

P3 - Proposed Evaluation

Overview:

We chose Approach 2 for P2, therefore we will be proposing an evaluation plan for P3. We wanted to build a device to avoid digital distractions in info centric environments for graduate students at Georgia Tech. Our final prototype is a “smart work timer” that helps mitigate digital distractions and increases awareness and concentration by usage of ambient music to inform user of work times. To test the prototype, we are proposing the following evaluation plan.

User testing:

Our target users are already familiar with all the steps involved in using the device so determining the usability of each step may be superfluous. Instead, we want to know whether or not the device is fulfilling its purpose from user’s perspective. Since we have developed a high-fidelity prototype, we have decided to conduct a summative user evaluation.

We will be conducting the evaluation in two parts:

Part 1: Lab based think aloud session with users to test the functionality and usability of the system.

Part 2: Field deployment of the prototype followed by survey and semi-structured interviews to better understand user experience.

Reliability and Validity:

While evaluating the prototype in context (home office, lab, or any other work space), which may change with each participant, the results of the study may not be replicable. However, for the particular scenario evaluated with each participant, the results may have higher ecological validity.

Avoiding Bias:

For evaluation of Part 2, the surveys and semi-structured interviews will be designed to avoid leading questions and priming the users. This will help reduce researcher bias.

Scope:

Although this device is designed for graduate students, it might be useful for people who work in info centric environments. Therefore, carrying out user evaluation in the two phases will not just contribute to improving the user experience of this device for our targeted users, but also to other adopters of this technology who also work in info centric settings.

User Tasks

The major task is for the users to engage in infocentric activity while using the smart work timer. We have divided the task into smaller chunks as follows:

<i>Task</i>	<i>Sub task</i>
Setup	Turning the router on
	Add work event on google calendar
	List websites to block
	List playlist from pandora
Use of the device	Time spent using distracting websites
	Time spent taking breaks
	Time spent doing "work"-assignment, job search etc

Study Outline

We will carry out a within subject's comparison study:

i. Recruitment:

To ensure adequate statistical power for the study, approximately 40 participants-graduate students enrolled at College of Computing, will be recruited. We will control for the following variables:

- a. degree level (first year grad students)
- b. self-reported productivity (highly productive, unproductive, productive under pressure etc)
- c. number of course credits (between 12-16)
- d. time during semester (beginning, mid, end of semester)

User profile:

We will also maintain user profiles with the following information:

-Demographic info

- Self-reported time spent on info centric settings
- Self-reported level of distractions (usage of internet related distractions, cell-phone related distractions, gaming distractions etc.)
- Effect of distraction on overall well-being (e.g.: does it affect sleeping habits, caffeine intake, exercise etc.)

ii. Concurrent think-aloud session in the lab:

Users will be introduced to the device (please find the introductory script in the appendix) and asked to think-aloud while performing a series of task:

- turning the device on/off
- listing websites to be blocked
- linking to google calendar and Pandora.

We will observe user interaction, capture screen recording, audio recording, and take notes on time to complete task, any user errors, any device related errors/functionality.

Immediately after think-aloud we will ask few follow up questions related to their user experience:

- How would you describe your user experience?
- Do you think these three functionalities help you avoid distractions?
- What other functionalities do you expect for this system to support?
- Does the device encourage breaks at appropriate intervals?

iii. Field Deployment:

In addition, the users will be asked to complete an assigned task (e.g. literature review-20 papers and write 2-page summary), during provided duration (3 days):

a. With the device: users will take the device with them for assigned period and keep track of usage behavior and user experience.

b. Without the device: users complete a comparable task within the same time duration but without the device and keep track of their work behavior.

To avoid carryover effects on study results, half of the participants will complete the task with device followed by task without device and vice versa.

Participant	First Task	Second Task
1	Without Device	With Device
2	Without Device	With Device
3	Without Device	With Device
4	With Device	Without Device
5	With Device	Without Device
6	With Device	Without Device

- iv. After completion of each field based tasks with the device, the participants will be asked to complete the System Usability Scale survey (1, appendix).
- v. All participants will be followed up with a short semi-structured interview to understand their:
 - a. working behavior (with and without device)
 - b. productivity (do they accomplish task within set time, are the time slots effective- 45mins work, 15mins break)
 - c. self-reported quality of work, feelings of accomplishment/satisfaction with work
 - d. healthier habits (taking regular breaks vs. distracting for long period of time then working for long period of time)
 - e. overall feedback on the device

Evaluation Measures

	Identify/State-	Why?
Independent Variable	Device (used vs. not used)	
Dependent Variable	<ul style="list-style-type: none"> - Time to set up the device - Number of errors by users in setting up the device 	<ul style="list-style-type: none"> - Efficiency, learnability - Evaluating the user's productivity, system usability, ease of use of the system, system improvement (debugging, adding/removing

		functionality)
Confound Variables	- context (environmental setting)	- Impact on distraction
Control Variables	-degree level -self-reported productivity -number of course credits -time during semester	- If not controlled for, these variables may confound the study findings.

References:

Brooke, J. (1996). SUS-A quick and dirty usability scale. Usability evaluation in industry, 189(194), 4-7.

Appendix

Introductory Script

Our device features capabilities to automatically block internet services, provide ambient light-based notifications of work time, and play curated music to aide focus and productivity. In the current prototype iteration, all that is required to activate the device is hooking up power. To hook up power, simply connect the red plastic connector from the 12-volt power supply to the red plastic connector located on the side of the prototype enclosure. Once the device is powered on, the unit will take approximately two minutes to boot up and begin operation. To configure websites to be blocked, music to be played, and the Google calendar account to be synced to a few configuration files will need to be edited.

First, let's cover configuring the list of websites to be blocked by Squid:

To customize which websites the Squid proxy blocks, you must add the website to the squid.conf file. The squid config file for work is located at ~/work/squid.conf on the Raspberry Pi. To add a new website to the blacklist (for instance www.reddit.com), add: "http_access deny reddit.com" to the squid config file.

Now, let's set which Pandora station you'd like to be played automatically:

Currently, in prototype version v1.0, all Pandora configuration settings must be configured manually in the pianobar application configuration file. In order to change the account information or the default Pandora station, open ~/.config/pianobar/config in a text editor and configure the settings to your desired preferences. For instance, to specify your Pandora account information insert your username and password in the User variables as shown:

```
#User
```

user = enter_username_here
password = enter_password_here

To configure which pandora station plays on start, enter the station's ID number into the autostart station variable, for example:

autostart_station = 3557476821133827106

After you have made any and all desired changes, save the config file and restart the system.

Finally, to sync the google calendar account:

You must schedule events titled "work" in their Google calendar. There is no additional effort required by you in order to sync your calendar with our developed prototype

System Usability Scale

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	Strongly disagree				Strongly agree
1. I think that I would like to use this table frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
2. I found the table unnecessarily complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
3. I thought the table was easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
5. I found the various functions in this table were well integrated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
6. I thought there was too much inconsistency in this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
7. I would imagine that most people would learn to use the table very quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
8. I found the table very cumbersome to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
9. I felt very confident using the table	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this table	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

Interview Guide

How would you describe your working behavior with and without the device?

Prompts:

- a. Duration of work sessions
- b. Following the time set up on google calendar
- c. Use/non-use of device

How would you describe your productivity levels with and without the device?

Prompts:

- a. Time spent on accomplishing the task
- b. Effectiveness of working time slots (45mins), break sessions (15mins)

How would you rate your quality of work produced with and without the device?

How did the use of device affect your habits of self-care?

Prompts:

- a. Taking regular breaks
- b. Scheduling time for stretch, exercise
- c. Taking snacks etc.

How would you describe your overall experience of using the device?