



Aiki: Turning Online Procrastination Into Productivity

A Case Study On A Procrastination Intervention Tool

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1 ABSTRACT

This paper presents and evaluates a new version of the browser extension *Aiki*, which is built to assist a user by allowing them to exchange procrastination time for microlearning when working at a computer. It achieves this using a method called 'redirection of activity', which redirects users attempting to visit procrastination sites to more productive platforms (in this experiment, an online learning platform for Python). We redesigned Aiki based on feedback from previous work and the needs of this experiment, and then evaluated it for a period of three months with $n=17$ participants learning Python. We logged each participants' total time spent on procrastination sites and learning platforms, tested their Python knowledge before and after using Aiki, and conducted surveys and interviews to evaluate participants' perceived procrastination levels and experience of redirection as an intervention strategy. We then compared the average and individual procrastination time, productive time, learning outcome, and experience of using Aiki. Based on our findings, we conclude that this method can be very successful for some users in controlling and reducing their browser-based procrastination time, while further empowering a smaller subset of them to spend their procrastination time in a more productive manner, such as learning a skill like Python.

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2 INTRODUCTION

Recent research has shown that *redirection of activity* may be a promising strategy for procrastination intervention while working on a computer[25]. There is, however, limited research and evaluation of this strategy in practice. With that in mind, this thesis aims to present a long-term evaluation of the browser extension, Aiki, to determine how it influences online procrastination, in order to determine how successful it is and to extract lessons about how to design applications and extensions for redirection of procrastination behaviour to other, more productive activities.

In today's world, the desktop computer is an information worker's greatest asset, as well as the primary tool with which they conduct their work[30]. On one hand, a modern computer is an incredible device: able to run myriad programs and tools that allow users to carry out their daily tasks with increasing efficiency. It is also connected 24 hours a day to the largest repository of information ever constructed by humankind: the internet. But all that convenience comes with a pitfall: the constant demand for users to control their urge to procrastinate.

As we all know, computers these days are used for far more than just work: they provide instant access to social media sites, online streaming services, news feeds, video games, and the endlessly growing depths of information and services on the internet. Knowledge workers who struggle with self-management of their time may engage in 'cyberslacking'[42], reducing their productivity. This creates a need for tools that can help workers manage their attention better. In response to this need, a wide array of software tools have become available to aid in this battle. With the right software, users can block problematic sites and notifications[6, 10, 13, 14] shred distracting news feeds[31, 44, 45], list and remind themselves of their goals[17, 34], and so on[25].

Of these methods, *feature minimization* (e.g., removing the news feed from Facebook) and *blocking* (e.g., blocking navigation to Facebook entirely) the two most popular forms of intervention[25]. Their premise is straightforward: the simplest way to avoid a distraction is to block it, or remove it entirely. However, research shows that this may not be the most effective method for some users[27, 28, 39]. While blocking unproductive sites has been shown to increase productivity and focus in some users, it has also shown to increase stress in others who actually need the scheduled break from tasks to process difficult problems.

This calls for continued exploration of existing intervention strategies to find a method that works for users who need the breaks to reduce stress, without allowing them to indulge in each distraction indefinitely. This leads to the idea behind Aiki: rather than completely blocking the urge a user has when they attempt to visit a procrastination site, perhaps that urge can be *redirected and used elsewhere* for their benefit.

In this study, we explored the research question: **How might we design digital systems that use redirection of activity as an intervention strategy to help people manage online procrastination?** Previous work on Aiki[18] gave a positive indication that redirection was a promising alternative to blocking and that it was possible to exchange procrastination time for microlearning episodes, but the research also left several questions unanswered. For instance; whether this intervention strategy works over time, for multiple types of users, and with different types of learning environments (the websites users are redirected to). This work presents an in-depth, longitudinal user experience evaluation of an improved version of Aiki, focused on identifying practical implications for interaction designers interested in procrastination and attention management.

3 BACKGROUND

In our research question, we focus on procrastination, and some of the systems underlying it. Here we define some terms we will be using in the paper.

3.1 Procrastination

Procrastination (derived from Latin *pro*: "forward or in favour of" + *crastinus*: "belonging to tomorrow") can be defined as "*a trait or behavioural disposition to postpone or delay performing a task or making decisions*"[12]. As such, procrastination involves the avoidance of performing a certain task, usually by spending time on another, less important activity. This activity is often some sort of pleasant distraction that offsets the discomfort of delaying the pending task. To put it simply, "*procrastination involves avoiding doing what we know we should be doing*"[5].

Studies show that 20% of adults consider themselves to be chronic procrastinators[16]. This issue creeps into the workplace, where an estimated 1-3hrs of time is spent daily on tasks not related to work[32], and between 30-65% of time spent on the internet during a workday is similarly wasted[33]. Furthermore, longitudinal studies in procrastination have shown that procrastinators are more stressed and produce inferior work to their non-procrastinating counterparts[38].

For the purposes of the study, we define "time spent procrastinating" as **time spent on unproductive websites online** (e.g., Facebook, Twitter, Instagram). This time could occur at any time of the day, as we do not try to distinguish between "time spent procrastinating at work" and "time spent procrastinating at home". Procrastination outside of this field (such as scrolling through Twitter on your phone) is beyond the scope of this study to control or influence, and so is not discussed further.

It may be that not all procrastination is harmful. Some research theorizes that there are two general strategies of procrastination[8]: **active** and **passive** procrastination. **Active procrastinators** consciously delay their tasks, seeking the pressure imposed by an upcoming deadline to increase motivation without diminishing performance[43], while **passive procrastinators** are unintentional about their delays, feel pressured and become pessimistic in their outlook, especially about their ability to achieve satisfactory results[22, 36]. The distinction here is that active procrastinators choose when to procrastinate - and appear to benefit from doing so - whereas passive procrastinators do not choose, and suffer for it.

When we attempt to combat procrastination, we should therefore distinguish between *good and bad procrastination*, i.e. necessary breaks from work and strategic delay, versus needless delay of things one intends to do, despite expecting to be worse off for the delay, and with detrimental consequences of stress or reduced well-being.

For the purposes of the study, we relate to this model of procrastination by asking if we can change "**unproductive**" procrastination into "**productive**" procrastination. What do we mean by "productive" procrastination? In this case, it still means diverting attention from your primary task, but rather than spending that time in a wasteful manner (e.g., scrolling through Facebook) instead spending it on a more productive task (e.g., learning a new skill). In this manner, perhaps those moments of weakness can be put towards something useful.

3.2 Dual Systems Theory of Self-Control

Dual Systems Theory is a model used to describe how humans process automatic and conscious decisions in order to exert (or fail to exert) self-control[25].

In this model, **System 1** handles "*habits and instinctive responses*"[25], whereas **System 2** handles more conscious decisions such as "*planning, decision-making, or overcoming a habitual response*." [25] The key distinction here is the capacity of Systems 1 and 2 are not equal. System 1 operates with much more bandwidth, executing learned habits and processing environment inputs constantly, whereas System 2 can handle "7 plus-or-minus 2" inputs, meaning that there is limited space for conscious decision-making and self-control at any given time. System 2 control is also shown to shrink when you are emotionally or physically exhausted[7].

This leads into the theory of how and why we procrastinate. With most decisions and activities, people operate on System 1, executing inbuilt routines and habits without much conscious effort. When we begin any kind of action that may have become routine in our lives, System 1 patterns can kick in almost instantly, without conscious thought, allowing us to perform the task without using the limited space available in System 2 memory. This is why it can seem so hard to break bad habits (such as procrastinating) *even when they directly conflict with consciously held values*[25]. It takes some sort of delay, or reminder, or conscious effort, to push tasks normally assigned to System 1 into System 2 memory, where we have the capacity to make a rational choice about our upcoming activities and attempt to exert some self-control over the (normally automatic) process.

Keeping this theory in mind, we can consider how automatic the process of procrastination is for many, and design tools that help push relevant tasks into System 2 memory so that users can be more conscious of the choices they are making.

3.3 Microlearning

Microlearning is a form of learning that involves short bursts of content, applied at regular intervals, to enhance learning speed and retention[29]. Usually limited to episodes of less than 15 minutes (and sometimes as low as 30 seconds), it is a method of learning which is rapidly gaining popularity in the fast-paced modern world, where workers are either too busy to enrol in long-form 'macro-learning' courses, or just want to pick up new skills during their free moments every day.

Many popular modern applications make use of this to teach users new skills from the comfort of their mobile phones, as the many successful language learning applications on the market will attest to[4, 11, 24]. Applications like Duolingo can provide very small learning sessions - such as learning a few words or a common sentence - that can fit into a break at the water cooler or during a short commute.

In relation to the study, we propose that *procrastination sessions can be turned into microlearning episodes*, provided that the user is guided and encouraged by the correct tool, and has access to the right microlearning platform.

4 RELATED WORK

In recent years, researchers have investigated various intervention strategies for self-regulation and self-control of online procrastination behaviour, for instance increasing awareness of procrastination habits, [1, 2, 21], therapeutic inventions [41], gamification [3], alterations to the UI of specific social media sites [26], exchanging time spent on procrastination sites for time spent on more productive tasks [15, 19], and even rotation between different intervention features [23].

One of the most comprehensive analyses of all the existing tools on the market[25] applies the dual-systems theory of self-control to the existing set of tools while outlining different methods the said tools use to assist in regulating self-control. Among them, *feature minimization* and *blocking* are two of the most popular methods, with many notable applications[6, 10, 13, 14, 31, 44, 45] utilizing these methods as their primary form of control. These methods are popular - and perhaps for good reason - but we see an exploration of *redirection of activity* as a potential avenue.

Previous work[18] aimed to test exactly this method, using redirection as its primary method of intervening with users' procrastination habits.

4.1 The Aiki Method

"Aiki, a Japanese budō term, at its most basic is a principle that allows a conditioned practitioner to negate or redirect an opponent's power."¹

Aiki, within the context of this thesis, is a Google Chrome extension designed to intercept user's attempts to visit "procrastination" sites, by instead redirecting them to a site where they can learn Python. In essence, the Aiki method proposes a new combination of two existing methods of procrastination intervention: redirection and goal-setting[25], in an attempt to capitalize on the users' urge to procrastinate as an opportunity to do something more productive. After redirection, once the user has spent enough time on their learning platform, they are returned to their original destination and rewarded with a set amount of time to procrastinate, during which they will not be redirected.

An example use case: Andrew, a student, finds that he often spends far too much time scrolling through his Facebook feed rather than studying. He feels like he needs a break from his studies from time to time, but finds that the time spent on Facebook negatively impacts his mood and doesn't lead to anything productive. He installs Aiki in his browser in an attempt to help, by adding `www.facebook.com` to the list of blocked sites. He sets the active hours of Aiki to be between 08:00 and 19:00 and sets a 5-minute learning period followed by a 10-minute reward period. Now, whenever Andrew attempts to visit Facebook, he is instead redirected to Codecademy for 5 minutes. Once he has completed his time on Codecademy, he can choose to continue to Facebook for 10 minutes. During this period he can browse freely on Facebook, having earned this time to relax. Once the 10-minute window is up, he will be redirected again, and so on.

What makes a site a procrastination site is entirely up to each user. For the purposes of this study, our participants were redirected to one of three online learning platforms for Python (for reasons which we will discuss in the methodology). However, in the finished product, this "productive" site could be anything the user desires, and may not even have anything to do with learning. The previous version of Aiki was used to learn Danish, but

¹[https://en.wikipedia.org/wiki/Aiki_\(martial_arts_principle\)](https://en.wikipedia.org/wiki/Aiki_(martial_arts_principle))

other productive alternatives could be a meditation platform for the stressed, a history channel for the curious, or even the news during an election cycle.

As we have mentioned before, previous work had already developed a version of this extension that covers much of the core functionality outlined in this brief description[18]. However, in order to meet the needs of this larger study, as well as the critique from the previous work, Aiki needed to be rebuilt with new features. We will cover this in the following section.

5 METHODOLOGY

Under the overarching research question of **How might we design digital systems that use *redirection of activity* as an intervention strategy to help people manage online procrastination?**, we designed a user evaluation to explore the following subquestions:

- **RQ1.0:** Does the use of browser redirection decrease the time spent on passive, unproductive procrastination?
- **RQ1.1:** Why or why not?
- **RQ2.0:** Does the use of browser redirection scaffold "productive" procrastination?
- **RQ2.1:** Why or why not?
- **RQ3.0:** How is redirection of activity experienced as an intervention strategy for procrastination management?

In other words, we were interested in quantitatively measuring the effects of browser redirection on procrastination and productivity, and qualitatively exploring these effects. To this end, we designed a longitudinal two-phase experiment using the browser extension Aiki as a case technology.

5.1 Initial Development

As outlined in the introduction, during previous work[18], Aiki had already been developed as a standalone extension for Google Chrome. However, an extensive redesign was needed to meet our new research questions (cf. RQ1.0, RQ 2.0). As such, our first course of action (and a significant portion of the duration of the study) was committed to rebuilding and improving Aiki while adding the needed features. This step is further detailed in Section 6.

5.2 Recruitment

Participants were recruited from a wide variety of backgrounds through a combination of emails, Twitter, and Facebook posts. Recruitment materials described the study as investigating online procrastination habits with a focus on learning Python. The target audience included any kind of knowledge worker, with a preference for those that did not have a strong background in programming. Where possible, we tried to avoid recruiting students, particularly those in IT, as their existing skills in learning and programming might create an undue positive spin on the data. Participants were promised that their data would be used anonymously and that they would be compensated for their time with a subscription to an online learning platform for Python. We aimed for a batch of around 30 participants.

5.3 Surveys and Interviews

Several surveys and interviews were conducted to gather quantitative and qualitative data on Aiki's performance. The intent was to use *learning progress* as a metric for "scaffolding productive procrastination" (cf.RQ2.0), and a combination of interviews and surveys to measure their experience with Aiki (cf.RQ3.0).

Opening Survey: Conducted when participants were recruited, this survey included questions about: demographic information, how much time users spend working or browsing on a computer each day, websites they wish they spent more or less time on, and any previous measures they might have taken to curb their procrastination habit before. The results of this survey were used to categorize users into three learning groups, each of which would be assigned one of the Python learning platforms (see Section 5.4.1). All surveys are attached in Section 14.2 of the appendix.

Opening Python Quiz: Conducted at the end of phase 1 of the study, this quiz involved a follow-up question on how often participants felt they visited a procrastination site, their current Python skill level, and their preferred learning method. This was followed by 41 questions on Python designed to ascertain the participants' relative level of skill in the Python programming language across seven different topics. It was designed to last about 30 minutes. The intent was to cover a broad base of Python knowledge such that beginners would still be able to answer some questions while allowing advanced users some questions to show their skill. All quizzes are attached in Section 14.3 of the appendix.

Closing Python Quiz: Conducted after phase two of the study, this quiz was nearly identical to the first python quiz, this time only including the questions related to Python. The goal was to determine if participants had improved their skills in Python during the study period. We call this their *learning progress* (cf. RQ 2.0).

Closing Survey: Conducted at the end of the study period, this survey included questions about: how often they felt they visited procrastination sites, if they learned anything about their procrastination habits during the study, how they would rate Aiki and their experience with their learning platform. Participants were also asked if they wished to participate in the closing interviews at this point.

Interviews: Conducted at the end of the study period, this data was collected through semi-structured interviews with all participants that agreed to participate. The interviews were 10 minutes long on average and involved questions on the users' thoughts and feelings about Aiki, as well as their thoughts about how they procrastinate and structure their work. The goal was to determine how users experienced Aiki (cf. RQ3.0) and to learn more about their individual procrastination habits. Secondly, feedback was gathered on potential improvements to Aiki for future iterations of the application. The interview questions, as well as full transcripts of each interview, are included in Section 14.4 of the appendix.

5.4 Procedure

We have provided a flowchart in Figure 1, which shows the general outline of the study procedure, as well as a complete timeline of the experiment in Figure 2. The study was divided into two major phases, with some surveys interspersed between them, for a total duration of 3 months.

Recruitment began in April 2021. Immediately when they were recruited, participants were asked to sign consent forms and fill in the opening survey. Phase 1 began in May 2021, where each participant was then sent a version of Aiki that only included the logging functionality. They were instructed to install Aiki and input sites that they considered 'procrastination' or 'time-wasting' sites to Aiki, and to then continue to browse normally. Aiki would then log data on the participant's behaviour. This phase lasted four weeks.

Phase 2 began in June 2021. Participants were sent the first Python quiz to evaluate their Python skills and determine which learning platform they should be assigned to (Codecademy, SoloLearn, or Udemy). They were then sent a new version of Aiki which now included the full functionality shown in the previous section. Participants were also provided with a paid account for their learning platform. They were instructed to use Aiki as they pleased and informed that they would receive another Python test in two months time, after which the study would end. This phase lasted eight weeks.

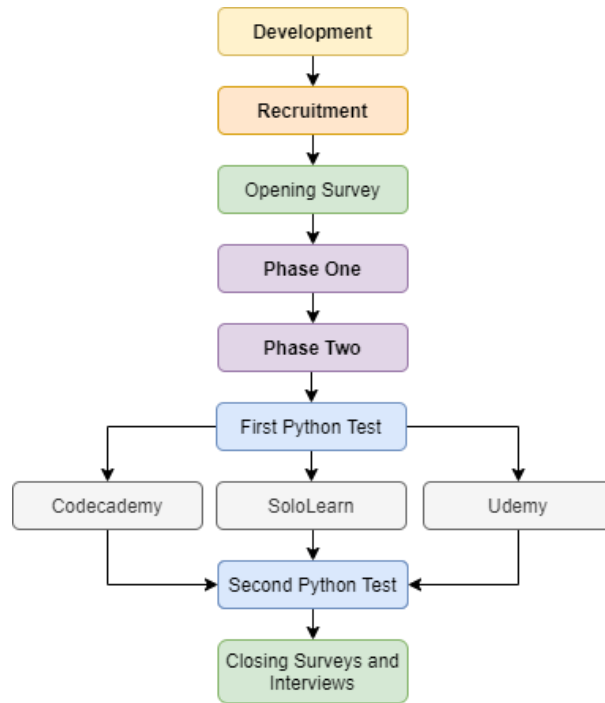


Fig. 1. Flowchart of the study procedure.

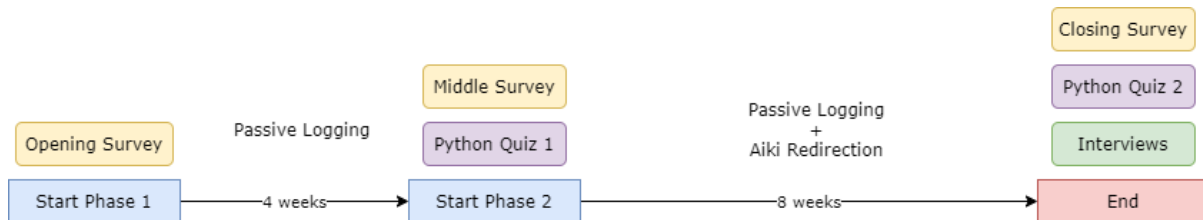


Fig. 2. Timeline of the study procedure.

Phase 2 ended in August 2021. The remaining participants were sent the second Python quiz and a closing survey. In the closing survey, all users were given the option to opt-in to a closing interview. The final interviews were conducted as the last data was collated and analyzed before the writing of this paper.

5.4.1 Learning Platforms. Previous work showed that the learning platform paired with Aiki has a significant effect on the user's experience of Aiki[18]. In an attempt to mitigate this effect, and perhaps determine if different teaching methods would be more successful when combined with Aiki, three different online learning platforms were chosen for participants to use in phase 2. These platforms were Codecademy, Sololearn and Udemy[9, 35, 40]. They were chosen for their differing approaches to teaching programming online[29]. Sololearn errs on the side of short, interactive microlearning sessions, and Udemy on the side of longer form videos and reading material.

Codecademy sits between the two platforms with a highly interactive coding environment that runs in the browser. Participants were assigned to each platform based on their preferred learning method. In total, 10 users were assigned to Codecademy, 8 to Udemy, and 10 to SoloLearn (although some of these would drop out, as explained in Section 7).

5.5 Participants

During our recruitment drive, we managed to gather 30 participants who signed a consent form. Of these:

- 2 participants uninstalled the extension during phase 1.
- 5 participants never installed the second version of the extension at the beginning of phase 2 - meaning we only have logged data of phase 1 from these participants.

That left 23 participants who completed both phase 1 and phase 2. Of these:

- 17 participants completed the final survey and Python quiz.
- 8 participants agreed to be interviewed.

5.5.1 Participant characteristics. Below is a table detailing the characteristics of the 23 participants that made it through both phases.

Participant	Age	Gender	Occupation	Daily computer hours	Daily computer work hours	Daily browser hours	Previous tool usage
1	18-25	Male	Student	12	9	4	Yes
2	25-35	Female	Researcher	9	8	8	No
3	18-25	Female	Student	7	5	3	No
4	18-25	Female	Developer	6	4	5	Yes
5	25-35	Male	Researcher	10	8	3	No
6	25-35	Female	Unemployed	7	7	1	Yes
7	25-35	Male	Post-Doc	9	8	2	Yes
8	25-35	Female	Student	5	4	4	Yes
9	25-35	Male	Project Manager	14	7	4	No
10	25-35	Female	Student	6	4	3	No
11	25-35	Male	3D Artist	10	8	8	No
12	25-35	Female	Student	3	1	3	No
13	36-45	Male	Postdoc Researcher	11	9	8	Yes
14	25-35	Male	Portfolio and Pricing Analyst	8	8	1	No
15	36-45	Female	Communications Consultant	10	10	8	No
16	25-35	Male	Researcher	10	5	5	Yes
17	25-35	Female	Lighting Designer	15	6	7	No
18	25-35	Female	I have my own company	10	3	10	No
19	36-45	Male	Software Engineer	5	5	2	Yes
20	25-35	N/A	Student	9	8	2	No
21	25-35	Male	Cloud Advisor	8	8	3	No
22	36-45	Female	Data Librarian	8	7	6	No
23	18-25	Female	Office Assistant	10	6	7	Yes

In summary: 17% (4) participants were of age 18-25, 65% (15) of age 25-35, and 17% (4) in the ages 36-45. We had 12 females, 10 males, and 1 who did not wish to say. On average the 23 participants self-reported to spend 8.8 hours at their computer each day where 6.9 hours are spent on work and (non-exclusively) 4.7 hours are spent in a web browser. 39% (9) had previously tried to use some kind of tool to control procrastination.

5.6 Data Analysis

In summary, the output of the study was a large amount of data, consisting of:

- (1) **Opening Surveys:** providing qualitative data on participant experiences.
- (2) **Aiki Telemetry Data from Phase 1:** providing quantitative data on participants' behaviour, including daily productive and procrastination time.
- (3) **Aiki Telemetry Data from Phase 2:** providing quantitative data on participants' behaviour, including daily productive and procrastination time.
- (4) **Opening Python Quizzes:** providing quantitative data on the learning outcomes of each participant.
- (5) **Closing Python Quizzes:** providing quantitative data on the learning outcomes of each participant.
- (6) **Closing Surveys:** providing qualitative data on participant experiences.
- (7) **User Interviews:** providing qualitative data on participant feelings about the Aiki method itself and how helpful it was/wasn't.

5.6.1 Statistical Analysis. To validate the telemetric data gained from Aiki's logging functionality, we use standard T-Tests for 2 dependent means when proving significance between results from phases 1 and 2. Additionally, we use a one-way ANOVA test to determine significance when comparing different users' results, relying on pairwise comparison of the The Tukey HSD ("honestly significant difference") tool. In both cases, the p-value will be reported to prove significance, or the lack thereof. Additionally Pearson's r will be used to report correlation.

We provide the results of the study in Section 7.

6 REDESIGNING AIKI

6.1 Terms

A short note: In this section of the paper, we must at times differentiate between the previous iteration of Aiki, created in previous work[18], and the new version of Aiki we have developed. We refer to them as Aiki 2 and Aiki 3 respectively. In future sections, we will not use this naming convention, instead just calling the modern version Aiki.

6.2 New Requirements

During previous work[18], Aiki 2 had already been developed as a standalone extension for Google Chrome. It would render the productivity site inside an iframe (inline frame) on an extension controlled page, displaying an interface around the iframe. The advantage of this is that Aiki 2 has full control of what is displaying on the page, and can easily log relevant events and data. We discovered early on that while this method was adequate for the language learning platform used in the previous work, many other websites (in particular, all of the learning platforms we wanted to use for this experiment) refuse to load within an iframe. As such, in order for Aiki 2 to be more broadly usable online, it would have to be redesigned such that it would no longer use iframes as part of its functionality.

Additionally, in order to answer our research question (cf. RQ1.0, RQ2.0) there was a need to develop a logging system that would allow Aiki 2 to gather quantitative data on user behaviour online. We needed to have a precise measure of each user's time spent online, with Chrome focused and unfocused, as well as how much time they spent procrastinating and being productive on a given day. Users had also asked for some features in the previous work, such as the ability to set operating hours and adjust reward times. In short, Aiki 3 would have to meet these requirements:

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- (1) Delivers the same interception and redirection functionality as Aiki 2 without using iframes to host the productivity sites.
 - (2) Implements a new function that allows users to set operating hours.
 - (3) Implements a new function that allows adjusting the duration of each redirection and reward period.
 - (4) Implements a logging system that gathers and stores data on user behaviour online. Including:
 - (a) Procrastination time. (Time spent on user-determined procrastination sites).
 - (b) Productivity time. (Time spent on a Python learning platform).
 - (c) Active Chrome time (Time spent on a with Chrome open and focused).
 - (d) Inactive Chrome time (Time spent on a with Chrome open and not focused).
 - (e) Registered Procrastination Sites. (All procrastination sites submitted by the user).
-

After much consideration, it was decided that it would not be possible to refactor Aiki 2 in time to achieve our goals. Too much of the original design revolved around the iframe method, which could take weeks to understand and disassemble properly. As such, we opted instead to rebuild Aiki 2 from the ground up as a new iteration of the existing program: Aiki 3.

6.3 Aiki Interface and Functionality

Aiki 3 is, like its predecessor, a browser extension with the purpose of intercepting the user's online procrastination. The process of redesigning Aiki 2 included figuring out when and where the program needed to interact with the user, and how the user should be able to respond. The gathering of data also needed to be included in

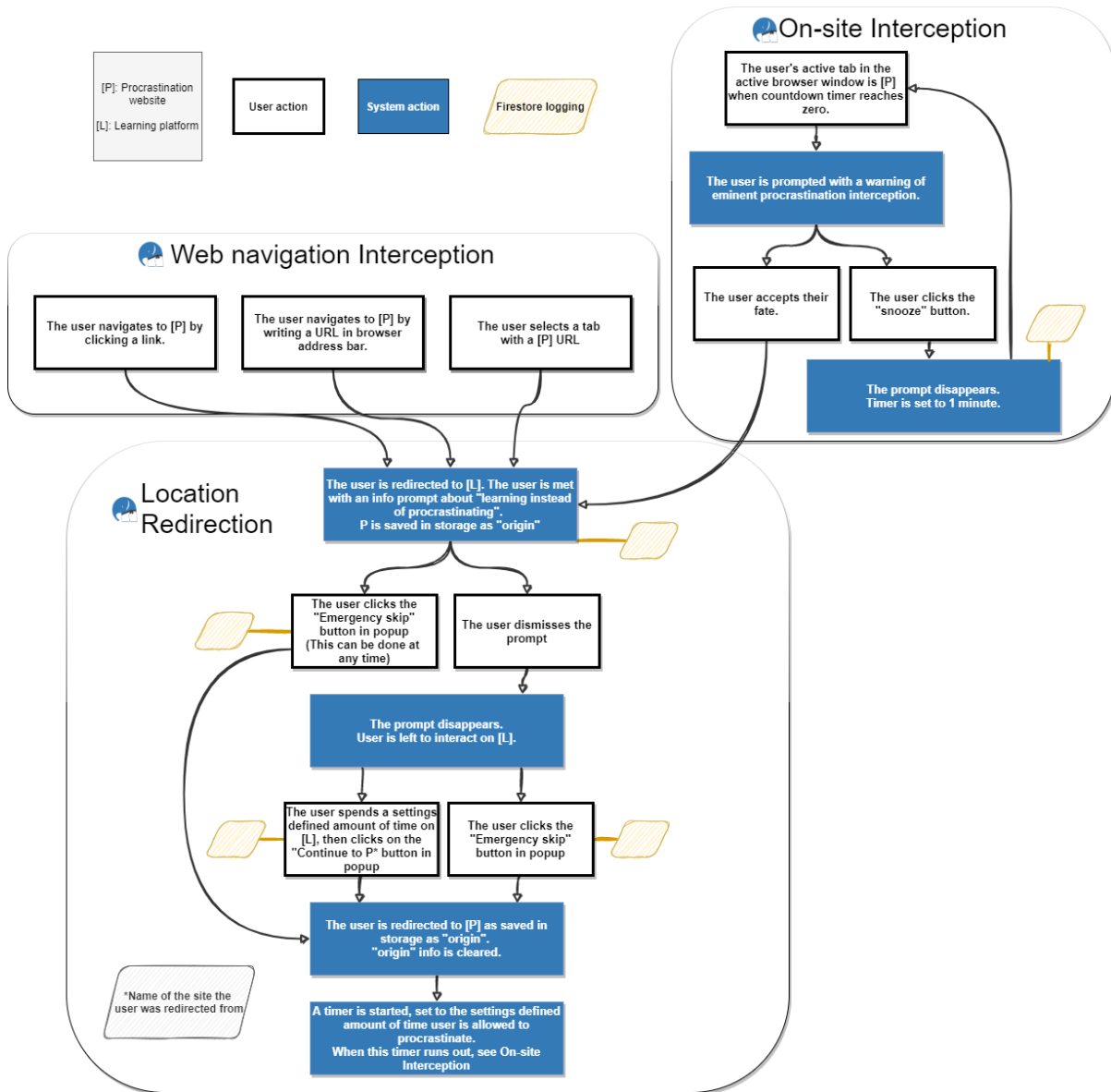


Fig. 3. Aiki 3 use case flowchart.

this design process. The resulting flowchart is shown in Figure 3 To accomplish this the extension needed its own interface, both a settings page and a popup menu, as well as something informative and interactive injected into the web pages the user visits.

Set Time Wasting Sites

Add your Time Wasting Sites here:

Type in pages you feel like you spend a little too much time on here (e.g: www.facebook.com, www.reddit.com, 9gag.com).

NB: You can still visit these websites, Aiki will just be logging the amount of time you spend on them.

Enter a time wasting site here... Add Site

Page Name	Page URL	Remove Site
Facebook	www.facebook.com	X
Twitter	www.twitter.com	X
Netflix	www.netflix.com	X

New Website Added! X

Fig. 4. The settings page.

The settings page (shown in Figure 4) was designed to allow full control of Aiki 3's redirection. It included a section to add and remove procrastination website, as well as options to set the learning time (how long should the user be redirected) and the reward time (how long should the user be allowed to procrastinate after completing a learning session), as well as the operating hours of Aiki 3 (what time of day interception should be active).

The popup menu (shown in Figure 5) has a button that allows access to the settings page, as well as the status on whether or not redirection is toggled on or off, and a button to change this. The popup menu also shows how much time, if any, the user has left to procrastinate before Aiki will intercept their self-defined procrastination sites. If a learning session is currently active (the user has been redirected and currently has a tab open with an Aiki learning session), the popup menu also displays how much time is left before that session has been completed as well as two buttons to either skip the session or continue to the procrastination site. If the learning session is active, the continue button is disabled. Once the session has been completed the continue button becomes active and the skip button disappears.

The extension icon that opens the popup menu (shown in Figure 6) is animated to show how much time is left of a learning session, or "Done" if the countdown is finished. This is done to spare the user from opening the popup menu to see how much time is left. It was intentionally left out of the design of the continue overlay (Figure 10 described below), so as to not draw unnecessary attention to the changing numbers.

The injected content needed to take into consideration that Aiki was hijacking someone else's website, both in the case of the procrastination website, and the learning platform. In order for the interception to feel as smooth as possible, but not delay the user unnecessarily, any new navigation to a procrastination site (for instance opening a new tab and typing in a website, or clicking a link) or selection of a tab with a procrastination site is intercepted immediately and the user is navigated to the learning platform. In the case that the user is on a procrastination site when the earned procrastination time runs out, an overlay would be displayed. This overlay, called the "snooze overlay" (shown in Figure 7) blocked interaction with the site and had a countdown timer as well as a snooze button that would allow the user one minute on the site before the same overlay would reappear.

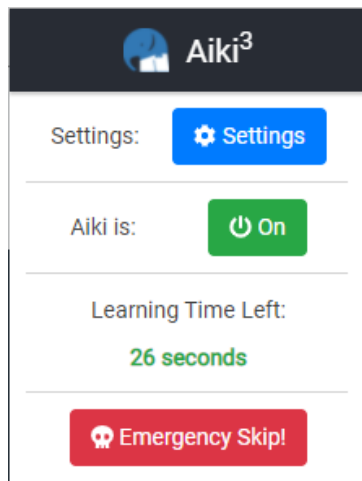


Fig. 5. The popup menu.



Fig. 6. The popup badge, showing a 7-second countdown.

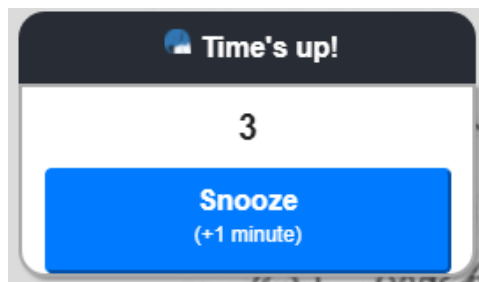


Fig. 7. The snooze overlay.

In the case that the user tried to access a procrastination site when they already had a learning session open, an overlay we named "blocker overlay" would appear, filling out the whole screen blocking the content on the site (shown in Figure 8). A message to go finish the learning session and a button would sit in the centre of the overlay. Pressing the button would navigate the user to the tab with the learning session. The overlay disappears whenever the user ends the current learning session, either by skipping it, finishing it, or closing the learning tab altogether.

To assist the smooth transition, and make the interception seem less hostile, a message overlay called "welcome overlay" (shown in Figure 9) would display in the centre of the screen whenever the user was redirected to a learning platform by Aiki. The message would be encouraging words picked at random from a predetermined list. Waiting a few seconds or clicking anywhere on the screen would make the message disappear and allow the user to start learning.

The last injected piece of interface is a single draggable button called "continue overlay" (shown in Figure 10 and 11) overlaid on the learning platform that allows the user to return to their procrastination site after finishing a session, identical in function to the continue button in the popup menu. Like the one in the popup menu, it is

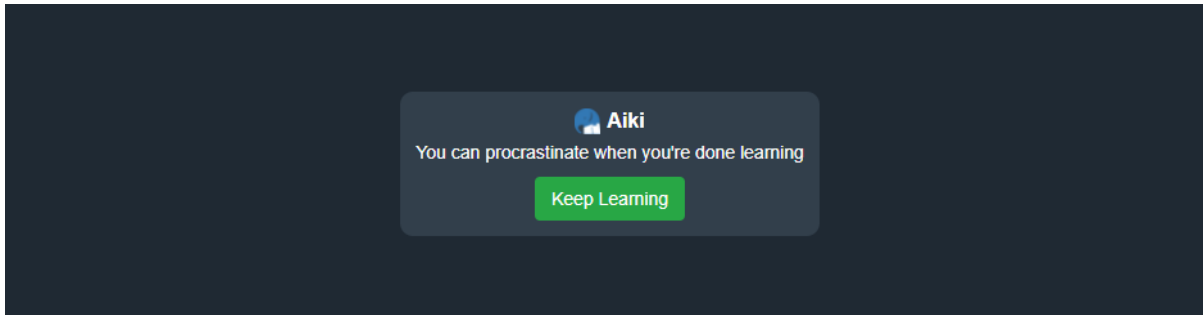


Fig. 8. The blocker overlay.

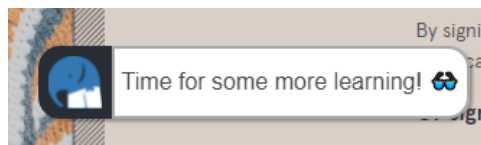


Fig. 9. The welcome overlay.

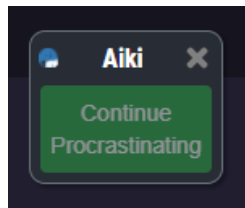


Fig. 10. The continue overlay (disabled).

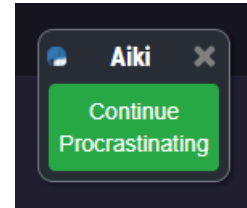


Fig. 11. The continue overlay (active).

disabled until the learning session has been completed. This overlay intentionally did not include a skip button. Instead, in order to skip the user would have to open the popup menu, thus providing a little more friction to the decision to skip.

6.4 Technical Description and Architecture

Aiki is a 4-tier, 3-layer browser extension written in the JavaScript framework Svelte. Three of the tiers are separate subprograms within the browser program, and one tier is a storage database on a server. The overall structure is shown in Figure 12).

6.4.1 Tier 1: Background Script. The background script includes all three layers. The presentation layer handles the settings page described earlier. It is persistently running in the background in the browser. This program starts when the user opens their browser, and stops when the browser is closed. It is the central part of the extension and is responsible for communication with ad between each other tier as well as retrieval and modification of the data stored in local storage. Notably, this script is also responsible for keeping track of whether or not the extension should redirect, and all timeouts, intervals, and countdowns pertaining to determining this. When necessary it

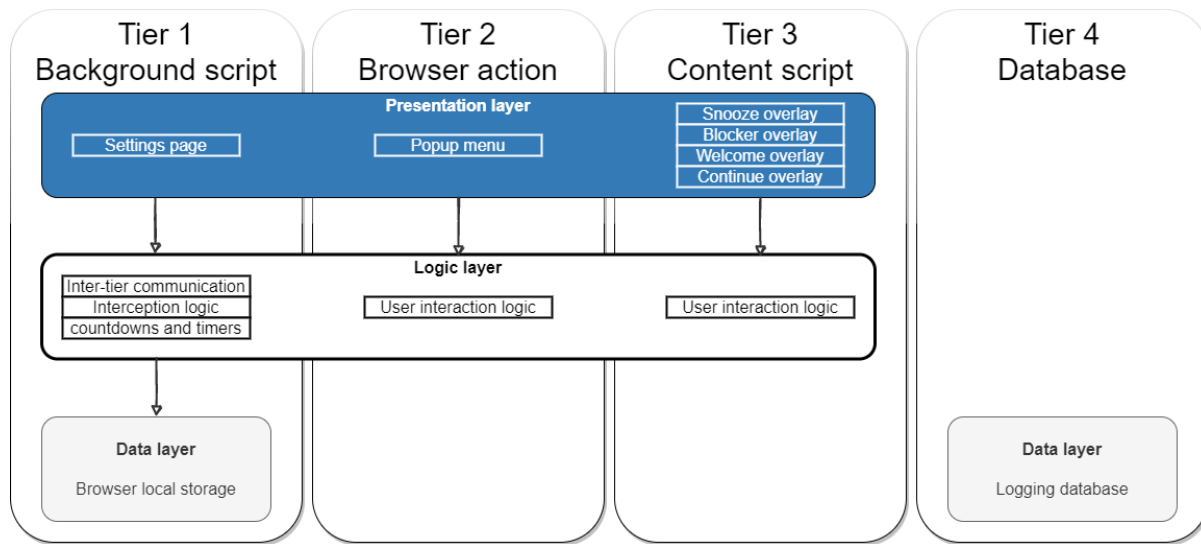


Fig. 12. A diagram of Aiki's architecture.

also syncs this data with the popup menu (tier 2) and the content script (tier 3). Notably, the background script has an extensive amount of event listeners that detect when the user navigates to or selects procrastination sites.

6.4.2 Tier 2: Browser Action. The browser action script handles the popup menu. It is a 2-layered program that starts when the user clicks the extension icon, and closes when the popup closes, for instance when the user clicks outside the popup or the browser program closes.

6.4.3 Tier 3: Content Script. The content script is a 2-layered program that starts along with the script of any website the user opens and closes when the website script stops for any reason, such as when the user reloads the page, closes the tab, or closes the browser. It is also referred to as an injected script. The content script injects Aiki's injection interface when instructed to do so by the background script.

6.4.4 Tier 4: Firebase Database. The Firebase database is a document database Google product named Firestore.

6.5 Video Demo

During phase 2 of the study, participants were sent videos to explain and help set up Aiki 3, including a demo of the finished system. This 7-minute video highlights the core features of Aiki 3 much better than any text description. The demo can be found at this link: <https://youtu.be/CFiRAIGL00Q>

6.6 Source Code

The source code for Aiki 3 is hosted on GitHub at this link: <https://github.com/bwesth/Aiki-3.0>

7 RESULTS

7.1 Data Gathered

As a brief reminder, we will recap the data that Aiki's logging functionality delivered, which we used to draw the following tables. For each participant in the study, Aiki delivers records of:

- (1) Procrastination time. (Time spent on user-determined procrastination sites).
- (2) Productivity time. (Time spent on a Python learning platform).
- (3) Active Chrome time. (Time spent on a with Chrome open and focused).
- (4) Inactive Chrome time. (Time spent on a with Chrome open and not focused).
- (5) Registered Procrastination Sites. (All procrastination sites submitted by the user).
- (6) Any changes to user settings. (e.g., Turning Aiki on/off, adding or removing a procrastination site, etc.).

7.2 User Types

Of the 23 participants who installed the extension, 16 made use of the redirection functionality in one way or another, 6 stopped using the extension within a week (either by turning redirection off or by not having the extension itself active) and 1 did not keep any visited procrastination sites during phase 2 - which in effect is the same as not using it. We call this latter person a **non-starter** and treat her data as if she did not begin phase 2 of the study. Based on this we divided participants into **users** and **quitters**. The 3 participants in the quitters group who had removed the extension entirely were not included in the data analysis, as a comparison between phases 1 and 2 is not possible.

Furthermore, we observed two different trends among the users, and so further subdivide them into two categories: **carrot users** and **stick users**. Within the context of Aiki, a carrot user is someone who spends time on the site they are redirected to, wanting the positive outcome that the site promises (in our case, learning Python). A stick user is someone who uses Aiki as a reminder or a blocker in order to not spend time on whatever they deem unproductive. Analyzing for these traits, we looked at each user's amount of time spent on their designated learning platform, as well as what progress they had made on that platform, and sorted them accordingly. The specific differentiation was based on the following criteria:

A participant is a **carrot user** if:

- (1) They have registered progress on their learning platform account
- (2) And they have spent 30 seconds or more per hour of Chrome activity on learning.
- (3) And they have not removed Aiki or disabled the redirection functionality.

A participant is a **stick user** if:

- (1) They have little or no registered progress on their learning platform account.
- (2) And they have spent less than 30 seconds per hour of Chrome activity on learning.
- (3) And they have not removed Aiki or disabled the redirection functionality.

A participant is a **quitter** if:

- (1) They have removed Aiki or disabled the redirection functionality within the first 10 days.
-

We based these criteria on the learning time options on Aiki's settings page. 30 seconds is the minimum duration when choosing learning time (how long Aiki should keep you redirected), and 59 minutes 45 seconds is the maximum duration when choosing the reward time (how long Aiki should wait before it will redirect you again after completing a learning session). This means that if a user averaged more than 30 seconds of learning a day,

Participant	Platform	Platform progress	Learning minutes per Chrome hour	Grouping	Reason for grouping
#1	Codecademy	0%	0.0	Quitter	Removed or otherwise disabled extension on day 4.
#2	Sololearn	25%	1.1	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#3	Sololearn	25%	0.7	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#4	Sololearn	56%	2.9	Quitter	Toggled off redirection on day 7.
#5	Codecademy	26%	1.6	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#6	Udemy	4%	1.2	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#7	Sololearn	53%	4.6	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#8	Codecademy	0%	0.2	Quitter	Toggled off redirection on day 8.
#9	Codecademy	25%	1.1	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#10	Sololearn	0%	0.7	Quitter	Removed or otherwise disabled extension on day 3.
#11	Codecademy	0%	0.1	Stick	Less than 0.5 minute of learning on average per Chrome hour, and no activity on learning platform.
#12	Sololearn	43%	14.3	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#13	Udemy	17%	0.6	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#14	Codecademy	18%	19.8	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#15	Codecademy	0%	0.0	Stick	Less than 0.5 minute of learning on average per Chrome hour, and no activity on learning platform.
#16	Udemy	3%	0.9	Carrot	Above 0.5 minute of learning on average per Chrome hour, as well as activity on learning platform.
#17	Sololearn	0%	0.1	Quitter	Toggled off redirection on day 3.
#18	Sololearn	0%	0.0	Non-starter	Added only 1 procrastination site in settings, and never logged any redirection events from that site.
#19	Codecademy	0%	0.1	Stick	Less than 0.5 minute of learning on average per Chrome hour, and no activity on learning platform.
#20	Codecademy	0%	0.1	Stick	Less than 0.5 minute of learning on average per Chrome hour, and no activity on learning platform.
#21	Udemy	0%	0.0	Stick	Less than 0.5 minute of learning on average per Chrome hour, and no activity on learning platform.
#22	Sololearn	0%	0.3	Stick	Above 0.5 minute of learning on average per Chrome hour, but did displayed no activity on the learning platform.
#23	Codecademy	0%	0.0	Quitter	Removed or otherwise disabled extension on day 7.

Fig. 13. Table of users with platform progress, learning minutes per Chrome hour, grouping, and reason for grouping

they were redirected (on average) at least once per day. Applying these criteria resulted in **10 carrot users** and **6 stick users**. This grouping is shown in Figure 13.

7.3 Telemetry

In relation to our research question (cf. RQ1.0), we are interested in participants' overall time spent on unproductive procrastination, and if there was a change in average time spent procrastinating before and after Aiki was installed.

7.3.1 Absolute decrease in procrastination. From the data gathered by the extension, we can compare the average daily procrastination duration from phase 1 to phase 2. This data is based on the participants visiting the websites they themselves regard as procrastination sites. The most added website was Facebook with a count of 20 out of 23 (including quitters). In second place came YouTube, which was added by 13 participants; a little over half. Third place goes to Instagram with a count of 10; a little under half. A list of the 10 most added websites can be seen in Table 1.

Rank	Website	Count
1	facebook	20
2	youtube	13
3	instagram	10
4	linkedin	7
5	reddit	5
6	twitter	4
7	dr	3
8	netflix	3
9	zalando	3
10	bbc	3

Table 1. Top procrastination websites listed by participants.

The graph seen in figure 14 displays user-specific numbers and reveals a difference between users. For 10 participants the amount of procrastination in phase 2 changed by an average of 15% or less, 5 participants decreased their procrastination in phase 2 by between 32% and 64%, and 4 participants saw an increase ranging from 37% to 100% more procrastination than in phase 1. The average amount of procrastination across all participants as seen in figure 15 was lowered by 32% (28,4 minutes). A T-Test for 2 dependent means using the procrastination numbers for all participants for phases 1 and 2 yields a p -value of 0.00223. This result is significant at $p < 0.01$.

7.3.2 Relative decrease in procrastination. The extension logged Chrome activity for each participant (defined as the number of minutes a participant had a Chrome browser window open and focused during the day). This includes procrastination and non-procrastination activity. The average amount of Chrome activity for all users decreased by 24% (47 minutes) as illustrated in figure 16. A T-Test for 2 dependent means using the procrastination numbers for all participants for phases 1 and 2 yields a t -value of -3.66335 and a p -value of 0.00178. This result is significant at both $p < 0.5$ and $p < 0.01$. If we adjust for this decrease in Chrome activity, the average procrastination decreased by 58% (7.2 minutes per Chrome hour) in phase 2. The same data as before but in the format of procrastination minutes per hour of Chrome activity is seen in Figure 17. Repeating the T-Test on these new numbers yield a p -value of 0.00477. The result is still significant at $p < 0.01$.

Procrastination in phase 1 and 2

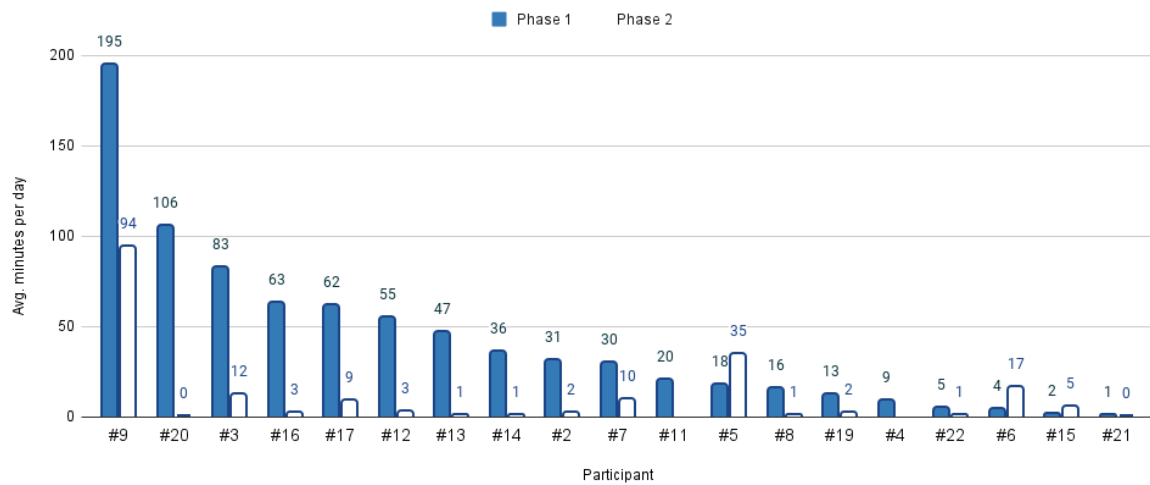


Fig. 14. Participants average daily minutes of procrastination in phases 1 and 2.

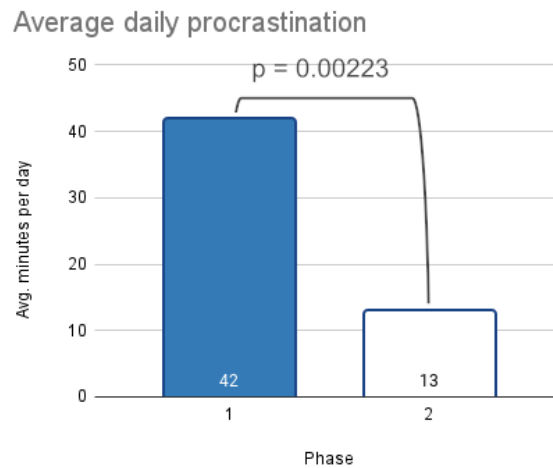


Fig. 15. Average minutes of daily procrastination in phase 1 and 2.

Using the earlier grouping, we can show the same data as before, but this time based on user types. This is shown in Figure 18.

The data is shown in the same format as above but divided into the mentioned groups. The carrot users saw an average decrease of 74% in daily procrastination (44 minutes less). The same data adjusted for Chrome activity

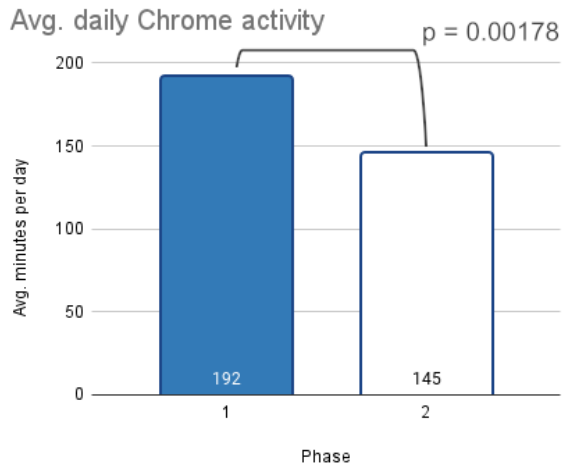


Fig. 16. Average minutes of daily Chrome activity in phases 1 and 2.

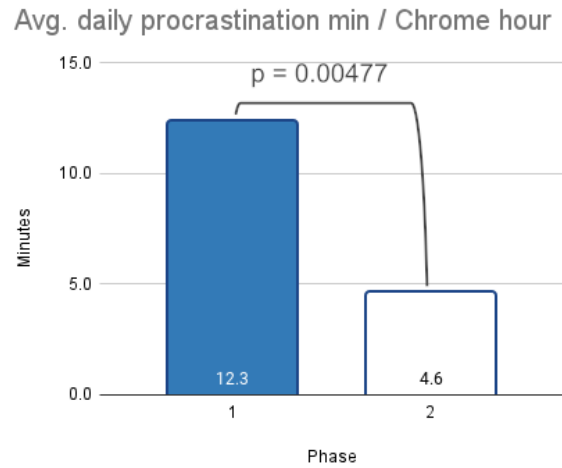


Fig. 17. Average minutes of procrastination per hour of Chrome activity in phase 1 and 2.

become a 64% decrease in minutes per Chrome hour (10 minutes less). Stick users saw an average decrease of 74% in daily procrastination (23 minutes less) and 93% decrease in minutes per Chrome hour (11 minutes less). Quitters' procrastination decreased by 3% (1 minute less), equivalent to an increase of 29% (2 minutes more) per Chrome hour when adjusted for Chrome activity differences.

7.3.3 Learning Platforms. We wanted to see if the assigned learning platform impacted the data. A grouping of the data by learning platforms can be seen in Figure 21. The graph shows the percentage decrease in procrastination based on the platform each participant used from phase 1 to phase 2. When doing a One-Way ANOVA calculation on the difference between phase 1 and phase 2 in the format of procrastination minutes per Chrome hour, separating the participants into platform groups (Codecademy, Udemy, Sololearn) we found the p -value to be 0.447995. This result is not significant even at $p < 0.1$.

7.4 Learning Progression

In relation to our research questions (cf RQ2.0), we are interested in participants' learning progression as a metric to measure whether Aiki can be used as a scaffold to generate 'productive' procrastination. When attempting to determine the participants' progress in learning Python, we use two metrics: the first is the *duration the participants spent on their designated learning platforms*; the other is *the results of the two Python quizzes the participants performed*.

7.4.1 Platform activity. For carrot users, the duration of productive procrastination (time spent on their Python learning platform) amounts to 5 minutes daily as the absolute productivity, 1.9 minutes per Chrome hour as the relative number. Stick users showed an absolute daily duration of 0.3 and a relative productivity of 0.2. The data for the relative productivity can be seen in Figure 20.

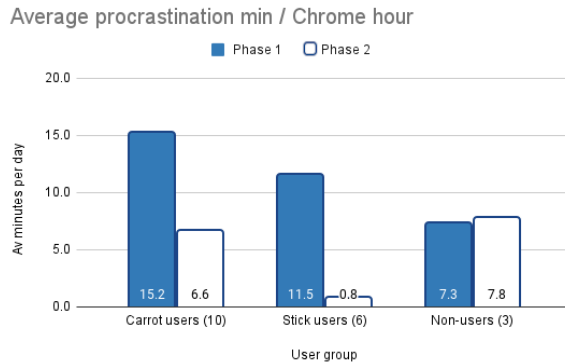


Fig. 18. Average minutes of procrastination per hour of Chrome activity for the three participant groups

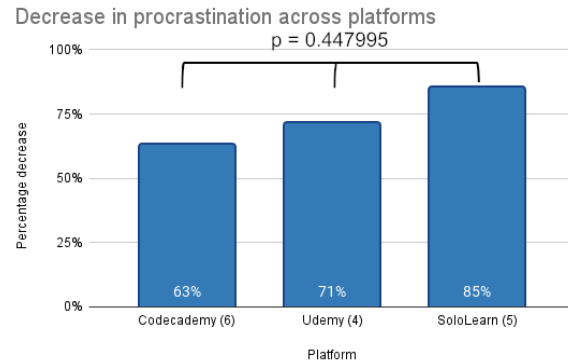


Fig. 19. Average percentage decrease of daily procrastination for three groups of users based on learning platform.

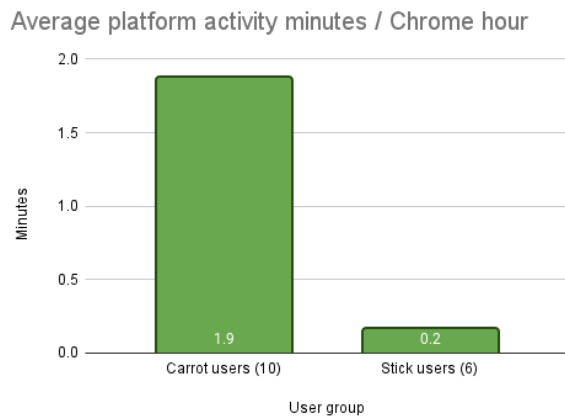


Fig. 20. Average percentage decrease of daily procrastination for three groups of users based on learning platform.

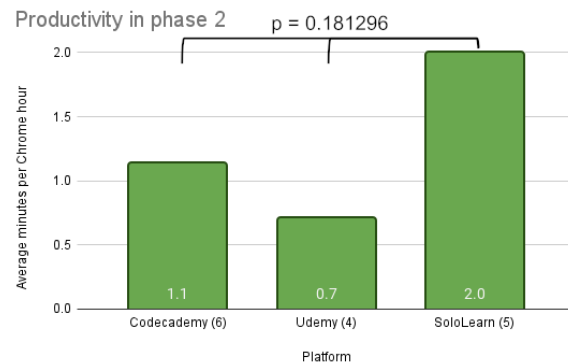


Fig. 21. Average minutes of learning per Chrome hour for the three groups of users based on learning platform.

While there was a noticeable difference in the average numbers for each platform group (as shown in Figure 21) a One-Way ANOVA calculation on the learning duration of the groups could not prove a statistically significant effect with a p -value of 0.181296.

Python quiz results

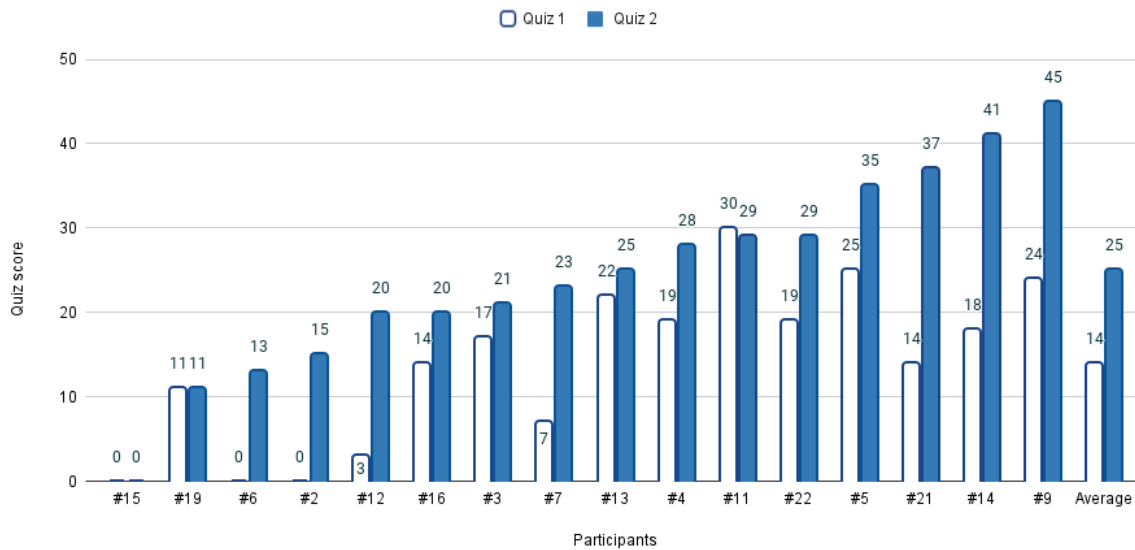


Fig. 22. Quiz results for the first and second quizzes. The last entry is the average.

7.4.2 Python Quiz Results. Next, we have the results of the Python quizzes. These can be seen for both the individual participants and the average in Figure 22. A T-Test for 2 dependant means on the averages of quiz 1 and 2 yields a p -value of 0.00011. The result is significant at $p < 0.01$.

If we look at the same data based on the participant groupings we find that the carrot users increased their quiz score by 112% - more than doubling their score on average. The stick users saw an average increase of 43%, still achieving a better score, but not as much as the carrot users. This data is shown in Figure 23.

From the angle of learning platforms, the variance is noticeable as can be seen in Figure 24, but as statistical significance cannot be proven with a one-way ANOVA p -value of 0.807549 (f -ratio: 0.21705), this observation is not definitive.

Additionally, observing the score increase based on initial skill (results from quiz 1), shows that those who had the lowest initial score saw the biggest difference in quiz 2 as seen in Figure 25. Those with an initial score of between 0 and 9 increased their score on average 610%, those with scores between 10 and 19 increased on average 67%, and those with scores 20 and above saw an average increase of 33%. This result, in spite of the large difference, cannot be proven either as a one-way ANOVA gives a p -value of 0.751704 (f -ratio: 0.29131).

7.5 Survey results

The participants were asked to fill out 3 different surveys. Each survey included a self-evaluation of how often they feel like they visited a "time-wasting" or unproductive website without thinking about it. 18 participants

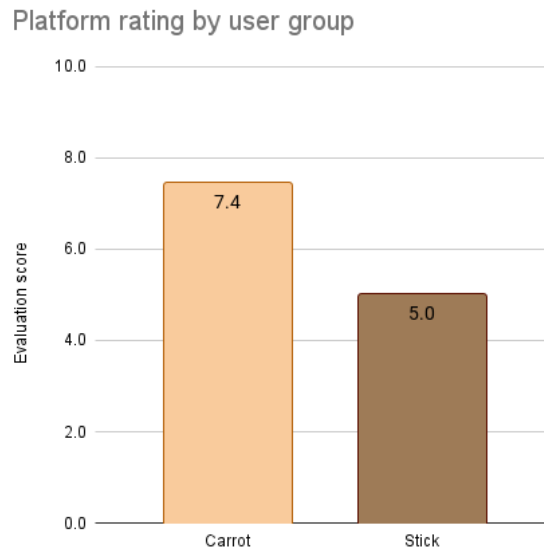


Fig. 23. Percentage increase in quiz score from quiz 1 to quiz 2.

Percentage increase in Python quiz score based on platform

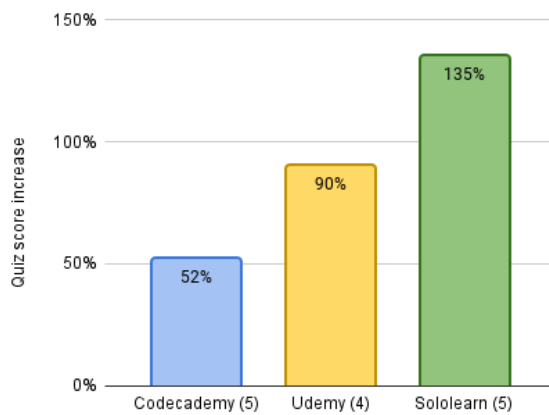


Fig. 24. Percentage increase in quiz score based on learning platforms

Quiz score grouped by initial result

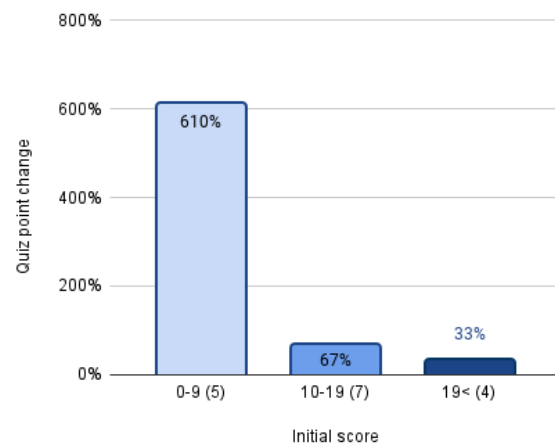


Fig. 25. Percentage increase in quiz score based initial result.

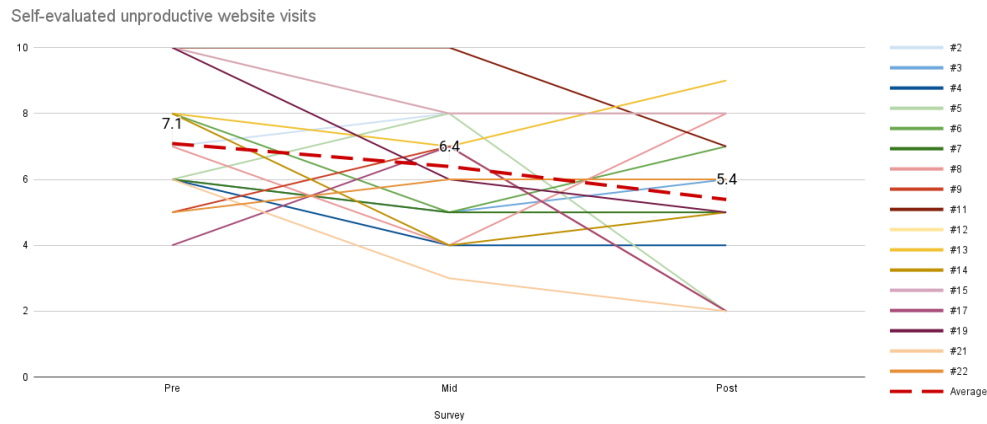


Fig. 26. Self-evaluation of unproductive website visits.

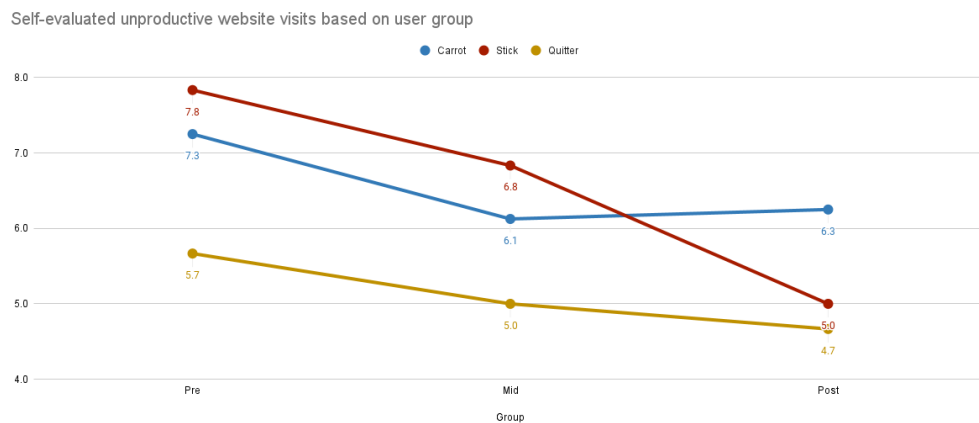


Fig. 27. Self-evaluation of unproductive website visits clustered by participant groups.

filled out the closing survey. Responses to survey 1 and 2 from participants who did not fill out the closing survey were not included here. An average decrease over time can be observed as shown in Figure 26. Using the participant grouping to cluster this data we get the averages shown in Figure 27. The resulting numbers show that the quitters self-evaluated to visit unproductive procrastination websites less from both survey 1 to survey 2 and survey 2 to survey 3. The stick users had the same evaluation, but with a more pronounced decrease in each step. The carrot users had the same evaluation as the carrot users from survey 1 to survey 2, but unlike the two other groups did not evaluate themselves to a decrease in visiting procrastination websites from survey 2 to survey 3.

Another question in the survey where participants were asked to rate Aiki on a scale from 1 to 10, participants had very varied experiences. Few users from the quitters group filled out the closing survey, those who did give Aiki an average score of 3.7, but the feedback from these are more relevant to the preparation and the administrative process (bugs, wrong learning platform account, etc). The rest of the users gave Aiki an average score of 6.6, with carrot users being more positive with their 7.4 versus the stick users' 5.7. This is shown in Figure 28.

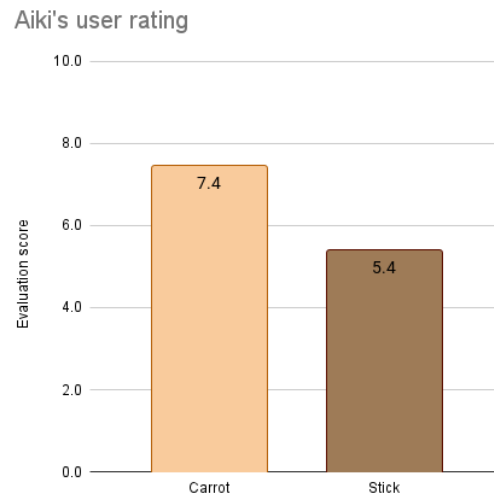
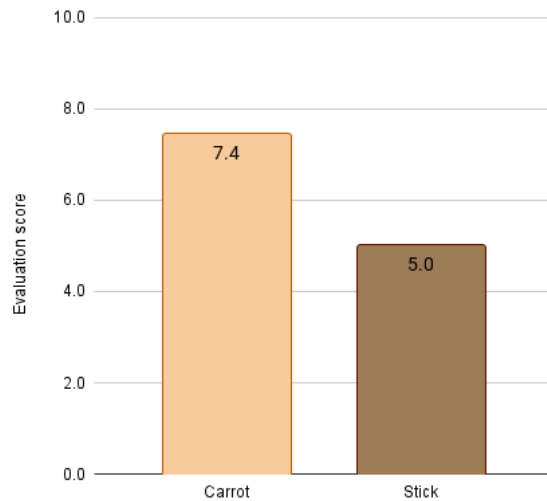


Fig. 28. Evaluation of Aiki on a scale from 1-10.

Participants were also asked to rate their designated Python learning platform. The average results including all participants can be seen in Figure 29. Based on this there was no discernible difference between the platforms. If we instead look at the same data but divide it into user groups as shown in Figure 30, the evaluation of the learning platforms closely resembles the evaluation of Aiki.

Platform rating by user group



Platform rating

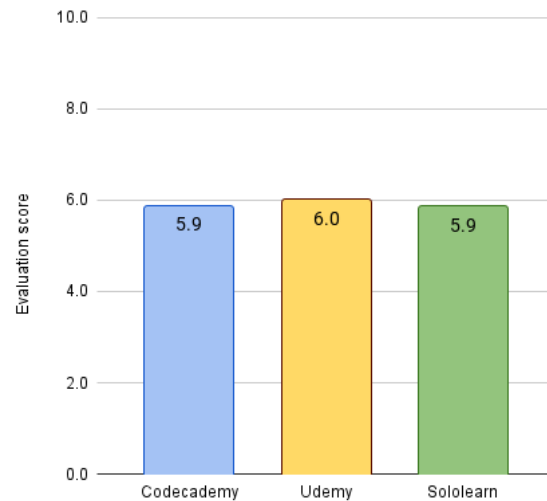


Fig. 29. Evaluation of learning platform on a scale from 1-10. Fig. 30. Evaluation of learning platform based on user groups.

7.6 Summary of key values

A summation of the key numbers presented can be found in Figure 31. The presented data shows that all active users went down in procrastination - with stick users showing a larger decrease than the carrot users. Carrot users, however, showed a larger increase in Python quiz scores after having used Aiki.

User group	Average procrastination decrease in minutes per Chrome hour	Average platform activity as minutes per Chrome hour	Average quiz score increase	Average scoring of websites visited less as per self-evaluation
Carrot	8.6	5	112%	1
Stick	10.7	0.3	43%	3
All active users	9.65	2.7	78%	2

Fig. 31. Summary of key numbers.

8 ANALYSIS

As shown in the previous section, we gathered a large body of data over the course of the study. In this section, we will first group our discussion around the three research questions stated in Section 5, analyze them and discuss our observations. Following that we dive further into RQ1.1, 2.1 and 3.0. in Section 9.

8.1 RQ1.0: Does the use of browser redirection decrease the time spent on passive, unproductive procrastination?

OBSERVATION 1: *Participants showed a significant decline in procrastination after having Aiki installed for 2 months.*

Looking at the numbers for both procrastination and Chrome activity, we observed a significant decrease in both. To avoid basing our measurements partially on factors not influenced Aiki, we chose the key value to be *the number of minutes a participant procrastinated per hour of Chrome activity*. We discuss other uncertainties in Section 10.2.

When looking at the change in procrastination time, we saw a 58% drop in procrastination time spent by all users (on average, 7.2 minutes per Chrome hour). Using the user groups defined earlier we can also note that carrot users, with an average decrease of 57% (between 15.2 to 6.6 minutes less per Chrome hour) saw a smaller decrease than stick users with their 93% decrease (between 11.5 to 0.8 minutes less per Chrome hour). Thus we can state that browser redirection does reduce time spent on unproductive procrastination.

8.2 RQ2.0: Does the use of browser redirection scaffold active procrastination, or "productive" procrastination?

OBSERVATION 2: *Carrot users showed a large increase in Python test scores. Stick users on average also increased their scores, but not to the same degree.*

The 6 users in the stick user group spent an average of 0.3 minutes daily on their learning platform. While this group increased in quiz score by 43% (from 14.8 to 21.2), this was due to two participants going up by 23 (participant 21) and 10 (participant 22) points. The 3 remaining stick users who completed the quiz did not have increased scores after using Aiki for two months. The carrot users showed a different tendency with an average of 112% increased quiz score, ranging from a 3 to 23 point increase after having used Aiki.

The difference is clear: carrot users improved their Python knowledge, whereas stick users did not improve to the same degree.

OBSERVATION 3: *Time spent on learning platforms strongly correlates with improved test scores, suggesting that participants engaged with the learning material after being redirected.*

On average, carrot users were productive for 1.9 minutes per hour of Chrome activity. Stick users had an average of 0.2 minutes. These numbers echo the results from the previous observation. While it may seem obvious that spending more time on a learning platform improves your score, together these numbers imply that carrot users *actually engaged with the material* when they were redirected, rather than just waiting for the timer to go down (e.g., by getting a cup of coffee), disabling Aiki, or skipping. This is important, as Aiki has no way of checking if its user actually does anything with the learning material once they are redirected, but these findings together imply that they do.

OBSERVATION 4: *User type played a strong role in the outcome of using Aiki.*

Carrot users and stick users achieved two different outcomes by using Aiki. Carrot users decreased their procrastination a moderate amount, and improved their Python knowledge by a significant amount, suggesting that Aiki aided them in using their procrastination time in a more productive manner.

On the other hand, stick users didn't gain much from Aiki when it comes to learning Python, - instead, they massively reduced their procrastination time (93% on average). This suggests that stick users would rather quit procrastinating than switch their procrastination time for another task, as stated in this interview:

"I realised that I ended up (not) going to those sites. So I did not end up learning a lot of Python, but I for sure did not procrastinate." (P5, interview)

OBSERVATION 5: *The data was inconclusive on the effectiveness of different learning platforms when paired with Aiki.*

Our initial hypothesis was that platforms that supported interactive microlearning environments such as Sololearn (in comparison to longer form teaching methods like those on Udemy) would have more positive learning outcomes.

Looking at the average increase in Python quiz scores, Sololearn users improved the most (135%), Udemy users came second (90%), and Codecademy users third (52%). However, the small sample size for each group makes it impossible to draw any concrete conclusions. Moreover, a further variance was observed based on other categories such as user type and how high the participant's initial score was. Finally, participants also gave similar ratings for all the learning platforms, giving Codecademy 5.9, Sololearn 5.9 and Udemy 6.

To gain useful knowledge regarding the choice of platform for use with the redirection strategy, another study is needed with more participants and a focus on evaluating different learning platforms and techniques in combination with Aiki.

8.3 RQ3.0: How is redirection of activity experienced as an intervention strategy for procrastination management?

OBSERVATION 6: *Carrot users generally evaluated Aiki positively, other users less so.*

When participants were asked to score Aiki on a scale from 1-10, Aiki scored a 6.6 on average. This number was more positive for carrot users, however (7.4) with a lower average for stick users (5.7). Ratings for Aiki from interviews were more positive, although this is likely influenced by the medium. Of the 8 participants who were interviewed, all expressed the desire to continue using Aiki in the future. Some features that participants appreciated were:

"The browser extension was relatively easy to install and the settings were easy to manage. I particularly liked that I could decide in which time frame I wanted to be redirected." (P2, survey)

"It's a good way of learning a thing that I otherwise wouldn't find time for." (P6, survey)

On the other hand, several participants also expressed frustration with Aiki at times:

"[...] sometimes I would get frustrated because I knew it was the better thing to do but I just really wanted to relax and watch a YouTube video. Also when I needed to access those sites for research purposes at work it was a hindrance." (P9, survey)

"On a subconscious level, Aiki helped with my procrastination, since I automatically didn't go to those sites that often anymore, but when I did need something from one of those sites, it just frustrated me." (P11, interview)

We will dive much deeper into this question and the design implications in the following section.

9 DIGITAL DESIGN OF REDIRECTION AS AN INTERVENTION STRATEGY

In the following we present our analysis of the qualitative findings from the surveys and interviews in response to the research questions RQ1.1 and RQ2.1: Why did browser redirection work or not work in decreasing passive procrastination and scaffolding of new productivity habits (learning)?, and RQ3.0: How is redirection of activity experienced as an intervention strategy?

To structure the analysis, we present a matrix of *factors, which influence the user experience* of a system like Aiki which redirects users to a perceived more productive website in response to their procrastination. The matrix is presented in Table 2. We note, that we do not claim that this framework is a final or complete picture of all possible factors relevant to systems designed for redirection. Rather, the framework represents the factors that the participants of *this* study brought up during and after this particular user experience evaluation of this particular system. We will discuss the generalizability and usefulness of the analysis further in the Discussion.

The individual categories in this matrix are presented first, and under each category, the factors are described, as well as how we define the factors based on the data. While drawing heavy inspiration from the principles of grounded theory analysis, this framework focuses on describing a digital system more than a social process. The categories "Intrapersonal factors" and "Context and environment" can be said to correspond to the grounded theory categories "Causal conditions" and "Context", and the "Interaction design features" category is similar to that of "Intervening conditions" [37]. The focus of our analysis is to describe these conditions more than to describe the central phenomenon of procrastination in general.

	Short term	Long term
Intrapersonal factors	<ul style="list-style-type: none"> • Goal of visiting website • State of focus 	<ul style="list-style-type: none"> • Motivation for use • Type of procrastinator
Interaction design features	<ul style="list-style-type: none"> • Perceived user control • Redirected to-website 	<ul style="list-style-type: none"> • Pervasiveness • Perceived effort
Context and environment	<ul style="list-style-type: none"> • Current tasks 	<ul style="list-style-type: none"> • Redirected to-website • Work-imposed restrictions

Table 2. Factors that influence the user experience

9.1 Short term and long term factors

By short term and long term factors, we attempt to distinguish between factors that are relevant in the moment and may change from use case to use case, versus factors that influence the user experience more generally, or during longer periods. This distinction emerged from the interviews with study participants in several forms, for instance:

"[if] the task is really boring, then sometimes I do tend to drift off a little bit. But in my most recent job, it's been a lot more interesting generally, so procrastination hasn't been as much of a problem - compared to my old job, which was quite boring. I would break off in the middle of a task a lot more" (P14, interview).

Here, the participant describes the difference in procrastination patterns when working on different tasks versus in different jobs. Whereas different tasks may change from hour to hour and week to week, some factors (like type of job) may influence the relevance of a redirection intervention more long term. We don't maintain a hard line between short term and long term factors, but let it depend on how different themes are described by participants. For individual users, long term might refer to a time span of a day, a week, or a month. The important aspect is that the situation is viewed as temporary.

9.2 Intrapersonal factors

With "intrapersonal" factors, we refer to factors that are related to the individual who uses the system - their preferences, inherent traits, feelings etc. Intrapersonal factors are therefore independent of the system or system designer. We can attempt, however, to address intrapersonal traits or features by adapting the system design. For instance, Lyngs et al. [25] describe how we may understand different procrastination intervention strategies in terms of how they attempt to support cognitive self-control systems. Cognitive systems are clearly intrapersonal and particular to the individual user. This complicates the design process of a system, yes, but if we understand relevant patterns or issues, we may design systems to support them.

9.2.1 (Short term) Goal of visiting website. Several participants mentioned that some of the websites they had listed in Aiki as procrastination websites were sometimes necessary for work or social reasons, e.g. *"many of the sites that I marked as procrastination sites are also some sites I use for learning material when I work"* (P11, interview) and *"after, like, a week or two, it started to get a bit annoying. Because sometimes I wasn't even going on to Facebook to procrastinate, I just wanted to write someone or something."* (P3, interview). The goal of visiting a procrastination website at that time clearly influences whether redirection is more or less welcome, and while Aiki is actually designed with an "Emergency skip" button for this reason, only one participant mentioned this button. This challenge is tricky to overcome, as it is a consequence of many websites being relevant to both work and leisure, as is described in the later section of *Redirection to-website* under long term, contextual factors (9.4.2).

9.2.2 (Short term) State of focus. Some participants described how the requirement to do another type of productive work (i.e. learning) was interfering with their state of focus in a way that visiting one of their procrastination websites would not have been:

"some times the whole, do five minutes of coding that, like pulled me out of my focus at work. (...) I get tunnel vision when I work. And it takes a long time for me to get into flow. And if I'm pulled out of that flow, I need another 30 minutes to get back into the other flow. (...) if I do go to just watch a silly movie or something that doesn't take me out of my focus, it just, like shuts off my brain for a bit." (P11, interview)

Previous research in Aiki suggested that different focus-modes might be relevant to an extension like this [18], where the user would not get interrupted when they were in a state of focus and potentially visiting their procrastination sites as part of their work. While the current study suggests the same, it also adds the aspect that

the requirement to *do five minutes of coding* is more disrupting to the state of focus than some other forms of procrastination, (i.e. "watching a silly movie").

9.2.3 (Long term) Motivation for use. During the interviews, we asked participants what their main motivation was for participating in the study. Out of the eight interviews, three participants (P2, P9, P11) said that their main motivation was to develop better control over their procrastination habits, four said that their main motivation was to learn Python (P3, P5, P13, P14), and one said that their motivation was equal between stopping procrastinating and learning Python (P19). This participant also said that because their goal was to stop visiting procrastination sites entirely, the idea of being redirected to a learning site before being rewarded with procrastination did not work:

"I guess the idea of being rewarded to go to sites that I just didn't want to go to, full stop, just didn't work out. [...] there was no motivation for me to, like, if I spend some time on Python, I can waste my evening on Reddit" (P19, interview).

Depending on whether the motivation for using Aiki is to procrastinate less or to engage in more productive behaviour, the user experience and user patterns seem to vary. As the observations about stick users in Section 8 suggest: if redirection actually works as an intervention strategy, the consequence may be that the learning outcome of using the extension is low.

9.2.4 (Long term) Type of procrastinator. We asked interview participants four questions to try and gauge their general relationship to their own procrastination and whether they would consider themselves primarily active or passive procrastinators [8] (e.g. "Would you describe yourself as a procrastinator - why or why not?" and "Do you work well under pressure - why or why not?"). Most participants said they work well under pressure because they procrastinate less during that time. This indicates that they are already active procrastinators. For instance:

"I think I am a procrastinator most of the time, because I do procrastinate a lot. And it takes a lot of effort to not procrastinate, but then at the same time, I think my environment would not describe me as a procrastinator. So I think I can procrastinate to the point where it's not harmful yet." (P2, interview)

While we do not have enough data to make well-informed assessments of people's general personality types, it appears that Aiki is appealing to more active, than passive procrastinators. However, because active procrastinators already have their procrastination "under control" or their work does not suffer from their procrastination habits, redirection to another productivity-related task interferes with their desire to disrupt their current productive task:

"And the way [Aiki] didn't work is that... is because of the way humans are built. We want to procrastinate, no matter - this is my personal experience - procrastinating is something that this is not fully under my control (...) I just wanted to something else more pleasant, more rewarding. And just what is rewarding at the moment is independence" (P13, interview)

If a person, in their procrastination, is looking for a break from the workload of their current task, redirection may be experienced less favourably, as it merely imposes a different task and not release a from workload. In our study, that effect may be stronger because we defined the learning environment for the participants. The pre-defined workload of an online learning platform may counteract the purpose of redirection as a self-reminder for the active procrastinator.

9.3 Interaction design features

Interaction design features are attributes of the system itself, and the system designer can manipulate and change these factors. We have described the specific interaction design of Aiki in more detail in Section 6, so in this section we focus on themes that may be relevant to the design of *any* digital tool for redirection.

9.3.1 (Short term) Perceived user control. Several participants mentioned that they appreciated the fact that they could control the hours during which Aiki is active, and the number of minutes and seconds each interception lasts: *"I would like that I could check Twitter, for example, in the morning, but then I say, okay, from nine o'clock, I don't want to check it anymore. Or I don't want to be able to check it anymore"* (P2, interview), and *"It's nice that you can set like, the timeframes, like how much how much time you want to do programming or whatever. And then how, how much procrastination time you get, I think that's nice - that I can see that for myself"* (P3, interview). While it appears to still be a considerable challenge for human-computer interaction to balance interference with the risk of *annoying* the user, our study indicates that the degree of customization possible in the system affects the user experience positively.

9.3.2 (Short term) Redirected to-website. We found that the website, the user is redirected to, influences the user experience significantly. The scores, users gave for the question "How would you rate your general experience with Aiki?" and "How would you rate your general experience with your coding platform?" in the closing survey were strongly positively correlated with $r(16) = .76, p < .001$, which confirms the observations of previous research [19]. While the design or content of the redirected to-website is not something the designer of the redirection has control over, the choice of redirection-to-website is, at least in this study. In the existing research on Aiki, the choice has been to exchange procrastination time for *microlearning*, either of language or of programming. Microlearning may be "too productive" a task to require from the user when they are looking for more passive or light entertainment:

"there were times where I was like, a little frustrated, because [...] I just don't want to do this right now. Like, I just need to like wind down and watch something." (P9, interview)

9.3.3 (Long term) Pervasiveness. The pervasiveness of the redirection system influences how much the system is able to assist the user's self-regulation:

"And in the worst cases, I would then just be like, okay, like, I can't use this right now, I'll just use my phone instead. Which I guess in future for something like this, [it] would have been nice if I had, like, more restrictions on me on different devices?" (P9, interview).

When the system is less pervasive, the user may be intercepted less, or it may be easier to develop circumvention-strategies, e.g. using a different browser or device to procrastinate. Whether this leads to less procrastination in the form of putting up "roadblocks" or tasks to override [25] would be interesting to study in future research. When the system is more pervasive, the system may be perceived as more annoying and the user may be more inclined to turn it off completely: *"I got redirected all the time from facebook so I unfortunately had to turn off the extension as all my communication happen through facebook"* (P8, closing survey).

9.3.4 (Long term) Perceived effort. Aiki and other similar tools work by tapping into the user's *expected value of control*[25] by, among other features, imposing a delay before procrastination is allowed. If the effort of completing the learning task is too high in relation to the reward granted by being allowed to procrastinate, the mechanics of redirection do not work: *"I didn't have the time for it."* (P1, closing survey. P1 uninstalled the extension after six days). If a user wishes not to visit their procrastination sites at all, the mechanics of redirection also do not work: *"I did not find the applicaton [sic] useful as I have no wish to visit the sites I choose to block, so the 'carrot dangle' of earning time to view sites I am trying to avoid did not work for me."* (P19, closing survey).

9.4 Context and environment

Similar to the intrapersonal factors category, context and environmental factors are outside of the control of the system designer, but they still influence the experience of the redirection application. For example, because our

study took place during summer, several participants described discontinuing their use of Aiki prematurely to the end of the experiment because they stopped using their computer for work.

9.4.1 (Short term) Current tasks. Naturally, the tasks someone is currently engaged in influence how welcome the redirection is. Some users described not having time for active procrastination while they were immersed in more work:

"I have been quite busy with work so I haven't been able to procrastinate and therefore be redirected by Aiki as much as I would have perhaps like, because the last eight weeks have been really busy. The first four weeks of the study, I had loads of time to procrastinate" (P14, interview).

The challenge for the system design in this circumstance may be how to allow the user to turn redirection off for a period of time while reminding the user to turn the system back on when relevant.

9.4.2 (Long term) Redirected to-website. Several participants said they found it frustrating to be redirected when they were trying to visit their entered procrastination websites for work purposes. This is an inherent consequence of many websites we frequently use providing content and functionality for both work and leisure, i.e. Facebook for social contact as well as company marketing, or YouTube for entertainment as well as education. Not to mention, many people are employed to primarily manage communication, marketing, and content creation via these media, and thus can not avoid them when working. One might add that the same concerns are relevant for the physical workplace: while a desk in an office provides a space to sit down and do focused work, the presence of other workers also introduce distractions and other opportunities for procrastination.

Additionally, the design of the redirected to-website can impose a bad user experience in and of itself: *"it was a bit passive. This, at least Udemy, because all the lessons, the lectures were just explaining the thing. (...) Probably making it more interactive, I would say, will make it a bit more engaging."* (P13, interview), and *"In the start I actually began using Sololearn as my new procrastination thing, I would prefer using time there. But I reached something I didn't understand and had nobody to ask, so I stopped using Aiki."* (P12, closing survey).

9.4.3 (Long term) Work-imposed restrictions. In the closing survey, we discovered that one participant (P15), whom we assumed had abandoned the experiment, had not been allowed to use Aiki by the IT department at her workplace. Work-imposed restrictions to privacy and logging will, of course, limit the functionality that a system can exert over a person's workstation, especially relevant in terms of the pervasiveness of the system. One participant circumvented this by installing Aiki only on their personal computer: *"I've got my work computer here and then I've got my personal computer here, which I installed Aiki on. And I kind of made sure I was using that during the day if I wanted to procrastinate"* (P14, interview), but if a user wants to reclaim control over their working habits at their primary working station, this is sub-optimal. Two participants also mentioned that they felt like the productivity exercise was just as illegitimate as procrastinating:

"In an office setting where I have to deliver, it felt like I was doing something I wasn't allowed to, even though I would have gone to an article that would have taken me five minutes to read as well. That just felt like I was cheating at work, instead of taking a break." (P11, interview)

10 DISCUSSION

Here we cover the generalizability and limitations of the experiment itself.

10.1 Generalizability

The results presented in this thesis are based on a small-scale, in-depth study, rather than a large population and statistical evidence. Because redirection of procrastination activity is an under-explored intervention strategy, we aim to generate insights and develop hypotheses, rather than to deductively validate existing ones. We can not know whether the results would generalize to a larger population, with different user groups, different learning environments, in different circumstances, which we will describe further in the next section.

10.2 Limitations and Future Work

While we stand by our analysis of the experiment, there were certainly weaknesses in the design which may have affected the results. Here we will address the shortcomings of the study, how we attempted to mitigate them, and opportunities for future work.

10.2.1 Selection bias. In our recruitment material for the study, we asked for participants who would be interested in two things: reducing their online procrastination time and learning Python. As such, our recruitment may have been selecting for users who were highly motivated to learn Python, more so than changing their procrastination habits. Motivation has been shown to aid in self-control[20]. Participants who were highly motivated thus would have been more positive and tolerant of Aiki's intervention method. A future study could be conducted with a control group who are not recruited to learn and assigned no learning platform to see if the effects of Aiki on procrastination time still hold.

10.2.2 Dividing participants by learning platform. Previous work[18] showed that the learning platform Aiki paired with has a large effect on the user's experience of the method. By sending our participants to learning platforms, we hoped to mitigate this effect and perhaps learn something about the effectiveness of certain teaching methods when paired with Aiki. However, in the process, we introduced another variable to the data that divided our participants. As the experiment continued, dropouts led to some of the groups having very small sizes, thus somewhat hampering our initial goal of gathering clear evidence on Aiki's effectiveness in each category. While the current data does seem to suggest that platforms with content focused more on microlearning techniques (Sololearn and Codecademy, with an emphasis on SoloLearn) are more successful in teaching programming than those with longer-form content (Udemy), the sample sizes are simply too small to state this with any certainty. Sticking with one platform or gathering a much larger set of participants base could have avoided this issue, but this would have run the risk of skewing the results differently if we had chosen a platform unsuited for the Aiki method. However, the One-Way ANOVA test was not significant even at $p < 0.1$. Thus we cannot prove that choosing multiple platforms had an impact on the results, but this might change if the same study was done with more participants.

10.2.3 Unlocked procrastination sites. In an attempt to give the participants flexibility and allow them to modify the way they used Aiki, they were not locked to their chosen procrastination sites for the duration of the study. In phase 1, participants were told to provide a list of sites they wished to spend less time on. In phase 2, we felt it unrealistic to hold them to the sites they had previously listed, as their experience of the redirection method and how it affected their behaviour might lead them to quit Aiki completely. Instead, we strongly encouraged them to use the same sites. For the most part, they did, but a small handful of participants removed sites such as YouTube and Twitch (in several cases, users found they needed YouTube for work, ie; watching tutorials), which may have improved their procrastination numbers further during phase 2. On the other hand, several participants added

more sites than they had in phase 1. In the future, locking procrastination sites for the duration would probably be preferable, at the risk of losing participants who find the lock too restrictive.

10.2.4 Small participant sample size. When we began the study we had hoped to get 30 participants through the whole experiment, but the duration and timing of the study lead to many dropouts, leaving us with half the sample size, of which only 8 appeared for interviews. While we suppose this kind of falloff is to be expected in a long study such as this, it nonetheless did lead to loss of data that would have been very useful in drawing a more concrete conclusion. In order to get our desired results, we should have doubled the number of participants recruited. Future work with a much larger cohort of participants or shorter studies with a more rigorous focus on user experience could perhaps be conducted to try and fill in this gap in the knowledge.

10.2.5 Interference due to changing COVID restrictions. While we saw an overall decline in procrastination over time, this was quite likely in part due to the changing scenario in the outside world. The study ran from the beginning of May to the end of July, 2021. During that time many countries began to open up: dropping COVID restrictions and allowing their citizens to socialize outdoors again as the summer arrived. It's not unlikely that many of our test subjects felt the need to leave their computers after a year of isolation and Zoom sessions. Doubtless, this multiplied any decline in procrastination that Aiki may have caused.

That said, the overall decline in procrastination was larger than the overall decline in Chrome time. Combined with testimony from the participants, we can still conclude that Aiki played some part in this decline, but due to these circumstances it would be erroneous to conclude that the decline in Chrome and/or procrastination time was *only* due to Aiki. Sadly this was completely outside our control to mitigate, and as such we can only keep it in mind when assessing the data.

10.2.6 Lack of cross-device tracking and blocking. We logged and blocked procrastination only on computers on which Aiki was installed. As such, a determined procrastinator could find many alternate avenues through which to escape: their phone, their tablet, another browser, or another computer without Aiki installed. It is also possible to avoid Aiki by using Chrome's incognito mode. As such, it is quite possible that for some participants, Aiki only shifted their procrastination behaviour to other platforms (such as scrolling through Facebook on their phone instead of their computer). In order to control for this, Aiki would have to be extended to cover more (or all of) these platforms simultaneously. This may be an interesting area for a much larger future study.

11 CONCLUSION

In this paper, we presented a new version of Aiki: a Chrome extension designed to allow users to trade procrastination time for microlearning sessions. Building on previous work, we re-implemented Aiki with a new architecture that supported more websites, new features that users had requested from the previous work, and logging of user behaviour. We then conducted a longitudinal study on the effects of redirection as a procrastination intervention strategy on procrastination and learning with 17 participants over the course of 3 months. We summarized our findings and observations into 6 general points, as well as using the described experience of Aiki to design a preliminary framework of factors that influence the user experience of a system like Aiki. Using the collected data, we show that some users find Aiki quite effective for trading procrastination for "productive" procrastination time, allowing them to learn a new skill such as Python - while others find it useful primarily to reduce procrastination time. While we were not able to state with certainty which learning platforms in particular work with Aiki, we find the results promising and believe there is still more room to explore this kind of intervention method with more participants and learning platforms in order to fully determine how effective Aiki can be. Further studies involving a much larger population might reveal new insights on where and how to apply this method, perhaps by launching the application to a much larger audience online.

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14 APPENDIX

This appendix includes a link to the *Aiki* repository, as well as the survey questions, python quiz questions, and transcripts of the user interviews.

14.1 Aiki Repository

The source code for *Aiki* is hosted on GitHub at this link: <https://github.com/bwesth/Aiki-3.0>

14.2 Surveys

Below is an outline of the questions asked in each survey.

Opening survey

- How often do you feel like you visit a "time-wasting" or unproductive website without thinking about it, as though your fingers almost type the address out of habit? (Scale, 0 = Never – 10 = Many times a day)
- Do you have any websites you wish you spent more time on or visited more often? Please tell us which sites and why you wish you spent more time there. (Open answer)
- Do you have any websites you wish you spent less time on or visited less often? Please tell us something about which sites and why these pages take up your time. (Open answer)
- Have you ever taken any measures to limit your visits to certain websites because you felt like they distracted you or prevented you from doing your work? If so, which measures? Were they successful? (Open answer)

Follow-up (During Python Quiz 01)

- How often do you feel like you visit a "time-wasting" or unproductive website without thinking about it, as though your fingers almost type the address out of habit? (Scale, 0 = Never – 10 = Many times a day)

Closing survey

- How often do you feel like you visit a "time-wasting" or unproductive website without thinking about it, as though your fingers almost type the address out of habit? (Scale, 0 = Never – 10 = Many times a day)
 - Did you learn or discover something about your procrastination behavior during the course of the study? Was the redirection how you expected? Did you get redirected more or less than you expected?(Open answer)
 - How would you rate your general experience with Aiki? Try to think about your experience of being redirected and the coding platform you were sent to as separate things. We will ask you about the coding platform in the next questions, so focus only on the Aiki browser extension here.(Scale, 0 = Not good – 10 = Very good)
 - Tell us more about why you chose that rating? Describe your experience with Aiki in as much detail as you can think of. (Open answer)
 - How would you rate your general experience with your coding platform? Try to think about your experience of being redirected and the coding platform you were sent to as separate things. (Scale, 0 = Not good – 10 = Very good)
 - Tell us more about why you chose that rating? Describe your experience with the coding platform in as much detail as you can think of. (Open answer)
-

14.3 Python Quizzes

Below is an outline of questions asked in the Python quizzes. Both quizzes were identical, barring some initial questions up front. These unique questions are listed first, followed by the 41 Python questions which were the same for both quizzes. These were designed to gauge the users general knowledge of Python principles, and consisted of a mix of multiple choice and open questions where the participants could write their own code.

-
- (1) **Quiz 1:** How would you self-evaluate your current level of Python?
- No experience at all (Beginner).
 - Extremely light exposure to Python (Novice).
 - Some experience with Python (Intermediate).
 - I can confidently code in Python (Expert).
-
- (2) **Quiz 1:** So we can get you to the most appropriate Python learning environment, would you prefer:
- Interactive exercises
 - Learning from a tutor / tutorial videos
 - Reading about the subject
 - “Tinkering” with the material, i.e. trying different things in an open-ended, unrestricted way
-
- (3) **Quiz 1:** If you had to choose one, what is your preference for the python learning sessions?
- I would like as short learning sessions as possible (less than 5 minutes per time)
 - I would like more time to focus and get into the zone (more than 5 minutes per time)
-
- (4) **Quiz 2:** How would you self-evaluate your current level of Python?
- No experience at all (Beginner).
 - Extremely light exposure to Python (Novice).
 - Some experience with Python (Intermediate).
 - I can confidently code in Python (Expert).
-
- (5) In Python 3, the maximum value for an integer is 2 to the 63rd power-1:
- True
 - False
 - I don't know.
-
- (6) Which of the following are valid ways to specify the string literal foo'bar in Python:
- 'foo"bar'
 - 'foo'bar'
 - ""foo'bar""
 - 'foo\bar'
 - "foo'bar"
 - I don't know
-
- (7) In Python, a variable must be declared before it is assigned a value:
- True.
 - False
 - I don't know

(8) Which of the following statements assigns the value 100 to the variable x in Python:

- `x < 100`
- `let x = 100`
- `x = 100`
- `x <- 100`
- `x := 100`
- I don't know

(9) In Python, a variable may be assigned a value of one type, and then later assigned a value of a different type:

- True.
- False
- I don't know

(10) Which of the following are valid Python variable names:

- `return`
- `4square`
- `ver1.3`
- `Age`
- `home_address`
- `route66`
- I don't know.

(11) You are reading Python code, and these statements appear scattered in different locations throughout the code:



```
Python
employeenumber = 4398
EmployeeNumber = 4398
employeeNumber = 4398
```

- These statements refer to the same variable
- These statements refer to different variables
- I don't know

(12) Which of the following are Python reserved words (keywords):

- `None`
- `class`
- `default`
- `and`

- goto
- I don't know

- (13) Write Python code to:
- Create a variable x with the value 100
 - Increase the value of x fivefold

- (14) Which of the following are truthy:

- 0.000001
- True
- 'None'
- False
- 0
- []
- I don't know

- (15) Suppose the following statements are executed, what is the value of the expression **a and b**?

```
Python
a = 100
b = 200
```

- 100
- False
- 0
- 200
- True
- I don't know

- (16) For two objects x and y:

- **x is y is True** if and only if
- **id(x) == id(y)**
- True
- False
- I don't know

- (17) What is the value of the expression **1 + 2 ** 3 * 4**?

- 33
- 108
- 4097
- 36
- I don't know

- (18) In a Python program, a control structure:

- Manages the input and output of control characters

- Directs the order of execution of the statements in the program
- Defines program-specific data structures
- Dictates what happens before the program starts and after it terminates
- I don't know

(19) What signifies the end of a statement block in Python?

- }
- 'end'
- A comment
- A line that is indented less than the previous line
- I don't know

(20) The following **if/elif/else** statement will raise a **KeyError** exception:

```
Python
1 d = {'a': 0, 'b': 1, 'c': 0}
2
3 if d['a'] > 0:
4     print('ok')
5 elif d['b'] > 0:
6     print('ok')
7 elif d['c'] > 0:
8     print('ok')
9 elif d['d'] > 0:
10    print('ok')
11 else:
12    print('not ok')
```

- True
- False
- I don't know

(21) What is the output of the **print()** function call?

```
Python
s = 'foo'
t = 'bar'
print('barf' in 2 * (s + t))
```

- True
- False
- I don't know

(22) Write the code for a Python function **greet(person)** that returns the string **'Hello, my name is .'**, with **person** inserted in place of **.**

(23) What is the slice expression that gives every third character of string **s**, starting with the last character and proceeding backward to the first?

- (24) Write the code for a Python function **expand(x)** that takes a list of strings, concatenates them, and returns the resulting string repeated three times.

Example 1:

- Input: ['string1', 'string2']

- Output: 'string1string2string1string2string1string2'

Example 2:

- Input: ['a', 'b', 'c']

- Output: 'abcabcabc'

- (25) What is the result of the following statement:

list((b'abcde' + 'fghi'[3:6]))

- b'def'
- It raises an exception
- [b'd', b'e', b'f']
- ['d', 'e', 'f']
- [100, 101, 102]
- I don't know

- (26) Which of the following mathematical operators can be used to concatenate strings:

- -
- *
- /
- +
- I don't know

- (27) List **a** is defined as follows:

a = [1, 2, 3, 4, 5]

Select all of the following statements that remove the middle element **3** from **a** so that it equals

[1, 2, 4, 5]:

- a.remove(3)
- a[2:2] = []
- del a[2]
- a[2] = []
- a[2:3] = []
- I don't know

- (28) List **a** is defined as follows:

a = ['a', 'b', 'c']

Which of the following statements adds 'd' and 'e' to the end of **a**, so that it then equals

a = ['a', 'b', 'c', 'd', 'e']:

- a[len(a):] = ['d', 'e']
- a.extend(['d', 'e'])
- a.append(['d', 'e'])
- a += ['d', 'e']

- `a += 'de'`
- `a[-1:] = ['d', 'e']`
- I don't know

(29) Suppose you have the following tuple definition:

```
t = ('foo', 'bar', 'baz')
```

Which of the following statements replaces the second element (**'bar'**) with the string **'qux'**:

- `t(1) = 'qux'`
- `t[1] = 'qux'`
- `t[2] = 'qux'`
- It's a trick question - tuples can't be modified
- I don't know

(30) Write Python code to create a tuple with a single element, the string **'foo'**, and assign it to a variable called **t**.

(31) Consider this assignment statement:

```
a, b, c = (1, 2, 3, 4, 5, 6, 7, 8, 9)[1::3]
```

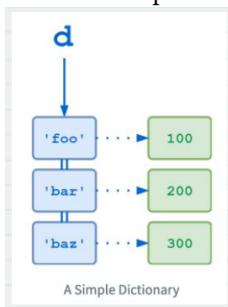
Following execution of this statement, what is the value of **b**:

- 2
- 4
- 5
- 6
- I don't know

(32) Which of the following are true of Python dictionaries:

- A dictionary can contain any object type except another dictionary
- Items are accessed by their position in a dictionary
- Dictionaries are mutable
- Dictionaries are accessed by key
- All the keys in a dictionary must be of the same type
- Dictionaries can be nested to any depth
- I don't know

(33) For this example dictionary, what statement will remove the entry in the dictionary for key **'baz'**?



(34) Consider this dictionary:

```
d = {'foo': 100, 'bar': 200, 'baz': 300}
```

What is the result of this statement:

```
d['bar': 'baz']
```

- [200, 300]
 - (200, 300)
 - It raises an exception
 - 200 300
 - I don't know
-

(35) What is the output of the following code snippet:

```
Python
d = {'foo': 1, 'bar': 2, 'baz': 3}
while d:
    print(d.popitem())
print('Done.')
```

- ('baz', 3) ('bar', 2) ('foo', 1) Done.
 - foo bar baz
 - The snippet doesn't generate any output
 - Done.
 - I don't know
-

(36) What is the output of the following code snippet:

```
Python
d = {'foo': 1, 'bar': 2, 'baz': 3}
while len(d) > 3:
    print(d.popitem())
print('Done.')
```

- ('baz', 3) ('bar', 2) ('foo', 1) Done.
 - foo bar baz
 - The snippet doesn't generate any output
 - Done.
 - I don't know
-

(37) What is the output of the following code snippet:

```
Python
1 a = ['foo', 'bar', 'baz', 'qux', 'corge']
2 while a:
3     if len(a) < 3:
4         break
5     print(a.pop())
6 print('Done.')
```

- The snippet doesn't generate any output

- corge qux baz Done.
- corge qux baz bar foo Done.
- corge qux baz
- I don't know

(38) This code is identical to the code in the previous question except that the break statement is replaced by a continue statement. How does that change the behavior?

```
Python
1 a = ['foo', 'bar', 'baz', 'qux', 'corge']
2 while a:
3     if len(a) < 3:
4         continue
5     print(a.pop())
6 print('Done.')
```

- The snippet doesn't generate any output
- This code behaves identically to the code in the previous question
- This code displays all the items in a.
- The code prints the same list items as the loop in the previous question, but this loop never terminates.
- I don't know

(39) Will the **print()** statement on line 5 be executed in this case:

```
Python
1 a = ['foo', 'bar', 'baz', 'qux', 'corge']
2 while a:
3     print(a.pop())
4 else:
5     print('Done.')
```

- Yes
 - No
 - I don't know
-

(40) After execution of the following code, what is the value of **s**?

```

Python
1 s = ""
2
3 n = 5
4 while n > 0:
5     n -= 1
6     if (n % 2) == 0:
7         continue
8
9     a = ['foo', 'bar', 'baz']
10    while a:
11        s += str(n) + a.pop(0)
12        if len(a) < 2:
13            break

```

(41) The Python interpreter takes the code that you write and converts it to the language that the computer's hardware understands.

Is this statement True or False?

- True
- False
- I don't know

(42) When you try to run Python scripts, a multi-step process begins. In this process the interpreter performs three steps:

1. Ship off the code for execution.
2. Process the statements of your script in a sequential fashion.
3. Compile the source code to an intermediate format known as bytecode.

Identify the **correct order** of these steps:

- 1 -> 2 -> 3
- 1 -> 3 -> 2
- 2 -> 3 -> 1
- 2 -> 3 -> 1
- I don't know.

(43) Which of the following are true regarding multiple statements per line in Python:

- Specifying more than one statement on a line is typically not considered Pythonic, but may be acceptable if it enhances readability
- Multiple statements on the same line are separated by the `;` character
- Placing multiple statements on a single line is discouraged by PEP 8
- Only variable assignment statements may occur multiply on a single line
- I don't know

(44) Consider the following sequence of statements. Execution of these statements will:

```
Python
x, y = 1, 2
z = 3

print(x, y, z)
```

- Succeed without error
 - Generate an exception
 - I don't know
-

14.4 Interview Questions

Including in the following pages are anonymized transcripts from the user interviews conducted at the end of the study. Each interview was held in a semi-structured format lasting around 10 minutes on average. Attached first is the list of questions that each user was asked, follow by transcripts of each interview.

Interview Questions:**Experiment-Specific Questions:**

- What was your motivation to participate in the study?
- What was your motivation to learn Python?
- Why did Aiki work or why did Aiki not work for you?
- Will you continue using Aiki? Is there something missing that would convince you to continue?

General Questions:

- Would you describe yourself as a procrastinator? Why or why not?
 - Would you describe yourself as a person who structures their work a lot? Why or why not?
 - Do you feel like you work well under pressure, for instance as a deadline approaches? Why or why not?
 - Do you often start working on tasks at the last moment, and does that lead to problems finishing on time?
-

14.5 Interview Transcripts

Included below are transcripts for all 8 interviews conducted at the closing of the study. The interviews were semi-structured and lasted between 10 and 15 minutes.

14.5.1 Interview with P2.

John Muller 0:02 Okay, so... Hi there. My name is John Muller. I'm research assistant at ITU working on a paper on Aiki. And I want to thank you for participating in the study and in this experiment, and I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P2 0:23 Yes. So yeah, my name is P2. And, of course, you're allowed to use my answers for research purposes.

John Muller 0:31 Alright, great. So we'll get to the questions now. So specifically, related to the experiments. What was your motivation to participate in this study?

P2 0:43 It was actually two parts. So on the one hand, I was really feeling I was procrastinating too much - especially on Twitter - and then I saw a tweet, advertising this experiment. And then I thought, wow, and also wanted to learn Python. So yeah, I thought that this is a really nice combination of the two things, too. So minimising the procrastination time and using it for better purposes I'd say.

John Muller 1:13 Alright. So inside of that, what was your motivation to learn Python, if any?

P2 1:21 So I had that motivation before, let's say, already. So before I started the experiment, and I do know R (programming language) already but I felt like it would be a good addition to my toolbox, let's say. Yeah.

John Muller 1:38 All right. In the sense, just to expand on that a little bit, like for what reason? What do you think you would be using Python for?

P2 1:49 Mainly data analysis I would think. But I don't have a specific use case in mind already. So I thought maybe it would be handy later in my working life.

John Muller 2:06 Alright, cool. So why did Aiki work? Or why did Aiki not work for you?

P2 2:14 With Aiki, you mean now the redirection?

John Muller 2:19 Yeah, so the application itself. What parts worked or didn't work for you?

P2 2:23 Yeah. So it worked quite well that I got redirected when I wanted to get redirected. So I really liked the part of the timing. And that's something else I wrote in the survey at the end. So I would like that I could check Twitter, for example, in the morning, but then I say, okay, from nine o'clock, I don't want to check it anymore. Or I don't want to be able to check it anymore. So that worked very well for me. And I often - and that was part of the questionnaire as well - I often found myself that I just was bored and then I typed Twitter or whatever, whatever, into the browser window. And then I found myself redirected and was like, oh, yes, true.

John Muller 3:10 Yeah.

P2 3:10 And I would say like, most of the time, I then thought, okay, then I just continue the work that I'm actually doing instead of procrastinating. And sometimes I even did it on purpose when I felt like okay, now, I don't want to do what I'm actually doing right now anymore. So I would rather like to do something different,

but still useful. And then I went on the platform. On purpose. That's it.

John Muller 3:39 All right. That's interesting. So will you continue using Aiki, is there something missing that would convince you to continue?

P2 3:51 Difficult, so I switched it off. So I went on holidays. And these are my first couple of days after the holidays. I find I find it really hard to get back into it, because all my colleagues are still on holiday. So it's rather lonely at the moment and *unintelligible* a new home office anyway. So yes. So I now switched it off, and I'm not sure whether I will switch it on again. But I also can't really say why. So I can't really pinpoint what I think is missing. Sorry. Yeah.

John Muller 4:28 Yeah. Oh, that's fine. That's, it's all useful. So I know that feeling coming back from from a holiday, so. Alright, but now we'll just go to some more general questions. So would you describe yourself as a procrastinator and why or why not?

P2 4:50 Yes, I would. I think I am a procrastinator most of the time, because I do procrastinate a lot. And it takes a lot of effort to not procrastinate, but then at the same time, I think my environment would not describe me as a procrastinator. So I think I can procrastinate to the point where it's not harmful yet. Yeah.

John Muller 5:16 Yeah. You still get things done somehow. Yeah. Okay. So would you describe yourself as a person who structures their work a lot? Why or why not?

P2 5:29 Yes, I do structure my work a lot. I write a lot of lists, and to do lists, and I write everything down by hand. I've got a notebook here. So yes, I structure my work a lot. And that's something that my environment will also confirm. *laughs*

John Muller 5:49 All right, do you use like a calendar or scheduler as well? Or is it all by hand like to do lists?

P2 5:56 Mostly by hand, but then, of course, the Outlook calendar, and I really like OneNote, as well. And also that we can incorporate now OneNote into Teams and work on these lists together with colleagues that are in the same project. I think that's very handy.

John Muller 6:16 Alright. So do you feel like you work well, under pressure, for instance, as the deadline approaches? Why or why not?

P2 6:25 Yes, I do work well under pressure. And I think I work well under pressure because I then procrastinate less.

John Muller 6:36 Alright. Do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P2 6:45 No. I do not. I usually start early enough and then I always plan some buffer time in and I like to practice presentations and read over a paper again and again, before I submit. So I start early enough, I would say.

John Muller 7:03 Alright. Okay. Well, that's it for the formal questions. Is there anything you'd like to add or say about the experience? Just whatever's on your mind?

P2 7:16 No, nothing specific. I really liked the experiment, I think was very well set up. And the communication was always very nice. So I think that was just very cool and very good. Very well organised. So my compliments for this. Yeah.

John Muller 7:33 Thanks. That's good to hear. There is one thing, which is that we will probably be releasing a finished version of Aiki at some point where you can choose your own site to be redirected to. So it's completely under your control how it works, then. This is not an advertisement. But just if you're interested, we can send you an email when that happens.

P2 7:59 Yes, please.

John Muller 8:01 All right.

P2 8:02 So do you already have some things in mind that you will change or? The finished version will be different?

John Muller 8:11 Yeah, I mean, our biggest problem is that, you know, because of the way we developed it, we didn't have a lot of user testing. Like we were just doing it as part of a study and stuff. So I think, I think the core functionality will remain the same. But we want to allow people to choose what site they're going to be redirected to, and then probably just improve... there's quite a bit of bugs and might be better to move some buttons around and things like that, you know, but it should mostly stay the same, I think. But we would really like to sort of fine tune it now and that's where some of these interviews have been very helpful. Just getting little bits and pieces that people want. So...

P2 8:53 Yeah, cool. Nice.

John Muller 8:56 Alright. Well, thank you very much for your time. And again, thanks for participating. We really appreciate it.

P2 9:04 And good luck with the rest of your work.

John Muller 9:06 Thank you. Alright. Have a nice day.

P2 9:09 You too! Bye bye.

John Muller 9:10 See you.

14.5.2 Interview with P3.

John Muller 0:01 Okay. So, hi, my name is John, and I am a research assistant at ITU working on Aiki. And I just want to take a moment to thank you very much for participating in this study and in this experiment, and I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P3 0:21 Okay. Hi, I'm P3, it was nice to take part in the experiment. And you can use my data for whatever for research purposes.

John Muller 0:32 Alright, thank you. Okay, so there's just two batches of questions: a couple about the experiment and then I'm going to ask you some questions about like, your procrastination style, sort of. And then we'll be done. So I'll get started with the questions about the experiment. So first of all, what was your motivation to participate in the study?

P3 0:56 Mainly, I wanted to get better at coding, because I had some base, but I've never learned Python. So yeah, I guess I just wanted to get better and just get to know the language.

John Muller 1:12 Do you mind if I ask what previous programming experience do you have?

P3 1:17 I was working with the R programming language. And then we worked a little bit with PsychoPy, which is, I don't know, but it's in some relation to Python. I'm not sure. But yeah, at the time, I just didn't have any programming courses. And some of my friends were taking one where they learn Python, and they were just talking about, like, how nice it is. And so when I saw that there was this experiment, where I can learn some Python, then I was like, yeah, I want to know what it's like.

John Muller 1:58 Yeah. Okay, cool. Thank you. Um, so next question. Well, you kind of explained it already. *laughs* But what was your motivation to learn Python?

P3 2:10 Yes, I just heard that it's a very nice language to work with. And that you can do a lot and it's very widely used. So yeah, mainly this, I just wanted to get to know it. And yeah, see how I liked it better. I liked it, actually. So.

John Muller 2:28 That's good. Okay, so why did Aiki work or why did Aiki not work for you? And be brutally honest.

P3 2:39 I think in the beginning, it was fun, to always just to do five minutes of coding - I don't know before I logged into Facebook or something. And then, I don't know after, like, a week or two, it started to get a bit annoying. Because sometimes I wasn't even going on to Facebook to procrastinate, I just wanted to write someone or something. And so then, I don't know. Then I started to use a messenger instead of Facebook, because I didn't set that as procrastination site, which I guess is better because of Facebook. I can see the...

John Muller 3:27 Feed.

P3 3:27 ...or whatever. Yes. And on messenger it was just about the messages. So it worked, actually. And yeah, also, I set the Netflix as a procrastination site as well. And there were just times where I was having lunch or

something, and I wanted to watch something. And then it was a little bit annoying to get, like five minutes of coding every 15 minutes. So yeah, then I think I just use Netflix in incognito (mode). Because then Aiki didn't work. Yes, but to be honest, I didn't. I was kind of strict with myself. And I, like didn't let myself just procrastinate on Netflix in incognito. So then I actually used Aiki less, because I just yeah, I stopped going to my procrastination sites. Yes. And then in the end, I guess I just realised that I've been doing just so little coding. And I just started doing it again. But I think it was more because I liked it. The coding.

John Muller 4:55 It wasn't through Aiki you were doing the coding?

P3 4:57 It was, it was through Aiki.

John Muller 4:59 Oh okay. So would you deliberately try to procrastinate so you could do some coding? or how did that work?

P3 5:06 It was more like when I wanted to log into Facebook and just... Aiki came up. I was like, okay, I won't use messenger. I am fine with this five minutes or whatever. Yes. So yeah. It was a bit more deliberate, but I used Aiki. And then maybe I stay there for like, more than five minutes. And just like, did it for however long I enjoyed it.

John Muller 5:39 And you remind me what platform you will use an again? For learning programming?

P3 5:46 Ehm, R studio was the programming language or...?

John Muller 5:51 No, but did you get Codecademy or SoloLearn?

P3 5:55 Oh, SoloLearn.

John Muller 5:57 Okay. All right. Yeah. Reveal the curtain in a little bit. We used some different platforms for different people to see how they responded.

P3 6:04 Oh okay.

John Muller 6:06 Did you? But yeah, okay. So I don't want to go off on a tangent. But that was a good answer. Thank you. So will you continue using Aiki, and is there something missing that would convince you to continue?

P3 6:22 I actually wanted to ask if I can continue, because I don't know if I can just continue using it. And like, learn programming. I can? Or...

John Muller 6:33 Well -

P3 6:34 - like, I didn't know if it was going to end. And then it wouldn't let me do the programming or something.

John Muller 6:40 Oh, no. So, I was gonna save this for the end of the interview. But we are going to launch a version of Aiki where you can program where it takes you when you try to procrastinate. So you can say, send me to Duolingo and set or whatever you can choose. And hopefully with some of the bugs ironed out and stuff. So we will be releasing that. Hopefully soon. There's nothing stopping you from continuing to use the Aiki that you have right now, we have cancelled the subscription on the coding platform. But you can have the account if

you want it. I can just we can just email a little bit after this. Or we can talk about it after the interview. But so you would like to continue using Aiki?

P3 7:28 Yes, yeah, I think it's a really good idea. And it is just a nice reminder. Because if I didn't have that, I will just forget after some time that I have this that I want to do, or I would be just too lazy. But here I'm kind of forced to do it. And then I don't mind it. And I can also just switch it off if I'm really not in the mood. So yeah. Yeah. So I think I will going to use it in the future as well.

John Muller 8:04 Yeah. Is there anything you would like to add to Aiki? Like, can you think of a feature that's missing? Or is it as good as it is right now?

P3 8:15 Um, I think I liked it. I didn't have any problems with it or anything. Yeah, I think I liked it. It's nice that you can set like, the time frames, like how much how much time you want to do programming or whatever. And then how, how much procrastination time you get, I think that's nice - that I can see that for myself. Yeah, I don't know. I don't know what I would change. I liked it.

John Muller 8:50 Oh, that's, I mean, it's good feedback. So thank you. It's nice to hear that people like it. So... After working on it so much, so. Alright, so now on to the more general questions. Sorry, we got a bit sidetracked there, but I think there was a good discussion. So would you describe yourself as a procrastinator? Why or why not?

P3 9:14 Hmm. Usually I was kind of a procrastinator person in the past, but then I also get really stressed when I know I have stuff that needs to get done. So now I'm really trying to not procrastinate so much. But yeah, sometimes I still do and then lots of things just pile up and then... Yeah, then I just do them all at once. So yeah, from time to time.

John Muller 9:49 Yeah. Okay. I mean, I haven't haven't spoken to... If it helps, I haven't spoken to a single person who has said they're not a procrastinator. So don't worry about that. So would you describe yourself as a person who structures their work a lot? Why or why not?

P3 10:09 I would say yes. I like to have a list of what I have to do. Because then I know that I won't forget anything and then I just feel more comfortable. And then I can just plan how, like, how much time this needs. And yeah, then I feel like I can use my time better. So yeah, I would say I am.

John Muller 10:37 All right. So do you feel like you work well, under pressure? For instance, as the deadline approaches? Why or why not?

P3 10:51 I feel like yes. Yeah. Like if I'm late with a project or something, of course I'm a bit stressed. But I feel like yeah, I really focus on getting things done, and just to be finished by the deadline. So yeah, I really don't like to be late with things and stuff. So yeah, I would say I work well, under pressure. Yeah.

John Muller 11:26 Alright. Okay. And the last question is: do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P3 11:39 I usually don't, I usually start well ahead. And then just because then I get to *unintelligible* that it's gonna get done, and I'm fine and everything. And then I don't know, maybe I started, like, I don't know, like before the deadline. And then I just, I don't know, I do some work on it. And then just to see that I can do it,

and it's gonna get done by the deadline. And then maybe I don't work on it for some time. And then before the deadline, I just finish it, but I think it's better because I know I can finish it, because I already started it. So I know... like, yeah, where I stand with the project.

John Muller 12:23 So you you do some sort of preliminary work to kind of -

P3 12:27 - yes, yeah, just to see how much time and effort this project needs.

John Muller 12:33 Yeah. Alright. Well, that's the end of the questions. Is there anything you'd like to add? Any thoughts?

P3 12:45 Um, I don't know. I think it was a nice experiment. Yeah, I, and I liked learning the programming language. So it was definitely positive for me.

John Muller 12:59 All right.

P3 13:00 Yeah.

John Muller 13:00 I'm glad you enjoyed it. So this is normally where I'd tell you that we're gonna release a new version of Aiki. So what I will say is just that you're free to keep using Aiki - the one you have - and to keep using the learning platform that we gave you. I'll email you after this. We can talk in a little more detail there. But for now, I will just stop the recording. So thank you very much for your time. And thanks for participating. So yeah, thank you.

P3 13:39 Yes, thank you, and then talk to you later.

John Muller 13:42 Sure. All right. Cheers.

P3 13:44 Cheers. Bye.

John Muller 13:45 Bye.

14.5.3 Interview with P5.

Nanna Inie 0:00 We'll try to make it as short as possible to not take too much of your time. So I'm going to be a little quick to get started.

P5 0:09 That's fine. Happy to.

Nanna Inie 0:11 ...have recording. Fantastic. Okay, so first officially, can I get you to state your name and that you're okay with us using your answers for research purposes.

P5 0:20 Yeah, my name is P5. And I'm okay with you guys using everything that I say in this recording for research purposes.

Nanna Inie 0:28 Fantastic. Thank you so much. So first, I'll start off with what was your motivation to participate in study?

P5 0:36 Well it was actually to learn Python, there was a main motivation. And of course, also, avoiding procrastination is always a good thing. But I think the coding - or I mean the getting into Python was the bigger drive.

Nanna Inie 0:53 Alright, so well, what was your motivation to learn Python specifically?

P5 0:57 Okay. Because I use it for research or all the more. Yeah, the more... the deeper I dig into the things that I'm doing now, the more I tend to find things related to Python, or things that use Python, and it's one of the skills that I think I need as a researcher in neuroscience - which is my field - that has been dominated by MATLAB for a long time. So... and I'm already confident with MATLAB, but I've been meaning to get into Python too, because it feels to me that it will sort of grant me access to a new set of tools that are out there, and it will expand the things that I can do. And of course, it also feels like if ever I'm out of research and going into the industry, it also feels like Python would be a much more appropriate language. Yeah, in comparison to *unintelligible* for example.

Nanna Inie 1:55 Okay, yeah, yeah, so it's gonna ask like... Appropriate in terms of..?

P5 1:59 Yeah, in terms of usage, of the openness of the of the program in terms of that you don't need a licence as you do in MATLAB. But also, it feels that outside of research, or outside of neuroscience, yeah, MATLAB is not so common, I would say. And Python is way more flexible and powerful, or it feels like it's more flexible and powerful.

Nanna Inie 2:24 All right, thank you. Why did Aiki work? Or why did it not work for you?

P5 2:29 It did work. I'm not entirely sure it worked in the way you guys were planning on it to work. So it worked in a way... So at the beginning, I was super motivated and excited every time that I got this prompt and I was redirected to the learning site. And I engaged into the activities a lot. So it felt like that first stage, like the identifying the sites, the progressing insights, and all that and actually the times that I set - I think everything was appropriate. But I think, probably after the second or third week, I realised that I ended up (not) going to those sites. So I did not end up learning a lot of Python, but I for sure did not procrastinate. So it did help, you know, like, it did happen on one of the sites. Because I was... I knew I was going to need to spend some time there. And I didn't have time to do that. So I avoided procrastination a lot. So you guys have improved... probably

my efficiency in the last few months. That's good thing, I think. But my Python skills have not skyrocketed.

Nanna Inie 2:39 So yeah, so that's, yeah. Ok, we'll get back to that. Is there's something missing from the extension as it is, which would convince you to continue using Aiki?

P5 3:57 I don't think so. I think it works wonderful. And I think it - I mean, if the goal is to avoid procrastination, go for it. I think it works super nice. You guys did a great job.

Nanna Inie 4:08 And what if our goal was, like you said, you were primarily motivated to use Python?

P5 4:12 Yeah.

Nanna Inie 4:13 And what if the goal was that and that didn't succeed?

P5 4:16 Yeah, I wouldn't know how to fix it. I wouldn't know. *laughs*

Nanna Inie 4:21 It's not your job to do. So it's just if you have any...

P5 4:21 Yeah, but I wouldn't know. I mean... I take that the goal of this project is to use procrastination time to learn stuff, right? But you guys have managed to create something that avoids that procrastination time or reduces that procrastination time - at least in some people. And probably, if I want to learn Python, I should actually do a Python course or use some of the non-procrastination time to do that.

Nanna Inie 4:33 Do you think it's... Do you think it matters that it was a coding productivity site per se? Like, could you imagine that it would have worked better if it had been a different site you were redirected to?

P5 5:05 No, I don't think so. I think it was the sort of the awareness of I'm wasting my time here... was more on that side, I think. Because I'm really happy with the coding platform (Codecademy) if that - I don't know if you're going to ask about that. But I'm really happy with the way...

Nanna Inie 5:23 We ask about it in the survey, so we are interested in that for sure. Okay. Which platform did you use?

P5 5:29 Codecademy.

Nanna Inie 5:31 Codecademy. Okay. Yeah. Then we have a couple of general questions. Would you describe yourself as a procrastinator? Why or why not?

P5 5:42 Probably less after I started using Aiki, probably it's less than before. I don't have to. I think I don't tend to waste too much time on procrastinating on... Yeah. Yeah. Wasting working time on procrastinating? I would say not a lot. But definitely less since I installed Aiki.

Nanna Inie 6:05 All right. Would you describe yourself as a person who structures their work a lot? Why or why not?

P5 6:13 No, I would not. I tend to not structure my work a lot. And I would say that because I've been in contact with colleagues and I know colleagues who actually do and I know that I'm not doing that. *laughs*

Nanna Inie 6:29 Okay. Do you feel like you work well, under pressure? For instance if the deadline is approaching?

P5 6:35 Yeah, sure. For sure. Yeah. That would be...

Nanna Inie 6:42 What makes it - the deadline? Or what makes you work better under pressure?

P5 6:49 I think it's, yeah, it's probably also the awareness of the restricted amount of time that I have before I need to accomplish something. And that actually forces you to structure things, which I don't tend to use normally. And, yeah, so it's probably more of that time.

Nanna Inie 7:09 Okay, and the final question. Do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P5 7:22 No, I mean, I don't have problems finishing on time, because I've managed to fulfill the deadlines. It's not that I run over them. But I do feel like I have many things going on. And I tend to - if you want - procrastinate between different side projects, but I have my main projects, and I go and do something else in this other project, and this other one and this other one, which is probably not more the most efficient way of structuring my weeks. But that's what I tend to do. So I wouldn't say that I don't meet the deadlines. I meet them. But always I feel like I'm way more productive when the deadline approaches.

Nanna Inie 8:07 Okay, yeah, good to know. Well, that was the official questions that we had. So of course, we'd like to ask if you have any final comments, either about the experiment or about the interview or about the surveys?

P5 8:19 No, I would say you guys did a great job. Everything was super clear in the emails. It was fun to read what you wrote. I had some issues with the extension at the beginning. I don't know if I were talking with one of you guys. But you managed to fix it. So that worked out fine. Yeah.

Nanna Inie 8:42 Good. Then if you would be interested in getting a free, I mean, free for your own definition kind of version of the extension, where you could define which platform you might be sent to or like, would you be interested in keeping a version of it? Or us letting you know when we're releasing it into the open?

P5 8:42 Yeah, sure.

Nanna Inie 8:53 OK, we'll make a note of that, and reach out to you.

P5 9:09 Yeah, that would be great.

Nanna Inie 9:11 Thank you so much for your time. And for participating and have a great rest of the summer.

P5 9:17 You too, guys. Enjoy you and congratulations once more.

Nanna Inie 9:20 Thank you very much.

P5 9:21 Thank you.

John Muller 9:23 See you.

14.5.4 Interview with P9.

John Muller 0:00 All right, so now we're started. So. Hello, my name is John, and I'm a researcher at ITU working on this paper on Aiki and I want to thank you for participating in the study and this experiment. And I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P9 0:26 All right, my name is P9. And I agree to you using my answers anonymously, for this paper.

John Muller 0:35 All right, great. So we're just going to go through a list of questions. And I mean, be brutally honest. And I'm going to try not to sort of like, we'll have a bit at the end, where we can do like further discussion. It's more just like, getting your answers, getting your thoughts straight. And then at the end, we can talk a little more, but yeah. So, related to the experiment, what was your motivation to participate in the study?

P9 1:08 Um, primarily, I guess, just a better way to use my time, other than going to YouTube going to Reddit, you know, things like that. I find myself during work needing some time to just pull away. But, you know, I wanted to use that a little bit more effectively than, you know, the regular procrastination methods.

John Muller 1:33 All right. Okay. So what then was your motivation to learn Python.

P9 1:40 Um, I've had an interest in programming for a while, I picked up a few languages, not not to any great degree of expertise, but it's still enjoyable. And Python's just been on the list. It's one of those like, super popular languages that everyone's like, you should probably learn this, it's, you know, it can be really useful. And also from my job using Excel spreadsheets, I thought it might be a better way to interact with those instead of like, Visual Basic or something yeah.

John Muller 2:09 All right. So then, why did Aiki work? Or why did Aiki not work for you?

P9 2:19 It both did, and didn't work depending on the kind of use that I was trying to get out of it at the time. Initially, it was quite difficult to... No, I'd say, so initially, I got set up and running. And, you know, I got to grips with, you know, using Python every single time that I was prompted to, or, like, automatically went to a website that I put on the list. And that worked out quite well. And then there were times where I was like, a little frustrated, because I was like I you know, either need to watch this YouTube video for work or something. Or like, I just don't want to do this right now. Like, I just need to like wind down and watch something. And obviously, you guys had the the emergency skip feature, which was nice. But I think for the majority, like after that I started... I got into this habit where - and I guess this is a good thing, where whenever I was, I felt like I wanted to go to YouTube or Reddit or something. I would start that and be like, hold on OK. Now Aiki's gonna like interrupt me to do this, like, okay, so I just ended up avoiding going to those sites. And it meant in the end that I wasn't following on with Python as much, because I was like, okay, like, I just shouldn't be procrastinating. And then I'd like when did something else right? And in the worst cases, I would then just be like, okay, like, I can't use this right now, I'll just use my phone instead. Which I guess in future for something like this, who would have been nice if I had, like, more restrictions on me on different devices? But I know, that's obviously a lot more difficult to do.

John Muller 3:51 Yeah, I mean, as an extension of that question, then did your, like phone procrastination increase a lot?

P9 3:59 Um, I'm not sure. I don't think so. Maybe at times, where, you know, it would have been more convenient to use my computer and then swapped over to using my phone. But I think for the most part, the, I just got into learned behaviour of just not going to these websites at the time, because I was like, well, I don't want to get interrupted by Aiki and go through and, you know, do some Python and then jump back to what I was doing. And by that point, like, I'd already be like, well, I don't really want to watch this video anymore. I'd like you know. *laughs*

John Muller 4:34 Alright, cool. Okay, so while you continue using Aiki, is there something missing that would convince you to continue?

P9 4:44 Um, I think I definitely could use Aiki more. It would just, I would just have to tailor it to specific times, and be like, okay, I want to be in a focus period right now, so I'm going to turn it on, and it's going to bother me if I try and like, stray from the path, and then I can also continue to learn some some Python right? With it (Aiki) or, you know, have a direct me to something else. Yeah, I think that's the biggest thing is just being okay with it during that, and, and kind of getting into into better learned behaviour. So I think so. Yeah.

John Muller 5:26 All right. Cool. So just a more general questions that are, like less related to it. And more, yeah, general. So would you describe yourself as a procrastinator and why or why not?

P9 5:42 Uh, yes. Mainly, just because I have a tendency to, like, when I get overwhelmed at work, or just, you know, really don't feel like doing something, which happens quite a lot. Then I'll go and like, watch a YouTube video or something. And I'll be like, ah, just, you know, I just need five minutes or something. And then five minutes turns into fifteen minutes and so on. So yeah.

John Muller 6:08 Yeah. Okay. Would you describe yourself as a person who structures their work a lot? Why or why not?

P9 6:17 It depends on the day, I definitely have an order to things I prioritise, you know, the most important things to tackle at a time and then try and do those. But it depends on what happens because a lot of times I'll get new requests coming in, and I'll need to deal with those. So I generally don't tend to structure my time very strictly. So I'm not going to be like, okay, this time of the day, I'm doing this, etc. It's just, this is the next thing I need to work on. I'm working on that. If something else comes up, then I'll you know, figure that out.

John Muller 6:53 All right. So do you feel like you work well, under pressure? For instance, as the deadline approaches? Why or why not?

P9 7:02 Uh, yeah, I believe so. I feel like the the time pressure and getting, having that immediacy actually gets me to work more and harder. Instead of kind of the the time procrastination thing, where it's like, ah, I've got ages to do this. So I put it off, right. Whereas when I have a deadline, I'm like, well, if I don't do this, I'm screwed. So, yeah.

John Muller 7:28 All right. And then last is Do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P9 7:39 Um, yes. While it doesn't always lead to problems finishing on time, it definitely affects the quality - I think - of the work sometimes. But yeah, there have been times where I've been able to just pick things up and do them immediately. But that kind of slipped sometimes. And I'm just like, well, I've got time to do this, and I'll

do something else or procrastinate. So...

John Muller 8:03 Yeah. All right. Well, one thing that that we can offer is the... Okay, I'll just say that's the end of the official questions. So we're done. Is there anything else you'd like to add or like, say about Aiki or this process?

P9 8:22 I think it was an interesting prospect. And I think it's at the very least better than nothing. And has showed me that there are tools that I can use to help me get into better behaviour. I mean, even if I wasn't using the Python learning stuff, and it was just there to, like, annoy me and prompt me to be like, well, you shouldn't be on the site, either, you know, go and do this - and then you can watch it or, I guess, leave, right. And that in itself was effective to help me reduce the time I was spending procrastinating for the most part. Obviously, you know, going on to different devices and procrastinating different ways didn't help. But at the very least, it helped me stop doing those things during work a lot more. And other than that - sorry, what was the rest of your question?

John Muller 9:18 Ah, it's just like, general, anything about any thoughts you have? So it can be anything. Yeah.

P9 9:24 Okay. Um, yeah, I think I would have liked to have the option to - or at least in the future - I guess the the option to specify the website that you're directed to instead. You know, for instance, if I'm trying to learn a language or something, I could direct that to language learning website. And other than that, there were a few bugs. But that's understandable. I think nothing more than a restart or reinstall didn't fix it. So. That's OK.

John Muller 9:58 Yeah, they definitely were some issues that came with the rapid development. But yeah, that that's about it. Thank you for your time. You mentioned - like we have, we are going to launch a version of Aiki where you can control what site to redirected to. So if you're interested in that we can let you know when that comes out.

P9 10:25 Yeah, please.

John Muller 10:26 Yeah. Cool. All right. Well, thanks for your time. I will now...

P9 10:30 Thank you.

John Muller 10:31 ..say goodbye and stop the recording.

14.5.5 Interview with P11.

John Muller 0:01 So my name is John Muller, and I am a research assistant working at ITU on a thesis on Aiki. So I want to thank you very much for participating in the study and in this experiment, and I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P11 0:22 Alright, I'm P11, and I give my consent for you to use my answers here.

John Muller 0:29 I appreciate that P11.

P11 0:31 Thank you.

John Muller 0:31 So we're going to go through eight questions. Just real quick, it shouldn't take too long. First of all, I'm going to ask you questions about the experiment. And then I'm going to ask you questions about sort of your procrastination behaviour as a secondary part. So question number one, what was your motivation to participate in the study?

P11 0:55 Well, mainly, it was to test if I could control my habits online. While I worked a bit, I guess, because I have been an avid user of both Reddit and various gaming sites I used to frequent and also just not looking up stupid stuff while I'm working, like YouTube and stuff like that. But yeah, so it's a way for me to be conscious about my internet habits while I'm at work.

John Muller 1:24 Alright. So as a subset of that, what was your motivation to learn Python?

P11 1:31 That's been... I'm really lazy when it comes to my work. And I work in 3D (art). So I use it to automate the boring stuff, I would think, I would say. I use it to do the repetitive stuff so I don't have to click on the same buttons all over. So I did it because I'm lazy.

John Muller 1:57 Another way of putting that, I guess, would be to say you want to learn Python to try and improve your workflow? *laughs*

P11 2:01 Yes, exactly. Yeah, that is a that's an academic way of saying it, but I'm really lazy. *laughs*

John Muller 2:09 If we want to make you sound good in the paper then I'll use the latter. Okay. So next question, why did Aiki work? Or why did it not work for you?

P11 2:21 I think it worked, because it made me conscious about my habits online. But I don't necessarily want to say that I think it worked as a tool for me, because many of the sites that I marked as procrastination sites are also some sites I use for learning material when I work. So that's been frustrating, when... But the some of the other sites I flagged I don't think I went on them while I had Aiki installed, because I just - Oh, yeah, something's gonna happen when I when I do that. So that it's, subconsciously, it stopped me, I think, which is, which I think is cool. In a way. Something else I think I wanted to say, yeah. But maybe that's dealt with in another question. I think the some times the whole, do five minutes of coding that, like pulled me out of my focus at work. So I would actively avoid getting that, oh, you can do five minutes of this. So I would actively not seek out my procrastination sites, because I didn't have the time while I was working to do that.

John Muller 3:39 Okay, so the actual, do you think it was more about the time or the fact that it was a difficult task to do? Was it more about the focal shift, or..

P11 3:50 It's mostly about the focal shift. Because I am very, like, I get tunnel vision when I work. And I it takes a long time for me to get into flow. And if I'm pulled out of that flow, I need another 30 minutes to get back into the other flow.

John Muller 4:02 Yeah.

P11 4:03 So for me, that is not how I work. And that's where I can, if I do go to just watch a silly movie or something that doesn't take me out of my focus, it just, like shuts off my brain for a bit. But if I had to focus on something completely different -

John Muller 4:17 Yeah, to change track, and that disrupts your your flow. Yeah. Okay. That's interesting. That's useful to hear. Anything else you want to say to that or..?

P11 4:29 Not for this one, I think.

John Muller 4:31 All right. So will you continue using Aiki? And is there something missing that would convince you to continue?

P11 4:40 I would use it if I could set it to have a timer, like a work schedule, where I am at work because I work from my own home computer. And if I'm off work, I want to watch my YouTube videos. I want to go to Reddit. I want to read my gaming magazines.

John Muller 4:56 Yeah.

P11 4:57 But right now, it's frustrating that I can't do that - I have to go in and turn off the extension? That's...

John Muller 5:02 Okay, it does have like hourly... you can set a window when it works.

P11 5:08 Did not know that. *laughs* This is one of the main issues I had with it. This is why I hate it, John. Why are you not telling me?

John Muller 5:21 *laughs* Okay, well, maybe we need to -

P11 5:23 Ok another main issue is it hasn't been working for me for the past like month.

John Muller 5:27 Yeah, so you reported a bug, right? That it was - in what way was it not working?

P11 5:32 That it didn't send me to Codecademy? It just said, I continue procrastinating then I could just press a button and nothing happened.

John Muller 5:40 Okay, all right. Yeah. Well, that's, that's definitely not the intended behaviour. Alright. Cool. Okay.

P11 5:49 But I would continue using it because even though I might not actively use the whole thing, where it reroutes me to another site, just the fact that it's there and I just could remind it, if I go to another site, just that it tells me: "Eeh, maybe not go here now." That's enough for me to actually, oh yeah, maybe I shouldn't do that.

John Muller 6:08 Okay, so it does actually manage to like deter you.

P11 6:12 Yeah. And also just because I don't really go to those sites anymore. Like, "Eh, I don't want to deal with that." So I won't go to that site any more.

John Muller 6:20 Yeah, so it's kind of like there's a guy with a - we actually put the users into categories. And we have, like we called you a "stick" user, which is y'know, for you it's a big... Yeah. So for you, it actually stopped, like the five minutes and the losing focus and all of that that actually is, in a way its detriment - it makes you not like Aiki or whatever. But it also means that Aiki is like, kind of successful and stopping you from procrastinating.

P11 6:49 It is. It is successful, but I didn't really do a lot of Python. I did (learn Python). But that was because I had to because I was writing the tool while I was working. So *laughs*, but yeah.

John Muller 7:02 But that's very good to know. Like, it's interesting. And it's good to hear that from you. Like, it confirms what we thought we were seeing in the data. So that's, that's nice to hear. Cool, thanks. That's all about Aiki. So the now just some general questions. So would you describe yourself as a procrastinator? Why or why not?

P11 7:24 I am very much a procrastinator. Unless it's something physical. Any mental task, I I need to take a lot of uh, like, I need to look at the problem. And then give it a few hours and then I can maybe get into it. But yeah, very much a procrastinator.

John Muller 7:48 All right. This is uh, Nanna is joining us. She's my professor. Or, one of my supervisors on on the subject.

Nanna Inie 7:55 Yes. Sorry, super late. I just still wanted to listen in if I could.

P11 7:59 Sure.

John Muller 7:59 Yeah, no worries. We're just in the second batch of questions now. Anything else you wanted to add to that, P11?

P11 8:13 Well, it was all about procrastination. Mmm hmm.

John Muller 8:18 I think you captured it like -

P11 8:19 Yeah, I am a procrastinator. That's the main thing. I, I -

John Muller 8:23 But you use it to solve problems. You say like, you take breaks, and you process an idea.

P11 8:27 Yeah. And I'm a big proponent of the... leave the problem, and then get back to it later. Because I can't overthink a problem. I need to do something else. Like go for a walk to go to the gym. Drink some coffee,

do something.

John Muller 8:44 Alright, so would you describe yourself as a person who structures their work a lot Why or why not?

P11 8:51 I structure everything. I have, like notes, Trello boards for my own tasks, even though my job is very chaotic. I structure myself because as I said earlier, I need to do tunnel vision on one task. I'm not a good multitasker when it comes to, to my work. And that's why if I if it takes me 30 minutes to get into a flow, I can't focus on three different tasks, because then it takes me an hour and a half just to get into three different flows. And then I'm out of one and into another. So yeah, I need structure.

John Muller 9:24 Yeah. Okay. Do you feel like you work well under pressure, for instance, as the deadline approaches? Why or why not?

P11 9:33 I do think I work well under pressure because then I can't procrastinate anymore. Because then I could - I have to, to just focus and even though that focus might not be my 100% controlled focus, I do at least 80% focus where I can't control it and I just have to do it. So that's back in - back when I was at high school that was also like writing the paper the day before it was turned in and the night before. Yeah, so deadlines and pressure works well with me.

John Muller 10:05 Okay, do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P11 10:17 I think I used to. But I'm in a field, the creative field where everything can always be better. So now I give - allot - myself the time, I can work on tasks. And that's it. I can always draw another line, I can always tweak another shader. But nope, that's not allowed. Because it's this high, high turnover on stuff I need to deliver. So...

John Muller 10:46 You have a kind of a good enough attitude, or...

P11 10:49 Yeah, I think I always describe it as I lost my artistic integrity. I don't care anymore. I just have to deliver. *laughs*

John Muller 10:58 Alright. But it also sounds like you... I mean, did you always have that very structured approach? Or is that something that you developed to help you meet deadlines and stuff, so you don't find yourself in this scenario so often anymore.

P11 11:12 It's something I, I helped develop, because otherwise, I wouldn't stop working on a piece or a drawing or a 3D model. I could always keep doing it. But it's always getting that last 10% that's taking, like, double the amount of time and that doesn't work out for me. Otherwise, I come to a point where I think I've ruined the thing I'm working on, and just want to throw it out. So now let's just cut it off and go to another thing.

John Muller 11:39 Alright, well, that's it. I don't know if there's anything else you'd like to say? Now's the time. If you have any other thoughts on it or the experiment?

P11 11:51 Well, I think the experiment has been successful in keeping me focused on more of my work. And that's just without me ever really going on to the (procrastination) site. And I think there's something powerful in that. Like, it's always just a mindset. And just having a... Basically, you could technically have just installed a useless icon on my hotbar that just sent me to a blank page every time I went to one of my procrastination sites. That would have worked for me. Because the other things just been too obstructing for someone like me to actually have to shift focus and start doing mental tasks on another problem. That's not working for me at all. I thought it would work because I thought I really liked to learn more Python. But in an office setting where I have to deliver, it felt like I was doing something I wasn't allowed to, even though I would have gone to an article that would have taken me five minutes to read as well. That just felt like I was cheating at work, instead of taking a break. So...

John Muller 12:56 I guess it kind of it almost feels like you're doing other work.

P11 12:59 Yeah, exactly.

John Muller 13:00 I think we're like, just sort of like this distinction between active and passive procrastination, that we're learning about that, like you decide... It sounds like what you're telling me: that you're very structured, you focus - all that stuff, like you choose when you procrastinate, or you feel like you choose, and then having... but then having something trying to force you to be productive is actually disturbs that routine.

P11 13:25 Yeah, kind of want to procrastinate being "productively procrastinating". If you know what I mean. Yeah, it's a it's not relaxing for me. Yeah. So that's the main thing. For me.

John Muller 13:37 You use it, you procrastinate. Or I don't want to put words in your mouth. But you procrastinate to try and give yourself some space to think about a problem.

P11 13:47 Yeah, yeah. It's basically turning off my brain. To not think about it. And if I have to actively try and solve something else, then I don't solve the other issue.

John Muller 13:57 Yeah. Okay. Oh, that's very, it's very interesting. The other thing is that we will be releasing at some point, hopefully a like finished version of Aiki, where you can reprogram it to redirect you to where you want to go. So maybe you could find that blank page on the internet somewhere.

P11 14:17 I'll make it myself.

John Muller 14:17 *laughs* Would you like to hear from us when the that's up?

P11 14:22 Sure.

John Muller 14:23 All right. Cool. Well, that's it. P11, thank you very much for your time and for participating.

Nanna Inie 14:28 Thank you very much for participating.

John Muller 14:30 Yeah. Is there anything you would like to ask Nanna?

Nanna Inie 14:33 No, thank you so much. And I'm sorry, I dropped in very late. It was because I was so interested that even though I was late, I thought I would make it a point out of it.

P11 14:42 I slept through the last interview. So this is fine.

Nanna Inie 14:46 So did John! That was OK.

John Muller 14:50 *laughs* All right. Great. Well, thank you very much, P11. I appreciate it. Cheers.

P11 14:57 Cheers.

14.5.6 Interview with P13.

John Muller 0:01 Okay, so. Hi, my name is John, and I'm a research assistant at ITU working on a thesis on Aiki. I want to say thank you very much for participating in the study and in this experiment, and I'd like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P13 0:22 My name is P13, and I give you permission to use my, these answers for research purposes.

John Muller 0:31 Great. Thanks. So let's go on to the questions. So I have two groups one has is specific, specific to the experiment itself. And then some more general questions about procrastination and stuff like that. So about the experiment, what was your motivation to participate in the study?

P13 0:51 My main motivation was that I was still struggling with Python, and I would like to be more fluent with it. I thought that this was a very nice opportunity to learn Python. And also, I always strive to have a more structured day at work. So I would like... the idea of turning procrastination into something very useful was really appealing so I decided to participate.

John Muller 1:30 All right, great. So I guess the second question goes a little more deep into that. So what was your motivation to learn Python, specifically?

P13 1:40 My motivation is that... Mostly I'm using R as my main programming language sometimes MATLAB. But I want to switch to Python for two reasons. The first reason is that for the kind of work that I'm doing, and the computational models in cognitive psychology, and Python is the main language used for this kind of work. So I want to be more... to be able to program in Python all the work that I do. The second reason is that Python is taking over at the moment. So basically, it's becoming the most used language, even in psychology. So this is the reason why I really want to learn Python.

John Muller 2:35 Alright, this is not an official question, but I'm just curious, in psychology what do you use Python for? To crunch numbers about data... or?

P13 2:48 Yeah, I mean, it's used the same way this used in... for the same reasons we use R. So just to organise data, and then analyse the data, and this is the basic use. But for this use, I think R is still the most prominent language in psychology for data analysis. Especially now that there is like this boom in linear mixed effect models, I think R has the most cutting edge packages. But for computational models - at least, like stuff that I'm doing now - Python is the language that is most useful. It has many packages. And this pack... when you read like the, the papers and the most recent articles, they use Python to implement computational models. And Python is this kind of object oriented functions that make it very suitable for this kind of programming. So this is specific for computational models. That and this is the one of the main reasons why you want to learn Python.

John Muller 4:11 Okay. Cool. Thanks. That was very detailed answer. I appreciate that. So why did Aiki work? Or why did Aiki not work for you?

P13 4:22 So Aiki worked because it was very easy to implement - it was very straightforward. And so it was really nice, and I think I used Udemy as a course tool. It was really nice and very simple to use. And the way it didn't work is that... is because of the way humans are built. We want to procrastinate, no matter - this is my personal experience - procrastinating is something that this is not fully under my control. So it's something that

occurs automatically. Is like when I need to take my head off some...

John Muller 5:17 Task or problems?

P13 5:18 Yes some task, and just relax, I don't care, I just wanted to something else more pleasant, more rewarding. And just what is rewarding at the moment is independence. It can be like my, besides that I added in Aiki, were you watching videos in YouTube, or Facebook. And this release of dopamine is something that is inevitable. So it's something that I automatically go to. So since Aiki worked only with Chrome, I also had...

John Muller 6:00 Ah, okay, so you would open another browser or or something?

P13 6:03 Exactly, Thunderbird. With the excuse that I started with, in case I needed to use YouTube for educational purposes. For example, video clips that were important. And then yet when I wanted to procrastinate, I used to go to Thunderbird. It's something that... yeah, but I at least I feel like I've learned something more. And this is something very, very helpful. It was really helpful and great.

John Muller 6:39 Alright. Yeah, I mean, we were always aware that like, you could just whip out your smartphone, for example, you know, so it's sort of hard to, to cover all the potential areas. Right. So it's a real challenge. But that was very useful. Thank you. So will you continue using Aiki? And is there something missing that would convince you to continue?

P13 7:04 Well, yeah, I will definitely continue to use it. I don't know if there is something missing. I feel like after a while, it wasn't really fun for me. And probably I don't know... using them. I felt like I need a break from work. And it was not a break, it was just something that was asked for...

John Muller 7:30 Another type of work.

P13 7:31 Yeah, another type of work. So yeah, probably make it a bit funny. I don't know how, I really don't know. But yeah, and it was a bit passive. This, at least Udemy, because all the lessons, the lectures were just explaining the thing. And you had to just watch the videos, and then the rest is practice. Practice sessions in between. Probably making it more interactive, I would say, will make it a bit more engaging. Yeah. And that will probably work better.

John Muller 8:17 Alright, I can pull back the curtain a little bit and say that we actually use different programming platforms for different people. And we seem to see... So what you're saying I think is correct, because we had some people using SoloLearn, and Codecademy, which are more interactive, and they seem to get much more out of it as a result. Because also the content is kind of shorter, as well. Like, it fits into that five minute window or whatever, a lot better. So you were a guinea pig in that respect. *laughs*

P13 8:46 *laughs*

John Muller 8:50 But, again, it's very nice to hear that from you, because it kind of helps us see what worked and what didn't try it. So thank you. Okay, so then the following questions are just some general questions about procrastination and your work ethic and stuff, and then we're done. Okay, so would you describe yourself as a procrastinator? Why or why not?

P13 9:17 Yeah, I would describe myself as a procrastinator. And sometimes I tend to spend more time in activities, not because they are important, so they are on the top of my list, or the my priorities, but just because they - I like more those kinds of activities. And this makes me a procrastinator, because, yeah, I should work more on my priorities. But then I procrastinate those, and just focus on something that I like.

John Muller 9:54 Yeah. So you'll procrastinate with other tasks. Yeah. And avoid the difficult one, I guess.

P13 10:02 Sometimes I take very long breaks. And instead, I should work on those breaks. *laughs* But I don't know if this is like the, if I get the definition of procrastinating. Right, this is my interpretation.

John Muller 10:21 I think if you feel like you're putting off work, then it sort of counts, right? Like, you can procrastinate in a lot of different ways. So I think that makes sense. I don't think I've interviewed anyone who doesn't think of themselves as a procrastinator. We live in a society that's very focused on like, being super productive all the time. So, anyways, would you describe yourself as a person that structures their work a lot? Why or why not?

P13 10:53 Yeah, I would describe myself as a person that structures their work. I always try to find different ways for, for creating a structure for the work, but the reason is that I have many tasks, and then finish them. And I can't afford to just put a task aside, set it aside for a long time. So I need to always juggle several tasks. And I need also to progress in parallel with all these, all these tasks. So I need to... actually, I add for every day, I set the tasks that I need to progress. So all my main activities of the day, and by the end of the week, I set the main activities for the next week, and so on. And then I look back to the things that I finished during the day, during the week, and also during the month. I tried to also improve the way I structured my my time by asking other people how they do it and and trying to implement the strategies that they found more useful.

John Muller 12:15 All right. Do you feel like you work well, under pressure? For instance, as deadline approaches? Why or why not?

P13 12:25 Yes, definitely. I feel that I work better when a deadline approaches.

John Muller 12:32 Just from the like you get more motivated, and you find it easier not to procrastinate. That kind of thing? Or?

P13 12:39 I don't know, I think one of the reasons definitely is that you are more aware of the time that you have.

John Muller 12:48 Yeah.

P13 12:48 And then you... being more aware of the time that you have left, you make the most out of it. This is the main reason.

John Muller 13:00 Right, so last question. Do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P13 13:10 No. I tend not to do it. Because I'm very... How can I say that? I tend to be an anxious person. So I'm very scared of being to work during the last time. I just tried to to be prepared.

John Muller 13:35 Yeah. All right. Well, that's everything. Is there anything you'd like to add or?

P13 13:44 No. I just want to add that the course was really nice and was a really nice experience for me. I'm glad that I participated in this in this experiment, and I hope that my contribution will be helpful for your project.

John Muller 14:05 Absolutely. Yeah, no, it's this has been very helpful P13. So thank you. I also want to say that we will eventually release like a version of Aiki that anyone can use that will where you can program where it redirects you to. So you can choose to go to - you don't have to learn Python - you can go to... Duolingo or whatever site you want to do one. Would you like to hear from us when we release that?

P13 14:35 Yeah definitely. I would like also to learn German at the moment. I'm very bad at German. *laughs*

John Muller 14:43 Yeah. Yeah, I'm trying to learn Danish, so maybe I could use it too. So cool. Thank you so much for your time, P13. That was great. And have a nice day.

P13 14:54 Have a nice day too John.

John Muller 14:56 That's the end of the interview. So I'll see you.

P13 14:58 See you.

John Muller 14:59 Thanks. Bye!

14.5.7 Interview with P14.

John Muller 0:01 Okay. So hi, my name is John and I am a research assistant at ITU working on a thesis on Aiki. And I want to thank you very much for participating in the study and in this experiment, and I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P14 0:22 My name is anonymized, I'm happy for you to use my answers for research purposes.

John Muller 0:28 Great. Thanks, anonymized. So there's two batches of questions. It shouldn't take very long, probably about 10 minutes. I'm just going to ask you about some question about the experiment first, and then some more general questions about your, like procrastination and stuff like that. So first question, what was your motivation to participate in the study?

P14 0:51 Oh, well, I guess, twofold. It just sounded interesting for one. And then secondly, I was teaching myself some Python - I was between jobs between April and September this year, and I started teaching myself Python, because I'm a data analyst. So I thought it would be a useful use of my time. So I wasn't just studying, you know, looking for jobs all the time. So I kind of got into Python a little bit. Then I joined my new job in September last year. I haven't used much Python during it but there was talk of maybe Python being rolled out into the department. So when the Aiki study came up, I thought it was a great opportunity to revise what I'd learned previously, and maybe build on that.

John Muller 1:34 Alright. Was the like, was the procrastination part - did that interest you at all? Or are you -

P14 1:41 It did interest me yeah. I don't think -

John Muller 1:44 But it was more the Python -

P14 1:46 Yeah, it was more the Python. I'm not too bad at procrastinating. But I thought it would be interesting just to see how much time do I spend on these websites and things? But yeah, it was mostly Python motivated.

John Muller 1:56 Alright. Well, the funny thing is, the next question is, what was your motivation to learn Python? I don't know if there's anything to add there. Or?

P14 2:06 Yeah, just generally, it's useful for my job, it would be another tool to my skill set as a data analyst, make me more employable. So you know, even though I was in a job at the time, I thought, you know, if I'm ever in the situation where I'm looking for a new job again, it would be another useful language to have under my belt and give me a bit more versatility on my CV.

John Muller 2:28 Yeah. All right, cool. So why did Aiki work? Or why did Aiki not work for you?

P14 2:37 I think Aiki did work because it was actually really useful. I work from home, so I've got my work computer here and then I've got my personal computer here, which I installed Aiki on. And I kind of made sure I was using that during the day if I wanted to procrastinate or use a website or something rather than using my phone. So yeah, and sometimes I would just innocently go on one of my procrastination websites. One of them was Wikipedia. So I'd go on that - Aiki would pop up and say, time to learn Python. And then it reminded me, oh actually yeah, I haven't done any Python today. It's not even though procrastination was a huge problem. It was

just it was a nice reminder, when I did go on a website, that I actually, yeah, haven't done that today. I've got a bit of time, why do I use that doing Python instead? So yeah, I think without Aiki I would have completely just not thought about using Python in those instances. So it was useful for that.

John Muller 3:32 All right, that's cool. So will you continue using it? And is there something missing that would convince you to continue?

P14 3:43 Yeah, I have thought about this. And it looks like - so it was a subscription that was paid for the coding website. I don't know whether I continue paying for the website. But could I keep or use - like use a different coding website instead? Because I know there was a free one I was using before.

John Muller 4:04 Yes. So, I was gonna bring that up at the end of the interview, but we will be releasing a version of it where you can choose where it redirects you to, eventually and we can let you know when that comes out. So if that was the case, would you continue using Aiki?

P14 4:19 Yeah, I think so. Because it was useful yeah, my only hesitation was, oh wait, I don't know how much the website costs - and let's say it's \$40 a month or something that would be quite a lot. But if it could redirect me to the free Python website I was using before, then yeah, I think it definitely would be useful. It would keep reminding me to do bits of Python here and there. I really like the way you can customise the settings. So you can just be just turn it off, or you can have it on during certain times and customise how much Python you need to do before being allowed to procrastinate for a certain amount of time. So I really like the versatility of it. So yeah, I would.

John Muller 4:55 Alright, great. Well, that's all the experiment related questions. So now I'm going to ask you some more general questions. So first of all, would you describe yourself as a procrastinator? Why or why not?

P14 5:10 I would say generally not. I think everyone procrastinate sometimes, but generally, you know, I've got a job to do. I just decide that I want to just get it done as soon as possible. And then if I've got time at the end, then I can procrastinate afterwards, if there really is no work to do.

John Muller 5:28 Okay, so you like tunnel vision in on a task, and then you get it done. Sort of.

P14 5:31 Usually. Unless the task is really boring, then sometimes I do tend to drift off a little bit. But in my most recent job, it's been a lot more interesting generally, so procrastination hasn't been as much of a problem - compared to my old job, which was quite boring. I would break off in the middle of a task a lot more, but yeah, I think it got better.

John Muller 5:52 Okay. Cool. So would you describe yourself as a person who structures their work a lot? Why or why not?

P14 6:01 Absolutely. I'm a very, very logical, methodical thinker. And what I really like when I'm doing a task is I want to have like, a process for doing like, I do this step, and then this step, and this step. And some tasks naturally lend themselves to that. And I think even when they don't like try and in my head do like a little flowchart - alright I need to do this first, and then that. That's just, that's just the way I operate. I've got a maths background, so it's very methodical and logical the way my brain works.

John Muller 6:30 Yeah. Does that extend to like, do you organise material outside, like your calendars? Do you have Trello boards where you keep track of your tasks? Or is it more just when you do a task, you organise that task?

P14 6:46 Are we talking about, like work, or just generally with other things?

John Muller 6:50 I would say work - but that can mean, that can be any type of work. It's more just to see are you structured in your life? Like, do you when you have a set of tasks or a big project or something do you organise it in some way? Like by making notes or or check lists and then ticking things off? Or is it more, do you just, when you get into a task do you have a plan? That's kind of what I'm trying to figure out.

P14 7:21 Yeah, I do like to sort of make a list of what I need to do. And if necessary, what order I need to do the things because sometimes you can't do one bit of the task until you've done earlier things. So yeah, that it's kind of the way I go about things.

John Muller 7:37 All right. Okay. So, do you feel like you work well, under pressure? For instance, as deadline approaches? Why or why not?

P14 7:48 Do I work well under pressure? Honestly, I would say no. I'd never say that at a job interview. But I think because I really pride myself on the accuracy and the quality of my work. And if I feel like I'm being rushed, and there's like a deadline, then I really, you know, if I try and work faster, often the quality and accuracy of my work goes down quite a bit. Having said that, I think the reason I maybe struggle with deadlines and things is because you know, right, from a young age, if I've been given a piece of work to do, I do it like as soon as I get it, that deadline is really far in advance. And then there's never - I never get to that stage where I've had that pressure. But then the flip side is that hasn't served me well, later on in life where I do have things that have to be done. Very quickly.

John Muller 8:34 And there is a clock.

P14 8:35 ...and I'm not able to do that so far in advance.

John Muller 8:41 It's interesting, like completely opposite approach to mine. *laughs* So that's, it's very interesting to hear. So, do you often start working on tasks at the last moment? And does that lead to problems finishing on time?

P14 8:58 No, I'm sort of *unintelligible* my previous answer. But now when I get to task to do I try and do it as soon as possible, partly because I don't know how long that's going to take. And also I don't know if there's going to be other tasks coming in that will also have similar or conflicting deadlines, and then I don't want to end up with everything at the last minute.

John Muller 9:15 Yeah.

P14 9:16 What was the second part that question? Sorry, does that cause...?

John Muller 9:19 Just does it lead to problems finishing on time. But I think we've kind of... Yeah, you're not - you never deliberately find yourself in that scenario, and if you - well that's what I'm hearing. That you try to

ensure that you never end up in that situation. And if you are in that situation, it's because of some external - like the boss came and dropped something on your desk and said, I need this in two hours and you're like "Oh shit".

P14 9:47 And then it normally goes badly but yeah. I get through it but yeah, it definitely doesn't get done as well as it would have done if I received the work earlier and been able to do it straightaway and plan in my head.

John Muller 9:57 Yeah. In your method. Yeah, yeah. All right. Okay, well that's that's the end of the questions. So just want to thank you again for participating Paul. And as I said, we will eventually launch a version of Aiki that you can program. So if you want, we can let you know when that comes up.

P14 10:19 Yes, please. Yeah, that'd be great, because it's been really useful. And thanks for telling me about the study, because I've enjoyed taking part in it. Yeah, I have been quite busy with work so I haven't been able to procrastinate and therefore be redirected by Aiki as much as I would have perhaps like, because the last eight weeks have been really busy. The first four weeks of the study, I had loads of time to procrastinate. So that was - I was able to get loads of data, probably for the most part. But yeah, I've enjoyed doing it. And I'm really glad that you're bringing out a version where I can keep using it and get redirected to another Python website, and I can finally get really quite efficient at it hopefully so yeah, thanks.

John Muller 10:59 Yeah. Well, thank you very much for your time. And yeah, see you around man.

P14 11:05 Great. Thank you too.

John Muller 11:06 Thanks.

P14 11:07 See you.

John Muller 11:08 Cheers.

14.5.8 Interview with P19.

John Muller 0:01 Okay, and it says we are recording. Alright. So. Hi, my name is John, and I'm a research assistant at ITU working on Aiki, and I want to thank you very much for participating in the study and in this experiment, and I would like you to state your name and confirm that we are allowed to use your answers anonymously for research purposes.

P19 0:26 No problem. My name is P19, and I can confirm that you can use my answers for research purposes.

John Muller 0:31 Great. And I can see that one of our other researchers, Nanna, is also joining us.

P19 0:36 Good morning Nanna.

Nanna Inie 0:38 Good morning. Hi, sorry, I'm a bit late. I'm just listening in.

John Muller 0:42 No worries.

P19 0:42 Would you prefer my camera on by the way? Or are we alright with audio?

John Muller 0:45 Completely up to you.

Nanna Inie 0:47 Definitely camera P19. *laughs*

John Muller 0:54 Alright.

P19 0:55 Good morning. *laughs*

John Muller 0:56 Good morning P19. Nice to see you. Okay, so we'll just go through the questions. It shouldn't take longer than 10 minutes? I don't think so. We'll get started. So, first related to the experiment. What was your motivation to participate in this study?

P19 1:13 Um, I think it came out because I was on LinkedIn at the time - I'm not anymore. And I saw the post about learning Python, which was great because I was looking to learn Python. And also I was looking to spend less time on sites on the internet. And procrastination has always been a big problem. So it was like, ticks two boxes at once. So I sent my email across.

John Muller 1:33 All right. And then on to next question is, what was your motivation to learn Python specifically?

P19 1:43 I'm a, I guess, a software engineer, dealing with a lot of embedded systems and things and Python is something that's come up a lot of times over the years, I see it being used more and more and, and it's something I'd never got around to learning. I never had a project to actually do it. So the the idea of, I guess, being part of study or something else was the motivation to get it sorted. *coughs* Excuse me.

John Muller 2:05 Alright. Yeah. So basically, another another tool in your kit, I guess.

P19 2:11 Yeah.

John Muller 2:12 All right. So why did Aiki work? Or not work for you?

P19 2:18 Um, I think in the end, it probably, it didn't work. I think the main problem with what I was trying to do was to avoid using the internet. I find it's great when I have a question to solve, or I want something, but I hate it, when it's just there to go and like chewing gum for the eyes kind of thing, procrastination and bits. So I guess the idea of being rewarded to go to sites that I just didn't want to go to full stop, just didn't work out. But there was no, there was no motivation for me to, like, if I spend some time on Python, I can, I can waste my evening on Reddit.

John Muller 2:52 Yeah.

P19 2:52 I didn't want to go to Reddit, or those types of sites at all. Because there was no real reason for it.

John Muller 2:59 So you wanted something more like a complete block on those on those sites.

P19 3:03 Yeah, it's the kind of things I've used in the past is to try and stop me through certain hours and things. So there was things that before the question or sort of carrot dangle for me to go and learn Python, you idiot. Wasting time, it was just there was there was no reward for me, I'm afraid.

John Muller 3:18 Yeah. All right, that makes sense. So, related to that, will you continue using Aiki? Or is there something missing that would convince you to continue?

P19 3:30 Um, I didn't think continuing was an option. Cause I removed as the study finished. I would probably use it and then - just as a site blocker, or that type of thing, that kind of, I guess the added advantage of when I did go on to one of the blacklisted sites that they had sort of reminders it diverted me back to like, "Shouldn't you be doing this?" was kind of a, an okay, digital nag.

John Muller 3:55 Hmm. Okay. All right. So we'll go just do some more general questions now. So would you describe yourself as a procrastinator? Why or why not?

P19 4:08 Yes, because I have a huge list of things I'd love to do, but for some reason, never get around to doing them.

John Muller 4:15 I know that feeling. So would you describe yourself as a person who structures their work a lot? Why or why not?

Nanna Inie 4:23 Can I interrupt a little? Sorry.

John Muller 4:24 Yeah, go ahead.

Nanna Inie 4:24 I'm curious. So P19 might as you say, you have a list of things that you'd love to do, but you don't get around to them. Is it that you don't get round to doing those period? Or do you do something else instead?

P19 4:37 Uh, I think at the moment, there's a lot of time when I guess I am in the evenings, maybe with my feet up watching some TV or something else. When I could be like, I'm right here now my music studio and I

could be writing music and being more creative and things and it's uh, it's something that me and my partner discuss all the time as we're sat on the couch together to *unintelligible* something.

Nanna Inie 5:02 Okay. Yeah. Thank you. Thank you.

John Muller 5:05 Alright, I'll just repeat the next question. So would you describe yourself as a person who structures their work a lot? Why or why not?

P19 5:13 I would say yes, because it's part of the nature of my job that I'm given set tasks and things, and I'm always using sort of OneNote as a kind of a digital post-it notes system of queuing up tasks in progress and completion just to, uh, to keep me going by breaking tasks down into smaller chunks. So I find myself very much organising my day and trying to set some sort of daily goals as I'm working. I've also just changed jobs. So there's *laughs* probably, I'm probably working a lot harder than I was previously. *laughs* For now.

John Muller 5:47 Would you mind if, what's your new, because you mentioned you have a music studio? Is that like your main job? Or is the...

P19 5:53 Oh no, the music studio is my passion, but it's related to my job. I do embedded systems for audio devices. So right now I'm back working for a company called Marshall amplifiers. So I do guitar amp design.

John Muller 6:07 Alright, cool. So do you feel like you work well, under pressure? For instance, as the deadline approaches? Why or why not?

P19 6:18 No. I feel like sometimes if the... if things aren't going well, then it becomes a problem. If there's a deadline, and I'm working, and I can do my work without any problem, then it's fine. And it's kind of a motivation to get done. And this is, this is fine. And there's some pressure on. But if things uh, basically fuck up, then no, I hate it, and I will fall to bits. And sometimes it doesn't help because sometimes I'll put some bits off until the deadline is approaching. And then there's an element of gamble that I don't like about that.

John Muller 6:50 Yeah, there's a there's an interesting, sort of, it's called, like "revenge procrastination", which is when you're feeling very stressed about something and you're sort of procrastinate more as a result.

P19 7:02 That's very familiar, that that shutdown of like, Oh, I'm stressed, I'll reward myself now. Before I work more. *laughs*

John Muller 7:07 Yeah! And make myself more stressed. *laughs*

P19 7:10 You know, it's, it's it's Wednesday today. So if I start again, Monday, it just, you know, it's, yeah, I negotiate with myself a lot. First things start to mount up in the worst possible way.

John Muller 7:24 Okay, so last question. Do you often start working on tasks at the last moment? And does that lead to problems finishing on time? Um...

P19 7:36 No. I mean, some, I'd say maybe sometimes just depends on what my workload is, and what's happening. But I typically find these days that I know, I may try and put some task off. But if I force myself just to start that task, then once I'm in, I'm in, and it's fine, the initial start point is the issue. But once I'm over

that hump, then everything else carries on from there. So I guess I know I have to give myself that initial kick, especially while the task is fresh. I'll just put on the pile that it's like, oh, it's something new to look at, then I'll pick if I remind myself to dive in, and then make sure I - then I can either identify problems early on, like, oh I understand this, or I don't understand this. Or I need to order some parts or something else. And, yeah. It helps me in the long run. I'm not saying I do that all the time. Sometimes it's like, oh that'll be fine. And it will be put to one side until the deadline looms, then it won't be fine. *laughs*

John Muller 8:34 Yeah, then it's an emergency. Yeah.

P19 8:38 *laughs*

John Muller 8:39 Yeah, well, that that's it. We do have - we are actually going to release like a finished version of Aiki at some point where you can put in your own site that you want to be redirected to, instead of, you have to go to a coding path platform, for example, you could set any site as your target. Is that something you'd be interested in? Like, we could just send you an email when...

P19 9:03 Yeah, definitely. I'm very interested in anything that kind of can help guide me or give me a kick to uh, to be more productive or do things I actually do want to do. It's just a weird psychology of it all is like: I do want to do stuff. Yes, yes, I would be interested.

John Muller 9:18 Okay.

Nanna Inie 9:20 If you don't mind, I might be a little interested. Just from a like more. I mean, it's not something - I know we asked in the survey, but what was your impression of the Codecademy platform P19?

P19 9:34 Um, from what I used of it, I got so far, but not too far, unfortunately. I really liked it, just with the integration of the Python from like the... to be able to the code in the browser. So I could just I could log on on my laptop, my work computer, the studio computer, go through the examples it was very nice giving you suggestions to extend stuff. It was a Yeah, well laid out and I was enjoying it. I just didn't do enough of it.

Nanna Inie 10:01 Sure, sure. But since you know code, it's a little, you might have a different angle on such a platform than someone who had never coded before. Right? Because you can compare it to having to install the stuff.

P19 10:12 Yeah, I've been I've installed Python and things for some tasks before I started this just to try and get a handle on it. And yeah, the the minefield of like, have you got the right version? Have you got the right extensions and everything bits for the tasks I was trying to do? Because it was a lot of audio DSPs was looking at Sai.py, and things like that. So sort of in at the deep end, so it was, I think I ended up with Anaconda, the whole like - it installs everything. *laughs* That solved it. But yeah, the Code Academy platform was really nice in the structure. And the way it was kind of leading you through the tasks, because in the end, I only got so far doing things I'm quite familiar with, but not the Python way. So yeah, it was something I would I would return to to continue learning from.

John Muller 10:59 If I can extend that slightly. Did you feel like the the content on Codecademy was a little too long form for like when you were redirected? Did you not feel like you had enough time to get into

that? Because that's that's kind of a critique I have heard from some people. I don't know if I'm, like, leading you on.

Nanna Inie 11:25 That's OK, we're done with the must do questions.

John Muller 11:27 Yeah.

P19 11:31 No, I think, I think also the other issue is because I was - my main goal is to stop procrastinating, I guess, during my work hours is the most important thing, because working from home, like I think most people have been doing over the last few years. And I've been doing it for I guess, eight years or more now. So it was primarily sort of my work machine. So when it redirected to Code Academy, it was more a kick of "No, you should be doing your day job." And, you know, learning Python at that point, so that, that that point didn't really come up. It was more I didn't have time to do...

John Muller 12:03 - at the time.

P19 12:05 I had other tasks to do.

John Muller 12:07 Yeah. All right. Cool. Well, Nanna unless you have anything else, I think we're done.

Nanna Inie 12:13 No, no, thank you so much. P19, really appreciate it.

P19 12:16 No, no worries. Thank you for letting me be part of it. it's it's a it's something I'm very interested in. So it's good to give it a try and try and learn Python. I just don't procrastinate too much. *laughs*

Nanna Inie 12: I can have you let you in on the secret that I accidentally bought a yearly subscription for your account. That was a - whoops! In case you want to use it your to stay, you know, email me, I'll get you the new login, because otherwise I'll keep it for it. But I don't use it for Python as much as C sharp. So...

P19 12:46 You paid for it. So I think you should use it.

Inie 12:49 No, no, ITU paid for it. Yeah, but you can do separate courses. Right. So if you want to Yeah, okay. Yeah.

P19 12:57 Oh OK, so we can we can form one and we can learn all the languages together.

Nanna Inie 13:01 Exactly. And then between us we'll be able to code. Alright, thank you so much. Thanks for taking the time.

P19 13:10 No, no, it's been great and, yeah, all the best with the projects and the research.

Nanna Inie 13:13 Thank you.

John Muller 13:14 Thank you.

P19 13:14 Hopefully see you soon as well Nanna.

Nanna Inie 13:16 Yeah, see you soon.

P19 13:17 All right. Take care.

John Muller 13:19 Cheers.

Nanna Inie 13:20 Bye.