model generated, being generic, could be used for designing solutions for any problem involving a daily task, and completion of that task, such as medication adherence. In essence, any

habit forming activity that people want to start or stop could be incorporated into future design ideas using the process model.

5.3 Limitations and Future Work

The design solution presented is an untested prototype informed by user requirements research using secondary data and my personal experience. It needs further testing and design iterations to evolve into a more refined solution to the design problem.

In gathering user requirements data, this project was only able to access information relating to those participants of the Skillshare.com course that had an open public profile on the Internet. Of the 1500+ participants that had taken the course, only 65 had their profiles open with enough information to help inform the research. The project would benefit from exploring boundary or edge cases that would extend the design and test the extent to which the design addresses human difference.

A next step would be to create a functional prototype and conduct user evaluations to examine if this would help with people's daily planning and completion of goals. Evaluation would also be conducted with users having sensory/cognitive/motor impairments to discover barriers and to imagine adapted/augmented/alternative solutions such as different presentation modes. Improving the design to reduce visual distraction and clutter or audio distraction and noise would help all users.

Geolocation and motion data might also be used in future to help with better understanding relationship to location and tasks being completed. An example of this could be proximity to a grocery store and an alert reminding you to get items on your list category for groceries. Also, the possibility of helping people understand how well they sleep or the amount of movement and activity during the day as it relates to health and fitness goals. Enabling sharing of daily plans among group members might be another useful direction of further research to study the synergies created by collective planning, task visualization and modelling of successful strategies.

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Appendix A

Online Course Diagnostic Quiz

Questions	Yes/No
1 Do you keep a significant number of To Dos in your head, without writing them down anywhere?	
2 Are you ever distracted from your work by remembering things you have to do?	
3 Is there a physical (garage, closet, drawer) or digital location (downloads folder, documents folder) that you are afraid to look in?	
4 Do you ever completely forget to do something you said you would do?	
5 Is the number of emails in your inbox more than the number you usually receive in a week?	
6 Do you often have things floating around your digital or physical environment because you aren't sure what they are or what you need to do about them?	
7 Do you feel like projects and tasks you WANT to do are constantly pushed aside by those you NEED to do?	
8 Does looking at your To Do list make you feel discouraged?	
9 Do you often feel the desire to "get organized" but aren't really sure what that means?	
10 Do you sometimes forget to follow up with people on important matters?	
11 Do you want to use digital tools to increase your productivity but feel overwhelmed by how many there are?	
12 Would you be ashamed to show someone your personal organization system?	
13 Do you ever feel like you lose sight of the Big Picture with your projects and responsibilities?	
14 Do you forget to regularly look at your short-term, medium-term, and long-term goals?	
15 Do you sometimes encounter emergencies in your life due to tasks you didn't complete ahead of time?	
16 Do you feel like your day is controlled by the demands and whims of others?	
17 Do you have trouble trusting your productivity system to remind you to do the right thing at the right time?	
18 Do you feel like the digital tools you use take more time than they save you?	
19 Are your personal and work To Dos so mixed up that you find it difficult to focus just on one area?	
20 Do you find yourself more often dealing with work as it shows up, instead of planning it out?	
Phase 1: Collect	0 Ok
Phase 2: Process	0 Ok
Phase 3: Organize	0 Ok
Phase 4: Review	0 Ok
Phase 5: Do	0 Ok