Shutdown Helper

Helping knowledge workers detach at the end of the workday

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Master's Thesis

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Abstract

Knowledge workers account for a sizeable and continuously growing proportion of today's workforce. In order to continue to provide work of impeccable quality, knowledge workers, like any other group of employees, must replenish their depleted resources regularly. Through this research, we examine psychological detachment from work as a means to restore cognitive resources that have been exhausted during daily work. Our high-level goal is to develop and investigate a practical solution to promote psychological detachment for knowledge workers. Based on previous research in the area of organizational psychology, we designed a *Shutdown Ritual* that facilitates the transition from work to life domains. An initial version of a desktop application, named *Shutdown Helper*, accommodates the Shutdown Ritual and provides a range of features to facilitate the ritual execution. As a preliminary evaluation of this approach and tool, we conducted a user study with 7 participants from the knowledge sector (i.e., students). Our findings suggest that having a dedicated ritual for detachment at the end of the workday, as well as creating a tasklist with upcoming tasks and commitments, facilitate detachment from work. The effectiveness of the remaining steps in the Shutdown Ritual is highly dependent on individual workflows and detachment needs. Additional research is required to provide conclusive statements about the effectiveness of our approach for a more diverse set of knowledge workers.

Zusammenfassung

Wissensarbeiter bilden einen wesentlichen Anteil der heutigen Arbeitswelt - Tendenz steigend. Um nachhaltig einwandfreie Arbeit zu leisten, müssen Wissensarbeiter ihre aufgebrauchten Ressourcen regelmässig erneuern. Durch diese Forschungsarbeit möchten wir Wege finden, es Wissensarbeitern zu ermöglichen, sich am Ende des Tages von ihrer Arbeit loszulösen. Damit bezwecken wir die Erneuerung der kognitiven Ressourcen, die Wissensarbeiter täglich beanspruchen. Wir verfolgen dabei das Hauptziel, eine angewandte Lösung zu entwickeln und zu evaluieren, die das Abschalten nach der Arbeit fördert. Basierend auf Forschungsarbeiten im Bereich der Organisationspsychologie, haben wir hierfür ein *Shutdown Ritual* entwickelt, das den mentalen Übergang von der Arbeitsdomäne in das Privatleben fördert. Das Ritual ist im *Shutdown Helper*, der Erstversion einer Desktop Applikation, beherbergt, welches eine Reihe von Funktionen beinhaltet, um eine reibungslose Ausführung des Shutdown Rituals zu ermöglichen. Als Primärevaluation dieses Lösungsansatzes haben wir eine Benutzerstudie durchgeführt, an der 7 Wissensarbeiter (in diesem Fall, Studenten) teilgenommen haben. Die Ergebnisse aus der Studie zeigen, dass ein dem Abschalten gewidmetes Ritual am Ende des Arbeitstages und das regelmässige Erstellen einer Pendenzenliste die Loslösung von der Arbeit begünstigen. Die Wirksamkeit der restlichen Schritte im Shutdown Ritual hängt von den individuellen Arbeitsweisen und Bedürfnissen der Nutzer ab. Zusätzliche Studien, mit Beteiligung einer Auswahl an Wissensarbeitern verschiedener Gebiete, sind notwendig, um endgültige Aussagen zur Effektivität unseres Ansatzes zu machen.

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Chapter 1

Introduction

"Detachment is not that you should own nothing, but that nothing should own you."

-Ali ibn Abi Talib

1.1 Motivation

Technological development has brought about many disruptive changes in our way of living and working over the last few decades. These changes have made us more efficient, e.g. through the replacement of manual work by automated processes, but also more competitive by opening many local and isolated markets to a global competition. For employees and firms alike, high levels of productivity and agility have become essential to stay competitive in such a highly demanding and fast-paced environment. One important aspect of life can be easily neglected in this pursuit: rest. Previous work in the area has shown that overworking can be detrimental for physical and mental health in the long run [1] [2] [3]. An approach to counteract the problem is to look into how employees can better detach from work at the end of the day. Since each type of work may bring work-specific factors into the equation, we focus on one specific group of employees in this research: knowledge workers. Knowledge work includes any type of work that has information as its central resource and tool. As opposed to manual work, knowledge work utilizes brainpower rather than muscle power. The productivity of knowledge workers is measured based on their ability to use their knowledge and creativity for value creation. [4] [5] Occupations in this category can range from students to office employees and managers in a company. Despite the combined efforts from companies and researchers in understanding and promoting employee well-being, several reasons remain due to which knowledge workers fail to mentally disengage from work at the end of the day. Without appropriate levels of psychological detachment from work, employees are unable to restore depleted cognitive resources. This may result in increased levels of fatigue and low work engagement. [6] In the following, we explore some aspects of the interrelationship between knowledge work and psychological detachment (hereinafter, also detachment) that serve as further motivation for our research.

Despite being a collective term for a variety of professions, knowledge work has specific characteristics that make psychological detachment particularly difficult. For instance, there are no routines in place that signal the end of a workday. While other professionals may have certain procedures to wind up the day, like changing from work attire into their personal clothes, knowledge workers simply log off from their work devices. This implies that there are no means for

knowledge workers to mentally transition from the work domain to any other domain. As a result, employees ruminate about work-related tasks far beyond their working hours. Another potential hindrance for psychological detachment is the use of Information and Communication Technology (ICT). Knowledge workers are able to work from practically any location with internet connection at any given time using mobile devices. [7] [8] While this provides apparent advantages, the blessing may turn into a curse when employees are not able to leave their work behind. The outcome is an urge to continually check work emails or calls. Although constant availability and engagement of employees may seem beneficial for companies at first, in the long term, a lack of detachment from work has been found to result in decreased levels of employee well-being and job performance [9] [10]. With the COVID-19 pandemic and the resulting work-from-home policies, the inability to detach from work has become more evident. Not only the mental, but also the physical barrier from work has faded. The work-life balance and productivity of knowledge workers can be negatively affected if there are no mitigation strategies in place.

According to [11], productivity levels depend on the ability of an individual to focus on and detach from work at the appropriate times. However, the above-mentioned factors make detachment from work particularly difficult for knowledge workers. This thesis aims at helping knowledge workers to overcome the challenge of disengaging from work by means of an application named *Shutdown Helper*. The application is designed and implemented based on findings from a body of previous work, predominantly, in the area of organizational psychology. The Shutdown Helper should facilitate performing a *Shutdown Ritual*, which ideally helps knowledge workers detach from work at the end of the day. Our research objective is further synthesized into research questions below:

RQ1: How do psychological factors and surroundings affect the ability of knowledge workers to detach after work?

RQ2: Which strategies have been found to be useful for detachment after work?

RQ3: How does a tool incorporating findings from previous research influence knowledge workers' ability to detach at the end of the workday?

In chapter Related Work, we reviewed previous work in the area of organizational psychology to lay the grounds for the subsequent steps of this research. Based on the findings from this chapter, we designed the Shutdown Ritual and Shutdown Helper application. A description of the ritual, the application, and the rationale behind can be found in chapter Approach. Along with that, the chapter contains a detailed explanation of the preliminary user study conducted as part of this work. In the subsequent Results chapter, we gather the outcome of the quantitative and qualitative data analysis. The Discussion chapter contains the answers to the research questions above and a deep dive into some of the prominent results along with their association in the overall context of this study. Lastly, we conclude with chapter Conclusion by highlighting the important findings from our research, reflecting on the same and demonstrating our contributions to the body of existing research in the area.

1.2 Psychological detachment as a recovery experience

Relaxation-oriented (taking time to rest) and mastery-oriented activities (learning new skills), control (creating one's own schedule), and psychological detachment are all commonly identified recovery experiences in previous work [12] [13]. While individuals may have different perspectives on which recovery experiences they consider to be recuperative, a combination of the different recovery experiences has also been found to promote detachment from work. [14] [15] Our research primarily focuses on psychological detachment as a recovery experience, which we elaborate on in the following. Psychological detachment refers to a particular cognitive-emotional state that is characterized by the absence of work-related thoughts and feelings [9]. It suggests refraining from work-related activities, such as phone calls or checking and answering emails, while being off work. While detachment can both refer to detachment during work (e.g. work breaks) or detachment outside of work, we will target the latter in this work [16]. Another important characteristic to consider is that periods of detachment vary in length and frequency. [17] distinguish between detachment on evenings during the workweek, on weekends and on vacation. Detachment in the evenings is shorter but more frequent, whereas weekends and vacation represent less frequent but longer periods where knowledge workers can disconnect from work. The longer periods of detachment provide a chance for a greater sense of disengagement from work but are usually not sufficient since they only appear in limited frequencies. Thus, we investigate a way to promote psychological detachment among knowledge workers on a more frequent basis, which is at the end of each workday.

Chapter 2

Related Work

2.1 Concept of detachment from a role transition perspective

A way to formalize the concept of detachment has been put forth by previous work where detachment is defined as a shift from one formal role (e.g. employee) to another (e.g. household member). This transition requires crossing the role boundary between two distinct roles by mentally disconnecting from one domain and reconnecting to the next domain. [18] Highly segmented roles have stronger role boundaries which makes transitioning more difficult. On the other hand, high integration between roles blurs the role boundaries and makes it easier to transition from one role to another. [19] In the context of this thesis, an individual's social environment is divided into two categories of roles: the role of a knowledge worker (work domain) and all other roles (life domain). Scholars have found that high work-life integration results in increased exhaustion due to the scarcity of recovery activities. [20] Hence, to enable detachment from work, there must be a certain amount of segmentation between work-related roles and any other type of role that the individual occupies. Additionally, to make a transition from work to other domains easier, we incorporate the idea of *Rites of Passage* [21]. In his book, A. V. Gennep describes the idea that performing rituals aids an individual's transitioning from one social context to another. We apply this thought in our approach with the *Shutdown Ritual*, which should facilitate an individual's transition from work to personal life.

2.2 Psychological detachment, employee well-being and job performance

Knowledge workers experience stress resulting from extraordinary job demands such as high workload or external work pressure [22]. These job stressors are elements in the work environment that may lead to increased levels of strain (stressor-strain relationship) and other forms of impaired employee well-being. [23] A systematic approach explaining the relationship between job demands and well-being is the Effort-Recovery model. It suggests that work demands physiological and psychological resources. Once an employee terminates work, these resources are restored again over a certain period of time. However, failure to recover over long periods, possibly caused by a lack of detachment, may result in impaired well-being and health. [24] This implies that psychological detachment may act as a "moderator" in the stressor-strain relationship, where high levels of detachment help to reduce the effects of job stressors on experienced

strain and job-related fatigue (stressor-detachment model) [6] [25]. Various studies in the field of organizational psychology have also empirically identified psychological detachment as a facilitator for recovery from job-related stress and, thus, for employee well-being [9] [22] [26] [27]. Recent research demonstrates that the need to psychologically detach from work varies between individuals. For instance, people with high levels of autonomous motivation are less emotionally exhausted due to low levels of detachment than people who are less motivated and less involved in their jobs [28]. Furthermore, scholars have found implications for job-performance suggesting that both particularly high and low levels of detachment result in poor job-performance. Low levels of detachment result in impaired well-being for the above specified reasons, which possibly leads to lower performance at work. A high level of cognitive detachment, on the other hand, poses challenges to reconnect to work and may lead to decreased job performance [9] [29]. The latter supports the boundary segmentation concept stating that high levels of detachment suggest strong boundaries between roles and, therefore, transitioning is more costly [19]. Hence, medium levels of detachment represent the golden mean where high job performance is achieved [9].

2.3 Work from home and detachment

Remote work, especially work from home, poses its own challenges for knowledge workers. In particular, challenges may include distractions through family or flatmates as well as household chores. These consequent interruptions of work sometimes lead to longer working hours and thereby shorten the recovery period at the end of the day. Working from home also eliminates the commute which usually serves as a transition period between work and home. [11] As the physical space between home and workplace disappears, maintaining a work-home boundary becomes more difficult [30] [31]. This may result in seamless, but also more frequent, transitions between the two domains. Needless to say, detachment becomes even more challenging in this case. Therefore, it becomes essential to sculpt the work-home boundary in a way that it fits the individual's needs. In fact, research has shown that knowledge workers rarely keep work and life domains completely separate. [32] In the context of work from home, a complete segmentation of work and home can even turn out to be nearly impossible. However, strategies have been suggested by previous work that may help to establish a certain amount of segmentation when working from home. For instance, creating a dedicated workspace that is clearly separated from relaxation spaces inside the home has been found a helpful strategy for signalling to oneself and to other household members that a person is working. [11] Having such concrete strategies in place to establish a work-home boundary may also facilitate psychological detachment by consciously "crossing" the boundary to transition to the other domain. Although the Shutdown Helper application is not particularly dedicated to knowledge workers working from home, the detachment strategies that the application provides, can also be useful for this specific group of employees.

2.4 Factors influencing detachment from work

An extension of the stressor-detachment model mentioned from section 2.2 suggests that the negative effects of job stressors on detachment are influenced by *primary* and *secondary* appraisals. During the primary appraisal, an individual evaluates the event with regard to the potential harm it may cause. A minimum amount of attention to the event is a prerequisite for primary appraisal. If this is not met, the event cannot be considered as a potential job stressor and thus has no relevance for the person's well-being. During the secondary appraisal, the individual evaluates how to deal with the identified job stressor, i.e. whether the job stressor will result in a lack of detachment or not. Primary and secondary appraisals determine the level of influence of a job

stressor on an individual's detachment. [25]

There are a number of factors that may act as job stressors. For instance, a mismatch between an individual's preference for work-life segmentation and the degree of segmentation that the work environment is promoting may result in decreased detachment levels [25] [30] [33]. Companies that do not promote work-life balance can expect their employees to be constantly available for work-related communication or tasks. A facilitator for constant availability is the use of the same devices for work and personal use. [11] [34] Another potential job stressor are unfinished tasks at the end of the workday or workweek which can cause people to ruminate about these obligations, preventing mental detachment in the nonwork period. [17] The Shutdown Helper is not targetting job stressors before they occur but comes into action during the secondary appraisal when a person contemplates on how to deal with the potential hazard to their detachment.

2.5 Interventions promoting detachment

Along with the research on the antecedents and benefits of detachment, there are a number of papers proposing interventions to promote detachment. We will summarize some selected interventions that may be relevant for the Shutdown Helper application in this section. In particular, we consider person-directed interventions that address behaviour changes and boundary management for individuals while being off work. As a result, company-directed interventions which primarily aim to reduce job stressors and may serve as a supplement to person-directed interventions, are not covered in this work. We focus on interventions that alter an individual's primary and secondary appraisal processes. Within the range of papers that study person-centric intervention approaches for detachment, some are focused on detachment as a primary goal, while others focus on related subjects like stress-management (e.g., [35]), mindfulness or boundary management. [16] Interventions with a primary focus on detachment use educational approaches such as (online) recovery training as a technique to inform participants about a number of related topics, like recovery experiences or boundary management. Studies have found such training to have a positive effect on reducing insomnia severity and improving psychological detachment. [36] [37] [38]

Among the work that identifies detachment as a secondary outcome of specific practices, there are a number of interventions that have been found useful. As a precautionary measure to foster detachment, previous research suggests to break down larger tasks into manageable components that can be finished by the end of the day or week. Knowing that the tasks are planned out, the individual is less likely to worry about them and the associated deadlines. Furthermore, we have discussed before that boundary management is an enabler for psychological detachment. This includes creating mental boundaries between work and life domains. Mental boundaries can be established through role segmentation and specific rituals to cross these role boundaries (as mentioned in section 2.1). The practice of mindfulness is highlighted by previous work as "a cognitive-emotional segmentation strategy" that facilitates detachment from work [39] [40]. In addition, physical boundaries or space support establishing mental boundaries. [30] and [41] also suggest the concept of managing physical artifacts for boundary management, which implies that certain devices are only used for work in order to signal to oneself and others that the person is working. When working from home, dedicated spaces for work are suggested for the same purpose. By signalling the boundaries to others, a person creates shared norms of permeability of their work-life boundary and, thereby, manages expectations. [42] [30] While being off-work, detachment can be further encouraged through relaxing activities (listening to music, practicing mindfulness), mastery experiences (learning a new skill that is not work-related), social activities with family and friends, and physical exercise. [17]

2.6   Existing technological solutions for detachment

There are numerous applications that target detachment in some way. Our focus here is on applications that support detachment after working hours. One way to tackle the issue is offered by applications that promote focus and productivity. The idea is to improve time management by focusing on tasks more effectively and preventing long workdays that may shorten evening detachment periods. RescueTime, for instance, is a screentime tracker that helps knowledge workers improve their focus. Features include setting and tracking daily focus goals, blocking and alerts for distracting websites, and an overview of the focus behaviour over a certain period. Users can track their screenuse behavior and limit off-work screentime using this self-monitoring tool. [43] [44] A similar approach by the Personal Analytics tool allows a user to self-monitor their work behaviour and productivity using computer interaction trackers and biometric trackers. Again, this tool can be used to measure detachment by tracking how much time is spent on productive websites or work-related applications while being off-work. [45] An alternative approach is to target detachment when its due, which is at the end of the workday. A solution named *SwitchBot* is a conversational bot communicating with the user prior to starting and terminating the workday. The Switchbot is a Skype contact that, when prompted by the user, employs structured, task-related or emotion-centric dialogues to assess the user's current emotions and upcoming tasks. [46] Another solution that comes the closest to what we want to achieve with the Shutdown Helper application, is a Microsoft Viva Insights feature named Virtual Commute. As mentioned before, many knowledge workers use the commute as a time to detach from work. Virtual Commute translates this idea into an application and lets the user perform a number of tasks usually done at the end of the day or on the way home from work that act as a mental preparation for the end of the workday. The user is prompted to follow a number of steps such as finishing up current tasks, adding further tasks for later, an emotional check-in and meditation to wrap up the day. [47] The Shutdown Helper uses a similar set of steps but focuses on consciously guiding the user from work to the life domain. The following chapter explains this process in a detailed manner.

Chapter 3

Approach

The analysis of previous research shows that various aspects of work-life balance and psychological detachment as a recovery experience have been examined. However, concrete solutions to combat a lack of detachment for knowledge workers are sparse. In this study, we therefore aim to gain a better understanding on the needs of knowledge workers in this regard. Our approach to answering the research questions comprises of two main parts: tool development and a preliminary user study. The building blocks of our approach are explained in greater detail below.

3.1 Shutdown Ritual

Based on the related work analysis presented in chapter 2, we created a Shutdown Ritual to facilitate an active transition from work to life domains. The 8-step ritual follows along 4 high-level goals (see Figure 3.1) that should promote detachment after work when performed in the suggested order. The first goal is to *get one's mind off of upcoming tasks and deadlines*. As a result, the first four steps in the ritual are devoted to creating a tasklist for the following day, which includes unfinished tasks, unanswered emails and upcoming meetings and deadlines. This tasklist will be available to review the following day and will allow the user to reconnect to work. Once the user has planned their subsequent workday, they can signal the end of their workday to their colleagues by going offline on messaging apps, preventing further interruptions. This helps the user in *setting expectations of permeability of their work-life boundary* [30]. After closing all unneeded tabs on the device, the work domain can be left behind. To then *reset and clear the mind from work-related thoughts*, the user can do a mindfulness meditation. This step is intended to divert the user's attention away from work and into the present moment. The final step of the Shutdown Ritual is setting an evening intent. The intent should not be a chore or an additional task but rather something that the user does for themselves in the evening. By beginning to think about

> **Goal 1 :** Get rid of work-related thoughts by writing them down.
>
> **Goal 2:** Set expectations for work-life boundary permeability to avoid undesired interruptions.
>
> **Goal 3:** Reset mind by steering attention to the present moment.
>
> **Goal 4:** Mentally cross the work-life boundary by starting to think about the evening ahead.

Figure 3.1: High-Level Goals of the Shutdown Ritual

Step 1: Add any unfinished tasks to the tasklist.

Step 2: Check the latest emails to add related tasks to the tasklist.

Step 3: Check the calendar to add tasks and deadlines to the tasklist.

Step 4: Review the tasklist for the next day.

Step 5: Set status on selected messaging apps (e.g. Skype, Teams, Slack) to offline.

Step 6: Close unneeded tabs.

Step 7: Do a meditation session of preferred length (3 mins, 5 mins or 7 mins).

Step 8: Write down an evening resolution.

Figure 3.2: Shutdown Ritual Steps

the evening, the user is able to *mentally cross the work-life boundary*. The steps of the ritual are also listed in Figure 3.2.

3.2   Apparatus

Within the scope of this thesis, we developed an initial version for a desktop application named Shutdown Helper. This application assists users in completing the 8-step Shutdown Ritual and thereby facilitates the above mentioned transition from work to life domains. Users are intended to use the application at the end of the workday to do the Shutdown Ritual and on the next workday to check their tasklist.

3.2.1   Architecture decisions

The reason behind choosing a desktop application over a web or mobile application is to motivate the user to finish the Shutdown Ritual on their work device. Having the Shutdown Helper as a web or mobile application would allow the user to postpone the Shutdown Ritual and thus also delay the transition from work to their personal life. Completing the ritual on their work computer allows the user to transition to the life domain immediately after they finish work.

The desktop application was built using the Electron JS[1] framework to ensure cross-platform compatibility (namely for Windows and MacOS). React[2] was used as a JavaScript user interface library. Shutdown Helper is a front-end application that stores data to and accesses it from the user's local application data folder using Node JS [3] modules.

3.2.2   Design

The Shutdown Helper application was designed with the objective to facilitate a low-effort completion of the Shutdown Ritual. The rationale behind is that the user's cognitive resources are likely to be depleted by the end of the workday. If the completion of the ritual requires major effort, the ritual may not be completed as intended or even be skipped.

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[1]https://www.electronjs.org/

[2]https://www.reactjs.org/

[3]https://www.nodejs.org/en/

The user interface is kept in a night theme to represent the end of the day. To allow the user to focus on the action at hand, only one ritual step is displayed at a time. For each step in the Shutdown Ritual, we used icons instead of large blocks of text to make the related action easy and quick to grasp.
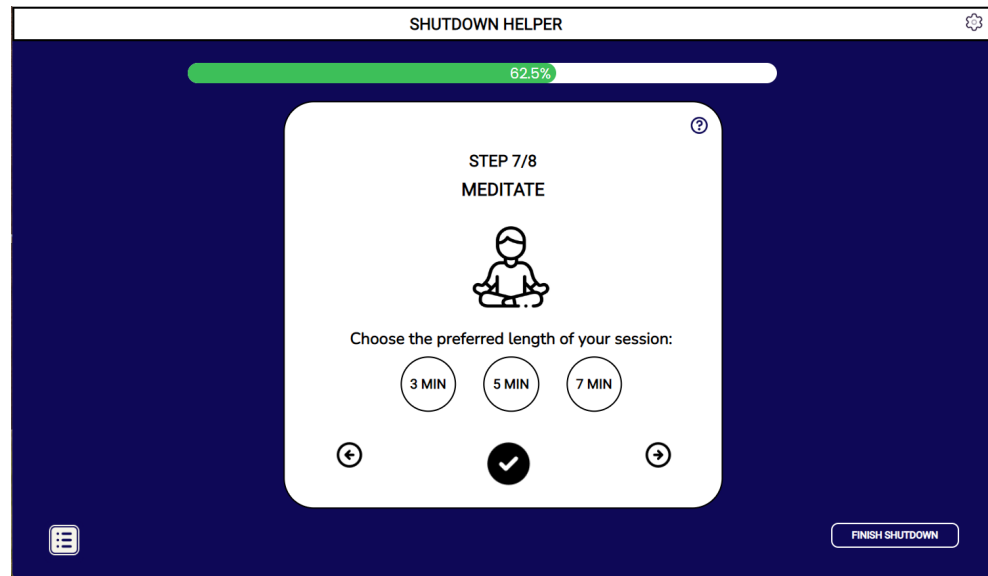
Figure 3.3: *Shutdown Helper:* Step 7.

3.2.3   User flow

A typical usage scenario starts with the user finishing their workday. Once the Shutdown Ritual has been started from the homepage, the first step of the ritual is displayed. Initially, the user is prompted to add any unfinished tasks from the current day to their tasklist. Afterwards, they mark the current ritual step as completed and go to the next one. Here, the user is supposed to check their calendar for any meetings or deadlines coming up the next day. Again, the related tasks are added to the tasklist and the task is marked as completed. By doing so, the user is able to constantly follow their progress in the ritual. The next step is checking the email for any remaining tasks but since the user usually does not have any relevant emails towards the end of the day, they skip this step. The user now checks and updates the current version of their tasklist. This means to review all tasks, to mark finished tasks as "done" and to add any remaining ones to the tasklist. Next, the user goes offline on messaging apps. This allows the user to avoid any unwanted interruptions of their leisure time. After that, the unneeded windows and tabs are closed to leave the work behind. Since all work-related matters are settled for the day, the user is now advised to do a mindfulness session of their preferred length. The user is interested in the purpose of this specific step and clicks on the help button to find out. After they finished their 3-minute mindfulness session, the user writes down and saves an intent for the rest of their evening and finishes the ritual session. On the subsequent workday, the user reopens the application

where they are able to see their tasklist. Reading through the tasks and starting to work on them reattaches the user to their work quickly. In addition, the user decides to review their evening intent from the previous day to check whether they were able to fulfill it.

3.2.4   Features

Ritual steps: At each ritual step, a title describing the related action, the respective step number and navigation buttons are displayed. There is a help button that, when clicked on, shows a description of the purpose of the current step. A progress bar in the upper area of the window displays the percentage of the ritual completed in the current session. Additionally, at steps 5 to 8, the user can open the tasklist by clicking on the button located at the bottom left of the window. The user can also finish the Shutdown Ritual at any point by clicking on the button on the bottom right of the window. See Figure 3.3 for reference.

Navigation: Each step can be skipped or marked as completed if the user has executed the related action. The user can go back to previously completed or skipped steps. The navigation buttons are, as mentioned above, available at every ritual step.
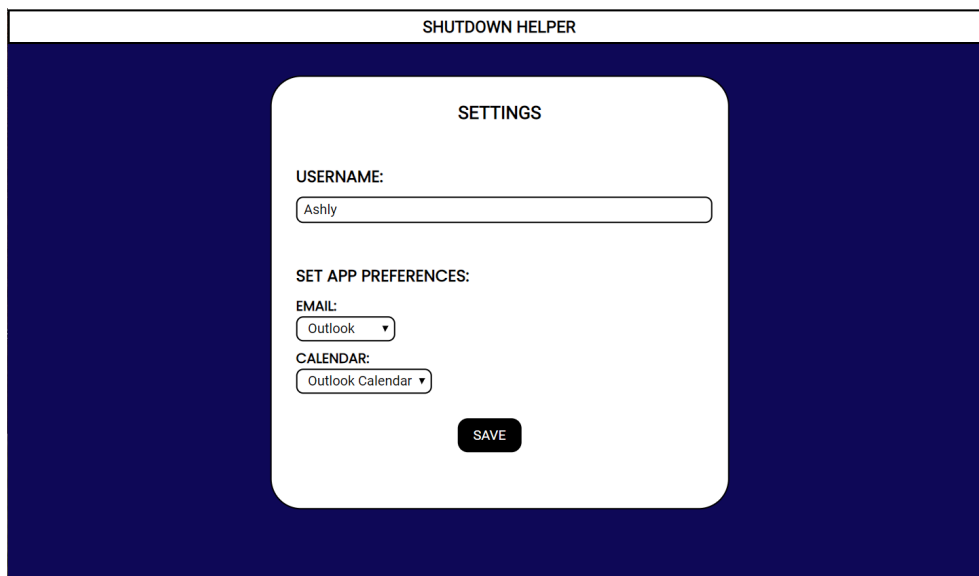
Figure 3.4: *Shutdown Helper:* Settings.

Tasklist: The app includes a basic built-in tasklist where the user can add tasks and remove them by marking them as "done". In steps 1 to 3, tasks can be added from the same page without opening the tasklist. The user can check the current version of the tasklist by clicking on the tasklist button on the bottom left of the window (visible on the homepage and at ritual steps 5 to 8).

Shortcuts: The app can be connected to the private email and calendar, which can be accessed through the user's default webbrowser during the ritual. For this purpose, the personal email and calendar provider can be chosen from a list of common providers on the Settings page (see Figure 3.4) At step 7, a meditation video of the chosen length will open in the user's standard browser (see Figure 3.3).

Homepage: The homepage contains the button to start the Shutdown Ritual. The evening intent, that is written down and saved at the last ritual step, can be reviewed by clicking on the button on the bottom right of the homepage. This allows the user to track their own alignment with the evening resolutions they set. When the app is opened in the morning, a question about the user's detachment level on the previous day and the current version of the tasklist appear (see Figure 3.5).
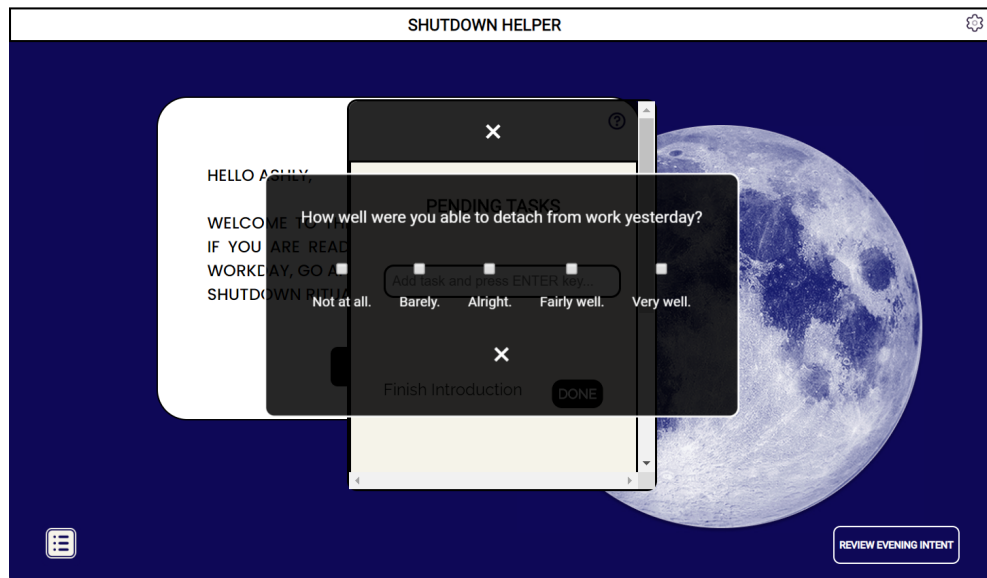
Figure 3.5: *Shutdown Helper:* Morning View.

3.3   User study

The purpose of our preliminary user study is to evaluate both, the Shutdown Ritual and the application. We want to learn more about individual detachment habits and shutdown routines, their compatibility with the Shutdown Ritual and the usability of the Shutdown Helper application. These insights can be utilized for future versions of the ritual and the application.
The user study took place over a 2-week period where the study participants used the application as part of their own end-of-the-day routine. Each participant got access to the application,

a setup and user study guide, and the consent form two days prior to the start of the study period. This gave the participants sufficient time to download the file containing the application and to get familiar with the usage and the study procedure. The participants were instructed to use the application at the end of each day that they were working during the two weeks of the study (weekends were optional). Additionally, participants should open the application on the subsequent mornings to answer the detachment question and review their tasklist created on the day before (see Figure 3.5). After the two weeks of the study, each participant took part in a semi-structured interview where they could share their experience. The interview questions were focused on three areas of interest: the participant's detachment habits before the study, their experience doing the Shutdown Ritual and the experience using the Shutdown Helper application.

3.3.1 Participants

For this user study, we recruited 7 participants through our personal network. Working in a field that is classified as knowledge work, being able to participate during the study period, and being able to download the desktop application to a personal or work computer used during the study were the inclusion criteria for the participants. Due to common company device policies that prohibit employees from downloading or installing unauthorized software, it was difficult to recruit any full-time employees from the knowledge sector for our study. All study participants are full-time or part-time students in Switzerland (5 participants work part-time). The participants' areas of study include Social Work, Medicine, Artificial Intelligence, Economics and Environmental Sciences. All working students were also employed in professions classified as knowledge work, such as social worker, business IT professional or (web) developer. Two participants were working during the study period and one of them used the application on workdays as well. The rest of the participants only used the application on days they were studying during the two weeks of the study. Out of all participants, 4 identify as female, while 3 identify as male. The participants' ages range from 22 to 32 with an average age of 26.

3.3.2 Data collection

In the context of this study, we performed a qualitative analysis along with a quantitative data analysis to underline certain aspects of the former. For the quantitative analysis, we collected two types of data during the user study. Each time the participant performed the Shutdown Ritual using the application, the steps that were marked as completed (by clicking on the tick button), were saved to a local file on the user's computer. Additionally, the answers to the detachment question answered in the mornings, chosen from a 5-point Likert scale (see Figure 3.5), were saved as well. From both datasets, we excluded a week's data if it was collected on less than three days per week and participant for the sake of a meaningful analysis. The result is a dataset of 26 entries from 3 participants for the detachment question and a dataset consisting of 42 ritual session entries from 5 participants for the steps completed in each ritual session. A breakdown of our datasets is provided in Table 3.1. An *entry* is data collected from either the answered detachment question or the ritual completion (i.e. steps marked as completed during the ritual) *per participant and day*. To perform the qualitative analysis, we collected data from the semi-structured interviews about the participants experience during the study and their previous end-of-the-day habits for detachment from work or studying. The interview mostly contained open-ended questions like the examples below to allow the participants to talk about points that they found important to mention. A complete list of the interview questions can be found in Appendix C .

Participants	Detachment Answer		Ritual Completion	
	Included Entries	Excluded Entries	Included Entries	Excluded Entries
P1	11	0	10	0
P2	9	0	13	0
P3	0	3	0	4
P4	6	0	5	2
P5	0	0	0	4
P6	0	0	7	0
P7	0	0	7	1

Table 3.1: User study quantitative data overview

> *What was your overall experience during the study?*
> *What measures do you take that help you detach from work?*
> *Which additional features would have enhanced your experience using the application?*

Furthermore, the semi-structured interviews allowed us to ask further questions whenever something was unclear or when a participant mentioned an interesting experience that might help to explain some of the data. The interviews were conducted in one-on-one fashion over a Zoom call. With the participants' permission, the interviews were either only audio, or audio and video recorded. Once the interviews had been transcribed, the recordings were deleted.

3.3.3 Analysing the data

The data analysis comprises the interview analysis and the quantitative data analysis. The starting point for the interview analysis are the transcribed interviews. We performed a thematic analysis on the entire set of interviews using a step-by-step approach suggested by [48]. Since we were already familiar with the data through the transcription process, we started by going through the transcripts to generate initial codes. A code was, in our case, one or several sentences containing a specific statement that may be helpful in our analysis or in answering our research questions. As this suggests, we employed a combination of "data-driven" and "theory-driven" approaches. In the former, the codes and themes depend on the data itself, while in the latter, we approach the data with our research questions in mind. A combination of the two approaches ensures that we do not miss any relevant statements while answering our research questions. After the first round of generating codes, we reevaluated the codes and adjusted if necessary. We then arranged the codes into themes and subthemes. A theme is an overarching topic that describes multiple codes. After we reviewed the themes, we named them. Ultimately, we assigned the themes to the respective research questions. Whenever a clear affiliation was not possible, the theme was added to the research question that it can most likely be associated with. After this process, we have 5 themes and 9 subthemes in total: 2 themes with 3 subthemes related to RQ1 and 1 subtheme related to RQ2, and 3 themes and the respective subthemes related to RQ3.
The analysis of quantitative data in this thesis by no means leads to statistically significant results since the sample size is too small to make any conclusive statements. However, since the quantitative and qualitative data origins from the same set of participants, we can analyse the quantitative data to evaluate whether they represent to some level the respective participant's statements from the interviews. For this purpose, we use visualisations and analyses of the quantitative data. The outcome of the data analysis is presented in the following chapter.

Chapter 4

Results

In this section, we provide a detailed presentation of the results from the qualitative and quantitative analysis. The chapter is divided into sections and subsections representing the themes and subthemes, respectively, that arised from the interview data. The corresponding codes are marked bold and further explained with illustrative example statements from the participants. The visual representations of the quantitative data (see Figure 4.1 and Table 4.1) are used to underline certain statements from the interview analysis. In the following, participants 1 to 7 are denoted as P1 to P7.

4.1 Detachment from work prior to user study

4.1.1 Ability to detach after work and studying (RQ1)

Little difficulty to detach on a regular basis. Our interview data reveals that most participants did not have a problem to detach on a regular basis before the user study since they have already taken some measures that help them detach (see subsection 4.1.2).

> "If I have written down everything that I need to do, then I don't (have a problem to detach)." - P2

> "I had the issue quite often but that was some time ago. I've also already dealt with it 2 or 3 years ago." - P5

> "Not often. I didn't really have that problem. Not in a way that it would bother me." - P7

Later in the interview, P7 mentions that they are often still at work in some way but it usually does not bother them since that is their desired level of detachment. P5 and P7 said that they have already incorporated certain practices into their daily routine to help them detach from work. Thus, these participants have confronted themselves with detachment before. One participant, however, struggled with detachment on a regular basis before the study.

> "Yes, so I regularly have problems to detach because my everyday is so... (...) Because I am doing my degree while working, the boundary is blurred." - P4

P4's inability to detach arises from the different domains (job and studies) that comprise work for them. The boundary between work and life is difficult to establish because after the workday

ends, oftentimes begins the study time.

Varying experiences regarding detachment while working from home. Three participants mentioned greater difficulty to detach from work when they work from home.

> *"Yes, I find it more difficult to shut down when doing home-office. And I think*
> *that's because I have the commute. When I am working from home, the commute*
> *is very short, right?" - P4*

For P4, the commute acts as a transition phase between work and leisure time. When working from home, this transition phase is omitted, which makes it difficult to detach. Other mentioned phenomenons for a lack of detachment were long working hours due to domain switching (between work and studies) and interruptions of leisure time through work emails. Contrary to these experiences, two participants mentioned that they did not feel a great difference during the pandemic when studying from home since they were also doing study related tasks from home before. It did not affect them as much to shift entirely to studying from home.

> *"Even if you have classes onsite, you still have to do some things at home. And*
> *I always did those things at home. So, it was similar I'd say." - P6*

P1 even mentioned, that they could detach better when working from home because they did not think about work when going out or even after just changing the room. For this participant, it was possible to apply the role of an office as a dedicated place for work to their office at home. For P3, detachment was also not a problem because they were usually more motivated to work longer when they see their colleagues at the office working long hours. Since they did not have that peer pressure when working from home, it was easier for them to finish work at a certain time.

4.1.2   Measures promoting detachment from work (RQ2)

Various detachment measures but no shutdown routine. Participants mentioned a range of detachment measures that have also been suggested by previous work such as distracting activities, commute and separate devices for work and leisure.

> *"Yes, when I was done with my workload for the day I usually watched TV or*
> *was gaming a bit with some friends. Something relaxing. Something apart from*
> *studying that helped me to distract myself." - P1*

> *"Maybe, when I am studying somewhere else, I go home. That could maybe be*
> *seen as a boundary. But other than that, not really." - P2*

> *"When I needed to do some personal things, I used the iPad and did not turn*
> *on the laptop. The iPad is my leisure device anyway. It's not related to work or*
> *anything." - P4*

The interview data also demonstrates that P7 has a different way of approaching detachment after work than the rest of the participants.

> *"So, I have exactly 3 interest fields and I just move around those. (...) For me*
> *shutting down means to focus on something that I did not work on the whole*
> *day." - P7*

This participant uses domain switching as a way of detachment since their engagement in both studies and work is very high. For them, switching to a domain that they neglected on a

specific day is a way to detach and to stay updated in their fields of interest.

Our data shows that most participants have already taken some measures that they think helped them detach or get better sleep. But these activities where not executed in a sequence such that it can be seen as a dedicated ritual for mentally shutting down. Thus, there is no active mental transition from work to life.

Use of tasklist before the user study. Tasklists are a tool that most participants used even before the study, either for work only or both studies and work. There is, however, a variety of ways in which tasklists were used prior to the study. While P1 made a "tasklist" in their mind thinking about the upcoming tasks for the next day, some participants used their calendar or a other applications (e.g. PomoFocus[1], TickTick[2]) to write down their tasks. One of the tasklist applications also had features that helped the user to detach from work more efficiently.

> *"So, it's a tasklist first but it also generates automatic tasks for you that help to detach. For example, checking your emails always at 5pm or also do 30 minutes of exercise. They call it habits. And yeah, then you can adapt those habits." - P5*
> about TickTick

The mentioned habits are incorporated into the users daily routine throughout the day to encourage detachment after work. While the primary goal of this app may not be detachment, it is part of the measures P5 took for better detachment.

Before bed routines for detachment at night and better sleep. Some of our participants identified several of their routines before going to bed as part of their detachment routines. Although this is not the kind of detachment that we are primarily targeting in this thesis, it is worth mentioning since better sleep is also enabled through the absence of work-related thoughts. Measures for this purpose vary greatly. For example, P7 enjoys checking social media as a distracting activity, while P2 prefers to have no screen time starting from 1 hour before bed. Further mentions in this regard were reading an easy fiction book or a specific muscle relaxation practice that serves as a quick way to fall asleep.

4.2 Determinants of detachment (RQ1)

4.2.1 Facilitators for detachment from work

Attitude towards work-related situation. The main factor mentioned by participants that may act as a facilitator for detachment is their attitude towards unfinished work and time constraints.

> *"At work, I have a time buffer for tasks. And my life doesn't depend on it. It's normal that a project sometimes gets delayed a week or so." -P7*

> *"I think, it was already too late. For my studies, it was kind of my own fault that I did not start earlier." - P3*

Both participants have accepted their work-related situation. For P7, this acceptance is clearly a source of peace of mind regarding their work responsibilities. While it is unclear whether the acceptance of their situation helps P3 to detach, it may help them to reduce some level of stress. Another factor that P3 mentioned which helps them detach from work is that they could distribute unfinished work inside the team. The sense of shared responsibility enables them to stop

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[1]https://pomofocus.io/app
[2]https://ticktick.com/

thinking about the tasks they were not able to finish by themselves.

Routine makes the shutdown effective. Participants mentioned that once they completed the first few days of the study, the Shutdown Ritual became part of their routine.

> "But I have to say, in the beginning it was an overhead and after 3-4 days, it was part of my routine. I did it and I knew it was time to shut down. The routine made the difference to say that it is time to shut down." - P7

> "I guess it's also related to whether you have the routine. I think it takes about 30 days for building a routine. And then your body also gets that it is the end of your day." - P2

Once part of their routine, it was easier for some participants to mentally detach from work. However, like P2, most participants would likely need more time to include the Shutdown Ritual into their routine effectively.

Effect of knowing the purpose of a step. Although there was only one participant who explicitly mentioned this, knowing the purpose of a step seemed to influence the effectiveness of the ritual.

> "I don't know if I was influenced by you because I knew what the purpose of the meditation was. I knew that it was there to make a cut in my day. So that the study time was over, and the leisure time started. And that worked better with a ritual or when I did the meditation." - P2

P2 could internalise the purpose of the meditation step during execution. It helped them to transition more smoothly from work to life domain using the ritual. The feature that is supposed to educate participants on the purpose of each step is the help button. Since none of the participants stated that they used this feature, we can assume that they were not aware of it or they did not use it.

4.2.2 Barriers to detachment from work

Unfinished tasks and unsolved problems. The barriers that were most commonly brought up by participants were unfinished work and unsolved problems at work.

> "But something that maybe bothers me in the afternoon is when I could not finish everything that I wanted for that day and I need to plan time for that somewhere." - P2

> "But one time, at work I had this programming problem. And I did not understand what the bug was. (...) I was just thinking about it all the time and it gave me a headache so that I couldn't sleep at night." - P7

Unfinished tasks affecting detachment were either concerning the completion of daily goals, like in the above example, or in regard to goals spanning over a larger period of time (e.g. upcoming deadlines). Another commonly mentioned barrier were late or long working hours.

> "Yes, so it depended on how long I had studied during the day. When I woke up early and went to bed late, it was difficult to get it out of my head." - P1

Other mentioned factors hindering detachment were the lack of fixed working hours, interruptions of free time by work messaging apps installed on a personal device, and procrastination

as the following quote demonstrates.

> "Maybe, if I wait too long to do the things, I have to always think about it. So, it
> would be better to just do it and stop thinking about it." - P6

In this case, the participant is aware that their own behaviour is the potential barrier for detachment from work.
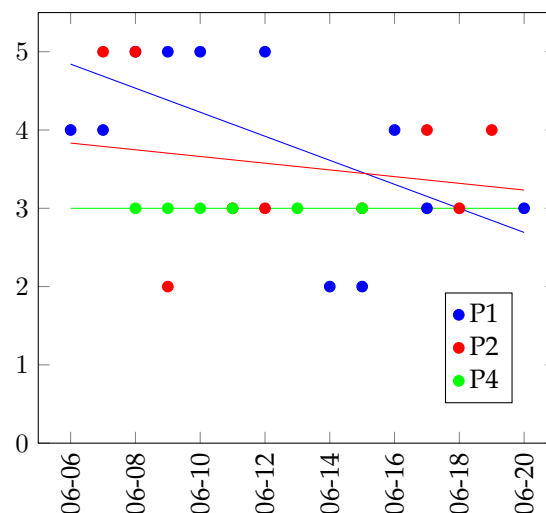
Figure 4.1: Detachment levels during user study incl. the regression lines per participant (5 =
"Very well.", 1 = "Not at all.")

Exam season affected the stress level during study. The main external factor that hindered the participants' ability to effectively shut down during the study was the exams phase, which lead to a lack of time to detach from studying in the evenings.

> "In those two weeks, the pressure increased which is why I couldn't detach from
> studying. But that was because my stress level increased due to the approaching
> exams." - P2

> "I was in a special situation because apart from the working time I was also
> studying because I am currently in the exam phase. And it was always a bit
> difficult to say where the work ends." - P4

> "It was the phase before my exams, so I was stressed. But I think it's not related
> to the ritual. It's just in general this phase before the exams which is the most
> stressful for me." - P6

All participants mentioned that the user study took place during or right before their exam season, which is the time that they are most stressed during the semester. Most participants pointed out that their lack of detachment was due to the exam stress and not because they were using the Shutdown Helper. However, this means that using the Shutdown Helper during this stressful time did not help participants to detach completely. In Figure 4.1, we can see that the

Step	P1	P2	P4	P6	P7	Avg. % of step completion
Step 1: Remember unfinished tasks	100%	100%	100%	100%	100%	100%
Step 2: Check calendar	100%	100%	40%	14%	100%	71%
Step 3: Check email	100%	100%	60%	0%	100%	72%
Step 4: Review tasklist	100%	92%	100%	100%	100%	98%
Step 5: Go offline	100%	100%	80%	86%	100%	93%
Step 6: Close unneeded tabs	100%	100%	100%	100%	100%	100%
Step 7: Meditate	100%	100%	100%	100%	100%	100%
Step 8: Evening resolution	100%	100%	100%	100%	100%	100%
Avg. % of ritual completion	100%	99%	85%	75%	100%	

Table 4.1: Breakdown of ritual completion by step and participant

detachment levels either show a decreasing trend or stay constant on a mid-level during the user study. This is a sign that, as stated by P2, the pressure has increased or was already high during the user study period. Hence, detachment from exam-related thoughts was difficult to achieve. Other participants reported similar experiences due to the ongoing exam season. A common issue resulting from the exam season is the lack of time to detach in evenings.

> *"Maybe, there was also not much time to detach. In the later exams phase, I used the Shutdown Helper right before bed. Then I just go to bed, and I don't notice whether I think about studying a lot or not." - P2*

> *"And because it was the exam phase it was like "Yeah, what is left to do in the evening?". (...) you eat dinner and you are at the computer until the absolute limit of the day." - P5*

Since there was not much time left between the end of the workday and bed time, participants could not plan their evening or enjoy free time.

4.3   Experiences with the Shutdown Ritual (RQ3)

Most and least helpful ritual steps. Writing down the unfinished tasks (step 1) and meditating (step 7) were most commonly mentioned as the the most helpful steps, while checking the calendar (step 2) and email (step 3) were the steps that participants skipped the most (see Table 4.1).

> *"I think writing down the tasks and meditating are the steps that will make the most impact." - P5*

As mentioned before, having a tasklist in some form was not something new for most participants. Some participants mentioned that it was helpful for them to write down their tasks for studying as well since it was something they only did at their workplace previously. For most participants, meditation was something they tried for the first time during the user study. While not everyone liked it, some participants experienced a temporary calmness. For a longer lasting

after-effect, participants may need to practice meditation for a longer period of time. Participants also had their reasons to skip the email and calendar steps.

> *"I often skipped email because I mark the mails that I need to process as not read. So, I have kind of a to-do list there already and didn't want to do that twice. And I skipped calendar because I use Outlook Calendar in my work routine and everything is already there as an appointment."* - P4

Some participants have their own routines on how they organise their email and calendar and it works for them. Thus, they do not wish to add anything from their email or calendar to the tasklist.

> *"I think when you work in an enterprise, the email is very crucial. But for me, that was not the case. I looked at the mails occasionally, but it was not really necessary for me."* - P2

Like P2, some participants mentioned that they skipped email and/or calendar because they do not need to check these platforms on a daily basis for their studies. However, most participants agree that they would benefit from these steps in a workplace setting.

Tasklist makes one feel secure about upcoming tasks. Overall, participants found it helpful to make a tasklist because they could structure their work and estimate the workload for the following day.

> *"Yes, so that I am not swimming in the middle of the ocean and I don't know which direction to go. This way I know what to do and also when there's not much time left, I know what to prioritize and what not, so that I can make it."* - P1

Making a tasklist gave P1 a sense of security and direction in the work that they have to do. Another participant pointed out an interesting factor that they noticed, while making a tasklist for work and their studies.

> *"Ah, I noticed something while doing the user study. With work, I am much more detailed. If I do a tasklist for my studies, I just say "I need to do this module." and not, "I want to look at slides 1 to 10.". I am less detailed with the studies. And then I sometimes I am not able to do it."* - P3

Having the direct comparison of tasks from studies and work in one tasklist made P3 realize that the precision with which they plan their workday in the respective domains is different. Having more concrete tasks helps them to get the work done.

Meditation is helpful but... Although meditation was mostly seen as a helpful step, some participants mentioned difficulties.

> *"I haven't done it before. I think it helps to stop thinking about studying. But it's also a bit difficult because you are still thinking about it. But I think in general it's a good idea."* - P6

P6 points out that although the meditation step is supposed to lead to less thoughts about studying, it is difficult because one is probably still thinking about the tasks that they wrote down. They later also mentioned (along with P5) that they find it difficult to meditate in front of their computer. It would help them to physically be somewhere else to meditate. Another difficulty with the meditation step was mentioned by P7.

"And as a person, I am quite restless. I cannot really sit still for long. It's a much greater effort to do that for me than just to do something else. It was quite stressful for me. Because whenever I did it, I started to think about the things I'll do after that." - P7

P7 was not able to relax at all during the meditation. Since they have a restless personality, the meditation session was stressful for them. However, P7 was the only participant with this experience among all participants.

No use of evening intent when there is no detachment time. As mentioned before, participants did not have enough time to detach in the evenings during the user study due the exam season.

"And the evening intent was quite sad for me because it was always studying or going to bed. I think once, I wrote spending time with my family." - P3

However, participants stated that it may be helpful for them outside of the exam phase to think about their evening plans. Table 4.1 shows that participants did not skip the evening intent during the execution of the Shutdown Ritual. P4 even said that the evening intent was their "personal highlight" from the Shutdown Ritual.

"It sounded like something that you are writing down for yourself and not like a to-do list that you need to work through. (...) Saying something like "I want to go to bed early tonight.". Then it was a little more conscious." - P4

Even though P4 was not always able to put their evening intent into action, the act of writing an intent for the evening was a reminder to do something for themselves. However, it is unclear whether the evening intent supported P4's pursuit of better detachment from work during the user study.

No better detachment for participants with existing shutdown strategies. Two participants have already implemented strategies to achieve their desired level of detachment.

"And because I already had this routine, the other one was kind of something additional but it did not really help me. I think, if I'd have never dealt with this topic before, then it would definitely have helped me." - P5

"So even though I did the Shutdown Ritual, I also continued the other routine. So, for me it did not change anything." - P7

The Shutdown Ritual was executed in addition to the individual routines of P5 and P7 including certain measures for detachment or better sleep. Thus, these participants did not feel any improvements in detachment compared to their previous situations.

Few suggested alterations of the ritual. Overall, the participants were content with the steps that the Shutdown Ritual comprised and their order. The steps coincide at least to some extent with the participants' end-of-work routines. Based on their personal preferences, some participants proposed changes to make the Shutdown Ritual more suitable to their own needs.

"I wouldn't really add anything. But I had the idea of doing some stretching after the ritual. (...) But maybe that can also be done instead of the meditation because you are at your computer the whole time." - P2

"It would be nice to write down what I've achieved on that day. That'd be something I'd really enjoy." - P3

"Yeah, or I would take out the checking your emails part because that also takes a lot of time. Writing down your tasks is something you can do in those 15 minutes but when you look at the emails... Then maybe you get an email that you think you should still answer and it takes even longer." - P5

P5's suggestion to remove the email step also stemmed from their experience that they found it difficult to detach when they looked at their email right before bed, which is when they did the Shutdown Ritual during the user study. Thus, they also suggested that this step should be done earlier in the day.
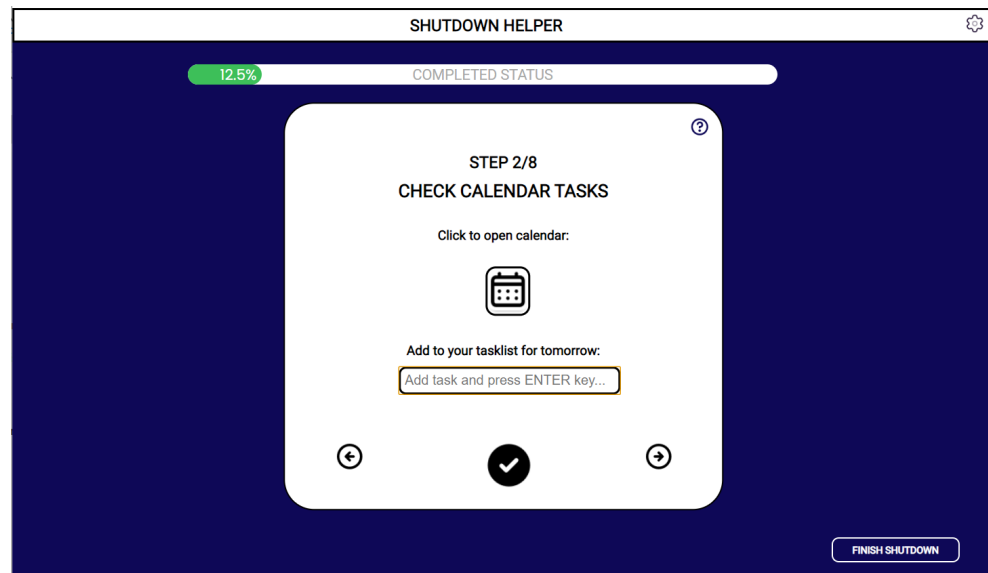

Figure 4.2: *Shutdown Helper*: Step 2. Adding tasks from the calendar to the tasklist.

4.4 Feedback on the Shutdown Helper application (RQ3)

4.4.1 Strengths of the initial application

The use of the app is self-explanatory. Overall, the participants thought that the use of the application was straight-forward apart from minor starting troubles for one participant.

> "I liked it. I found it very clear. Apart from that starting trouble, it's very clear
> and straight-forward how to proceed." - P4

P4's starting troubles are explained in section 4.4. After clearing that confusion, P4 did not have any issues to use the application.

Liked the shortcuts to web apps/links. Several participants found it convenient to open the email, calendar or the desired meditation link directly from the app.

> "I liked that you could connect the email and calendar with your own account.
> That's convenient. Also meditation where you click on the link and it opens in
> your standard browser. That was nicely done." - P7

However, this feedback has to be taken with a grain of salt since checking email and calendar were among the most skipped steps in the ritual. For instance, P3 mentioned that they liked the connection to the personal email and calendar but also stated that they skipped these steps the most. We derive from this that participants liked the feature although they may not have used it always.

4.4.2 Features that need to be improved

Confusion when adding tasks. Some participants were confused about different aspects of the process of adding tasks in steps 1 to 3 (see Figure 4.2).

> "Ah yes, so I wrote down a task and clicked on the tick-button instead of clicking
> ENTER, even though it was written that I have to press ENTER. (...) Not that
> I read the text though. It was just my instinct. And then it did not save it and I
> did not find my tasklist on the next day. That was confusing." - P4

Making done-button prevalent through its size may have tempted P4 to click on it. Furthermore, the instruction in the input box disappears as soon as the participant clicks on it. Thus, P4 overlooked the hint. Another comment regarding this feature by P7 stated that they wished for some kind of feedback after a task was added since the task just disappeared from the input box once added. P5 mentioned a similar concern and would also like to still see the tasks they just added to the tasklist.

Clicking on tick-button was tedious. Several participants mentioned that clicking the tick-button before moving on to the next task was something they found repetitive.

> "Sometimes I found it tedious to also press the green button (tick button) because
> you advanced slower. (...) But it was something additional to click because
> afterwards you clicked on the arrow (next button)." - P2

The execution of the Shutdown Ritual was slowed down by clicking the additional button every time. On further reflection, P7 understood the purpose of the tick-button.

> *"But maybe that was on purpose from your side. To really say "yes, I did this".*
> *So that one doesn't just click through." - P7*

For the purpose of collecting the quantitative data for this study, it was necessary to know which steps were completed by participants. Explicitly clicking on the tick-button was necessary in this regard to differentiate completed tasks from the uncompleted ones. However, deriving from the feedback, this feature can be omitted or modified for everyday use.

4.4.3 Desired additional features for future versions

Advanced tasklist features for better usability. As of now the Shutdown Helper application provides a tasklist with the basic features of adding and deleting tasks by marking them as "done". Some participants expressed a desire for a more advanced tasklist.

> *"Yeah, as I mentioned (I'd like to add to tasks) the required time, priority and*
> *the tags to separate the tasks for studies and work." - P3*

> *"I want to be able to manage my tasks better. I mean, when you know the other*
> *tool, this one kind of lacks that. Prioritizing would be nice. Because otherwise*
> *you wake up and see 20 tasks and think how you'll be able to do it." - P5*

The desired features would make the tasklist more structured and manageable. Especially compared to the more advanced tasklist apps on the market, the Shutdown Helper tasklist lacks features such as prioritization of tasks or separation of domains.

Reminder to open the Shutdown Helper. Participants mentioned that they would like to be reminded in the morning and evening to open the application.

> *"I would also like it if I don't have to start it in the morning and there would be*
> *a popup notification which I can click on to review the tasklist. Not that I have*
> *to actively look for it." - P4*

> *"Yeah, maybe that it's already integrated in Windows and would start up when*
> *I click on "shut down" on the computer. So that I don't forget. And also that in*
> *the morning when I start the computer it would autostart." - P1*

Many participants forgot to do the Shutdown Ritual occasionally or to open the app in the morning for reviewing the tasklist and answering the detachment question. The latter is visible in Table 3.1 where we see that three participants did not answer the detachment question at all. The above statements confirm that participants would like to be reminded to open the app in a low effort manner through popup reminders or automatic start up of the application.

Portable app vs. app on work device. The opinions about which platform is preferred for the Shutdown Helper are divided: While some prefer to have a web or mobile application that can be accessed from anywhere, other participants prefer to complete the Shutdown Ritual on their work device.

> *"Sometimes I was out and I thought I'd do it later but then I was too tired and went to bed. That happened a few times. Because of that, I wanted to suggest that you could have it as a website or on a Cloud... or also as a mobile app or something. (...) Yeah, maybe a website. Then I can still do it on the laptop."* - P3

> *"Ah I said before that I'd like to have it on other devices. But that's not true. I was happy that everything to do with work was on my laptop. I wouldn't want to have it on my phone or something. And then when you open the laptop in the morning, you'll see the tasklist. Yeah, I want to correct that."* - P4

Having a portable application would help P3 to complete the Shutdown Ritual on the go. However, many of the steps in the ritual were designed to be completed more conveniently on a laptop or desktop computer, like updating the tasklist after checking email and calendar or going offline on work devices. P4's statement captures the purpose of having the ritual on the work device. However, participants mentioned difficulties to do the meditation session in front of the laptop.

> *"I think the desktop app is definitely cool but if you want to detach, it could also be nice to have a mobile app. It was difficult for me to meditate in front of the computer. It would be nice to switch from the laptop to the mobile phone once I have looked at the rest."* - P5

P5 suggests a midway where the Shutdown Helper is available on a portable device in addition to the desktop app. This would allow them to move away from their work device for the meditation.

4.5 Outlook for the future (RQ3)

4.5.1 Future use of the Shutdown Ritual

Most participants will continue the parts of the ritual that they already did before. Some new steps that may be continued are checking the calendar for tasks for work (P6, P7), the evening intent (P4) and meditation (P1, P5).

Making a tasklist will be continued. Most participants have stated that they will continue to make a tasklist with their unfinished tasks even after the study.

> *"Um, yes I would probably write down the tasks for the next day. That's something I didn't do before. I planned them in my head and they were just roughly structured I'd say. If I would write them down they could be more structured and it would give me a feeling of better control, when you know "Yes, you are on track with the timeplan. You have it under control."* - P1

> *"Yes, so the open tasks I will definitely do and maybe also do it for studying as well."* - P6

The Shutdown Ritual inspired some participants to modify the way they make the tasklist. P1 will write down their tasks, which they previously only planned out in their head. P6 saw the benefit of writing down the tasks for their studies as well, which they only did for work before.

Try out meditation. For most participants, it was the first time they tried mindfulness meditation. Two participants mentioned that they want to add meditation to their current routine to see how it works for them.

> *"But I think meditation is something I will surely take with me from the Shutdown Helper. To detach a little and stop thinking about what I need to do." -* P5

Meditation is a practice that will show better results when used over a longer period of time. Seeing that it temporarily helped participants to divert their thoughts from work during the study is a promising result that shows the potential in exploring this ritual step further.

4.5.2   Future use of the Shutdown Helper application

Use of future versions of the Shutdown Helper. Most participants stated that they would use the application if certain needs are met.

> *"Because it's on the laptop, it's not that practical. If I could use it on my phone, I would use it. Because it's something I use often, the tasklist." -* P3

> *"I would use it if it was more adapted to my needs. So if there were only my steps in it. And if it's an app on my desktop. I think that really makes a difference for me. If I have to go look for it in the files, that's something I definitely won't do in everyday life." -* P4

For P3, the tasklist feature of the Shutdown Helper seems the most prevalent. They would want to have a portable version of the app to update their tasklist on the go. From P4's comment, we can derive that customization and ease of access are very important for them to use the Shutdown Helper on a daily basis. Most participants would not continue to use the Shutdown Helper in its current state since it contains only basic features. But generally participants are open to using future versions of the Shutdown Helper if it satisfies their most important needs.

Higher expectations from users of applications with a similar functionality. Since P5 and P7 already were using more advanced tasklists, they demanded more advanced features.

> *"At the moment it is more of a prototype, right? So, when it gets a bit more matured, you can also let it run in the background, get push notifications. And the going offline could be automated. I think when that is done, I would also use it." -* P5

> *"I have to have an additional benefit from it. Maybe having something like statistics of how many times I did it. (...) Or how accurate you were with your objectives for your tasks. If there were some key parameters that would show me these things, I would use it. It should give me more added value than just helping me to do the ritual." -* P7

P5 demands more automation than the initial version of the application has. P7, on the other hand, would need some retrospective statistics that add value for them to use the application in future. Helping them to execute the Shutdown Ritual is not enough for them since it is something they could do even without a dedicated application.

Chapter 5

Discussion

Our goal in this section is to discuss some of the prevalent results concerning the three research questions. On account of the exploratory approach used in this study, we will also dive deeper into further findings from the Results chapter to elaborate on certain aspects. Furthermore, this chapter will provide some guidance on which directions this approach for detachment from work could take in the future.

5.1 Discussion of the research questions

RQ1: *How do psychological factors and surroundings affect the ability of knowledge workers to detach after work?*

With respect to psychological factors, our results indicate that a person's attitude and engagement towards work contribute to their level of detachment after work. During the related work analysis, we discussed how negative effects of job stressors are affected by primary and secondary appraisal processes of an individual. [25] The attitude of a person towards work influences their judgement on how severe the damage is that an identified job stressor can cause (primary appraisal). Depending on the outcome, they will decide on which action to take (e.g. whether they need to worry) during secondary appraisal. This suggests, that the work-related attitude and engagement of a person influence their primary and secondary appraisal processes. Another crucial finding from the user study is that students find it difficult to detach in stressful phases like the exam phase, but not otherwise. The exam phase is an external influence, i.e. an influence from the participants' environment. As our related work and qualitative data analyses demonstrate, unfinished work is a common trigger for lack of detachment. [17] During the exam phase, participants are constantly dealing with unfinished work that is shortly due since the exams are approaching. This may represent one of the reasons why the exam season is characterized by impaired detachment.

RQ2: *Which strategies have been found to be useful for detachment after work?*

The reason for the ease of detachment during the semester are partly some measures that participants have already taken in order to organise their work. Deriving from our results, an important measure for detachment is making a tasklist, which all participants have been doing before our study as well. Writing down their upcoming tasks during the user study gave many participants a sense of security about their upcoming workday. This goes along with the findings from previous work suggesting that detachment is promoted when breaking down larger goals

into manageable tasks. [17] By making a tasklist, knowledge workers write down concrete tasks that they are able to do the next day or week. Regularly keeping up a tasklist with smaller milestones makes larger, long-term goals manageable.

RQ3: *How does a tool incorporating findings from previous research influence knowledge workers' ability to detach at the end of the workday?*

We created a Shutdown Ritual containing a sequence of steps based on certain measures and strategies that have been found useful for detachment in previous work. According to the findings from our user study, making a tasklist is one of the most helpful steps for detachment in the Shutdown Ritual along with meditation. Steps that came short in this user study setting were checking the email and calendar, and writing down an evening intent. However, participants did mention that checking email and calendar would be useful for detachment in their workplace routines. Moreover, the evening intent did not fulfill its intended use since most participants did the Shutdown Ritual shortly before bed at the end of their day of studying. Thus, these steps should not be discarded immediately despite the initial results. Overall, the Shutdown Helper has been well received by participants. It served its purpose of facilitating a hassle-free execution of the Shutdown Ritual in a intuitive manner apart from minor issues. But that is not sufficient for most participants to adopt this initial version of the Shutdown Helper into their end-of-the-day routines. A reason is that the average detachment during the user study, despite the use of the Shutdown Helper, was on a medium to moderately low level due to the exam phase. Potential reasons and implications of this outcome are discussed below.

5.2   Work is not just work

For some people, the domains are more fragmented than just work and leisure. In the case of our participants, this means their job, studies and leisure time. For many of the participants the work-life boundary is not clear since their workday does not end after they come home from work. Oftentimes, they need to work on tasks related to their studies after work. As it was the case during our user study, the Shutdown Ritual then turns into a before bed ritual. This has emerged as a problem in some cases since the ritual has not been designed as a night time routine. If there is little time between the end of the work and bedtime, steps like the evening intent lose their significance. Furthermore, thinking about the upcoming tasks shortly before bed may lead to the opposite of the desired effect. In these situations, it can be helpful to divide the Shutdown Ritual such that all steps related to the tasklist are done earlier, even if the user then continues to work a little longer. This way, the user does not look at all their tasks right before bed. The rest of the steps can then be done before bed. The evening intent could be transformed into a general intent for the following day. It is yet to be proven whether this slight modification of the Shutdown Ritual improves detachment for people working until late. Still, it may be the better alternative for longer working days based on the overall feedback from the interviews.

5.3   Dealing with a diverse set of needs

As touched upon before, knowledge workers are a diverse group of professionals. Despite the common factors that make knowledge workers a distinct group, the characteristics of their work and end-of-the-day routines vary to some extent. Individual users also have different coping mechanisms and attitudes towards work and the related responsibilities. And although studies

and profession fall under the domain of work, the shutdown routines for them vary due to different workflows, prioritization and demands. For instance, some of our participants skipped checking their email and calendar when studying but thought these steps would be helpful before ending a day at work. The step of going offline on messaging devices was mostly completed by participants but in a workplace setting, this step would have a greater benefit since interruptions by colleagues may be more frequent. Our ritual has been developed with office workers in mind. Although the steps are simple and adaptable to a certain degree, the benefit for students regarding some steps is limited. Based on the response that participants will mostly continue the steps of the Shutdown Ritual that they have been doing before (apart from some exceptions), we can assume that users are not ready to change their end-of-the-day routines remarkably. This leads us to the belief that the Shutdown Helper should be adaptable to some extent (e.g. option to remove unneeded steps from the ritual) to be able to cater to such a diverse set of users and needs. Moreover, it is important to understand workflows of knowledge workers on a more profound level and further divide knowledge workers into smaller groups where a homogeneous approach is not applicable.

5.4   Do we need more than a tasklist?

With the result that most participants already used and will continue to use some kind of a tasklist comes the question whether it is sufficient to write down upcoming tasks for detachment after work. During the semester, participants mentioned to generally not have a problem to detach. Therefore, a suitable way of writing down tasks seems to be sufficient for detachment. However, stressful periods like the exam phase demand a more sophisticated approach since there is reportedly little to no detachment during such periods. Moreover, making a tasklist alone does not provide a way to mentally transition from the role of an employee or student to any role in an individual's personal life. Despite the Shutdown Ritual being moderately effective as a means for the role transition, our study revealed potential for this idea and areas for improvement. For example, some participants stated that they had difficulties to meditate after looking at their tasks. This implies that the transition may be too soon. A possible way to counteract this issue is elongating the transition phase. This can be done by adding more steps to the ritual or postponing part of the ritual, especially meditation and evening intent. Based on our results, the former is the poorer choice since participants were generally content with the length of the Shutdown Ritual and the steps it comprised. Postponing the meditation and evening intent is a viable alternative to examine further. However, there should ideally be not too much time between the first and second part of the Shutdown Ritual. Otherwise, participants may be ruminating about the tasks that they have written down in the mean time.

5.5   Comparison to an existing solution

As mentioned in section 2.6, there are a number of solutions that target detachment in some way. The most similar approach to the Shutdown Helper takes the previously mentioned Microsoft Viva Insights feature *Virtual Commute*. Therefore, a comparison of the two approaches is justified. The steps in the Virtual Commute include reviewing and marking current tasks as done, adding new tasks, a review of the upcoming tasks for the next day, an emotional check-in and meditation session (in the same order). As indicated, the steps are similar to the ones in the Shutdown Ritual. Writing down tasks and reviewing them comes first in both approaches. We have already discussed the value of these steps for winding up the workday. Another similarity is the meditation

session. It is the last step in the Virtual Commute and the second to last step in the Shutdown Ritual. Thus, both approaches agree that the user should first write down the tasks to wind up the work and then reset the mind before going off into the evening. One step that the Virtual Commute has and the Shutdown Ritual lacks is the emotional check-in. [47] A similar step was proposed by one of our participants who would have liked to reflect on the current workday and write down what they have achieved. Deriving from this, a retrospective view on the day seems to be a reasonable step to wind up the workday. As for other differences, the Shutdown Helper takes a more detailed take on creating a tasklist by not only writing down the unfinished tasks but also checking the calendar and email to make sure that nothing is being missed when planning the upcoming workday. We have seen that the latter steps did not perform well during the user study but, as mentioned, this could be different in a company setting where these steps are seen to be more valuable by participants. Furthermore, the steps of going offline and closing all tabs in the Shutdown Ritual may help to completely wind up the workday. The Shutdown Ritual also goes one step further at the end of the ritual by prompting the user to write down an evening intent. Similar to checking calendar and email, these steps did not find appropriate use in the user study setting but the associated benefit was recognised by participants and would be useful in a more common work setting where the day does not end right before bedtime. Overall, we can say that the approaches are based on the same idea of allowing the users to transition from work to leisure in an organic manner. One main difference is that the Virtual Commute is a more mature solution with features like reminders to start the ritual, whereas the Shutdown Helper is still in its early phase with more of a prototype nature. On the other hand, the steps in the Shutdown Helper are more nuanced and guide the user from ending their workday into thinking about their evening.

5.6   Limitations of the Shutdown Helper

Along with the potential of the Shutdown Helper for facilitating detachment from work, some limitations have been revealed during our study. For instance, working habits of knowledge workers play a major role in their ability to disconnect from work. As we have seen, procrastination of work was mentioned as one of the barriers to detachment. If users of the Shutdown Helper generally tend to wait until the eleventh hour before a deadline to do their work, performing the steps in the ritual may not be sufficient for detachment since the time pressure is already high. An external influence factor, that was mentioned both as a facilitator for and barrier to detachment is the workplace culture. While peer pressure prompted a participant to stay longer at the office than they would when working from home, the support from their team made it possible to distribute their work during more stressful phases. Thus, the working style and culture of a company or team can restrict its employees' ability to detach to a level where performing a shutdown routine may not be effective. Combating these restrictions would comprise company-oriented interventions which are out of scope for this study. Individual coping mechanisms for workload and stress are also a critical factor in regard to the effectiveness of using the Shutdown Helper. If the user's coping mechanism requires specific measures that are not included in the rather standardized Shutdown Ritual, the application will fail to fulfill its purpose. In this case, even low-level customization options like removing unneeded steps from the ritual may not be sufficient. We have seen this case with a participant who has the habit of switching between their three areas of interest for detachment. While this may be seen as a general inability to detach, this participant affirmed that it is their desired form of detachment. The use of the Shutdown Helper, on the other hand, was only partly effective for them. Doing a mindfulness meditation was something they had immense difficulties with since it made them rather restless than relaxed. This goes along with the finding from previous work that people vary in their required level of

detachment from work. [28] Since this participant is highly involved in their work, the level of exhaustion from work is lower than of other participants. Keeping these limitations in mind, we conclude that the Shutdown Helper should be seen as a supporting tool for detachment rather than the only measure to achieve detachment.

5.7 Future of the Shutdown Helper

The results from our study suggest mixed opinions about the current version of the Shutdown Helper, while the steps in the Shutdown Ritual have been largely approved by our study participants. Compared to alternative apps used by the participants, the Shutdown Helper provides more than additional features to an advanced tasklist. With the goal of promoting an active transition from work to life, the Shutdown Ritual has introduced new steps to the participants' end-of-the-day routines like meditation and writing down an evening resolution. Moreover, the steps are executed in a specific order that facilitates this transition. The long-term effectiveness of using the Shutdown Helper is yet to be proven but the initial results are promising. Most participants were fond of the idea of using future versions if the application caters to their individual needs. Since we have found these needs to be diverse for knowledge workers, there are several paths to be explored with the future versions of the Shutdown Helper. One way is to cater to a large variety of users. To achieve this, a sample of users from diverse professions within the knowledge sector needs to be examined regarding their habits and needs for an effective shutdown at the end of the day. The corresponding future version of the Shutdown Helper needs to have a set of customization options such as adding new steps or removing unneeded steps from the Shutdown Ritual in order to match the routines of a diverse user group. The alternative approach is to focus on a more homogeneous group of knowledge workers such as students or software developers. This way, the Shutdown Ritual can be more particular and in accordance with the user group's common needs and working styles. The corresponding version of the app may need less customization options but more specific steps that will bring an added value to the chosen set of users. From the results of this user study, we identified several ways to add value for the specific user group of students with part-time professions. The most fundamental way is to enable an easier execution of the ritual through clear instructions, visualization of the related action at each step (e.g. with icons) and automation of the steps. We achieved this to a great extent but there is still room for improvement, e.g. through automation of steps 5 and 6 (going offline and closing unneeded tabs). Other participants mentioned it was beneficial for them to write down their tasks and the evening intent in a dedicated application where they can review them. For participants using alternative tasklist apps, a switch is only plausible if the tasklist feature of the Shutdown Helper is on a similar level. Since the Shutdown Helper mainly contains basic features at the moment, important tasklist features such as prioritizing, separation of domains (e.g. studies and job) and time estimation for tasks are missing. For some participants, the sole benefit of an easier execution of the Shutdown Ritual may not be sufficient. Therefore, more advanced features like visualizations of the self-reported detachment level evolution, statistics on the completion of the ritual and tasks may be some features that provide additional value.

5.8   Threats to validity and limitations

Descriptive validity: The gathered interview data may not completely capture what the participants were intending to convey. To counteract this threat, we have used video and audio recordings of the interviews with the consent of the participants. The interviewees and interviewer were both in a undisturbed space during all interviews. The interviews were carefully translated to the English language during the transcription process to prevent any information loss.

Interpretation validity: The author of this thesis may be imposing their own meaning to the participants' statements from the interviews. To prevent this, we used a semi-structured interview approach with predominantly open-ended questions. This allowed participants to elaborate on their answers and additional questions were asked by the interviewer for clarification.

Researcher bias: The researchers may have induced some bias by promoting certain theories while neglecting others. We ensured to minimize any researcher bias during the presentation of the results by making sure all prominent statements, mentioned by several participants, are included. In addition to that, we included results that were less commonly mentioned but may still hold value for the understanding some of the prominent results.

Sample size: We have a study sample of 7 participants. This may suffice for the qualitative approach which we predominantly utilized in this work. However, the validity of the quantitative analysis from the data collected during the preliminary user study is limited. The quantitative data serves the sole purpose of emphasizing certain aspects of the qualitative data.

Sample diversity: Our study sample exclusively comprises full-time or part-time students with professions in the knowledge sector. Due to restricting company policies, we were not able to include full-time professionals in our study. Although the qualitative data has some relevance for professionals from the knowledge sector, the ability to generalize the findings to full-time employees in the knowledge sector may be limited.

Duration of study: The user study duration was two weeks. This period is sufficient to capture initial feedback about the Shutdown Helper and Shutdown Ritual. It does, however, not capture long-term effects of using the Shutdown Helper, such as the effects of habit formation.

Exam season: We have emphasized that the exam phase had a major effect on our participants' ability to detach during the preliminary user study. It is a particularly stressful phase for our participants of relatively short duration. Hence, results are likely to be different outside of exam phase. Nevertheless, since students reportedly have difficulties to detach during the exam preparation, the results of the user study capture the impact of our approach to a certain extent.

Chapter 6

Conclusion

This study aimed to create and examine a method to help knowledge workers detach from work. Based on the review of previous research and existing solutions, we developed Shutdown Helper, a desktop application that assists users in performing a Shutdown Ritual for detachment from work at the end of the day. From the examination of this approach through a preliminary user study, we gathered initial feedback on our solution from a relatively homogeneous group of knowledge workers: students with part-time professions in the knowledge sector. Based on the overall feedback, we understand that making a tasklist is the most crucial part for detachment from work for all participants. The other steps in the Shutdown Ritual were only moderately useful for the students during the exam phase, despite being assumed to be helpful in a workplace setting. Participants also mentioned that once the Shutdown Ritual became part of their routine, it became easier to detach from work after performing it. Overall, participants appreciated the Shutdown Helper application for its ease of use and shortcuts to web applications. However, most participants will not use this initial version of the app in the future considering they did not notice a significant difference in their ability to detach or because their current solutions (e.g. tasklist applications) are better suited to their individual needs. Participants are, however, open to the use of future versions of the application with a more advanced tasklist, popup reminders and availability on additional devices. Our research clearly demonstrates the potential of an end-of-the-day routine for detachment from work but it also raises questions regarding its implementation. For example, are the needs of knowledge workers in terms of detachment similar enough to warrant a single version of the Shutdown Ritual? As we have seen, some ritual steps were frequently skipped by participants. At the same time, these participants recognized the potential utility of these steps in their workplace routine. Despite the fact that we based the Shutdown Ritual steps on previous work in the area, our solution did not meet the needs of our study participants on certain ends. Thus, future research should consider investigating the common and divergent needs of various professions in the knowledge sector. The findings can then guide future versions of the Shutdown Ritual to take a more specialized or a standardized approach in promoting detachment for knowledge workers.

We contributed to existing research in organizational psychology by investigating individual detachment measures among knowledge workers on a small scale. Many of the measures and recovery experiences suggested by previous research have been found to be used in specific ways by our participants. With our assessment of the approach of a dedicated ritual and application for knowledge workers' detachment from work, we have shown the relevance of the same and created a foundation for future work to expand on. Furthermore, our research has not only disclosed some research gaps concerning the needs of knowledge workers for detachment from work but also concrete ways to improve this initial version of the Shutdown Helper in the future.

Appendix A

Consent form

Consent Form: Shutdown Helper – Helping knowledge workers detach at the end of the workday

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Purpose
Knowledge workers (e.g. software developers, office workers, students) often have difficulties to detach from work at the end of their day due to the nature of their work and the lack of a routine that signals the end of the workday. This study aims to implement a Shutdown Ritual in the form of a desktop application (Shutdown Helper) that helps knowledge workers to mentally disconnect from work at the end of each workday. The application is tested by 5-10 knowledge workers (mostly students) over a 2-week period to gain insights on the effectiveness of the Shutdown Ritual.

Study Procedure and Collected Data
The user study spans a period of 2-3 weeks and consists of the following steps:

A 2-week **user study** during which the participants are using the Shutdown Helper application at the beginning* and end of their studying or working day. The Shutdown Ritual will take **no longer than 10-15 minutes each day** to complete. During the study period, data will be collected with information about the steps of the ritual that were completed by the participant on each day and how well the participant was able to detach from work/studying at the end of each day.

An **interview** after the user study to gain more detailed insights from the participant to better evaluate the effectiveness of the Shutdown Ritual/Application. The interview will be audio recorded (if the participant agrees to it) and will take **no longer than 30 minutes**.

Optional additional remarks on the topic and how the participant felt during the study period/interview. The recording will be stopped before this session.

* See the detailed study procedure for more information.

Benefits
By participating in this study, each participant is contributing to an ongoing effort to improve the well-being of knowledge workers like themselves. In addition, the Shutdown Ritual/Application may help the participant to mentally detach from work when used on a regular basis (even after the 2-week

study period). In the long run, the participants may benefit from the results and insights from this study and following research based on this study.

Risks

The main risk faced by participants of this study is the loss of time required for participation. To mitigate this risk, the Shutdown Ritual is limited to a minimum number of eight simple steps. Participants are also allowed to skip steps that they have experienced to have no or little effect on their detachment level over the two weeks. Additionally, the number of interview questions is limited to a minimum to further limit the time spent on participating in this study.

Data Storage, Confidentiality & Retention

The interview audio recording will be transcribed by Ashly Kolenchery (unless you give consent below to use a professional transcription service). After the transcriptions, the audio recording will be deleted.

All data will be treated confidentially and only reside on machines of the university researchers. Your data will be used and seen only by researchers directly involved with this project. After the entire data collection, the interviews will be coded and analyzed by the research team. In any case, raw data may not be stored for longer than one year. All identifying information will be kept strictly separate at all times from any other collected data and will be stored in a different location. Furthermore, it will not be associated with the data after it has been analyzed. The anonymized, non-identifiable data produced from the study will be stored for five years, after which it will be permanently deleted. No identifiable responses will ever be shared with your team, managers, or company.

Uses of the Study Data

For our research, we will only use pseudonyms with your data and no identifying information will ever be shared outside of the research group and the confines of this study without your explicit permission. The results of this study will appear in a thesis written at the University of Zurich. Additionally, the study may be published in a research paper and may potentially appear in both internal and external academic research presentations and publications, such as academic journals and conference proceedings.

Contact for Information about the Study

If you have any remaining questions or a desire further information with respect to the study, please contact Ashly Kolenchery (contact above).

Consent for Extended Data Uses

With your explicit consent, you can allow the researchers to transcribe the audio recording of the interview using a professional transcription service:

- I allow the use of a professional transcription service to transcribe my interview.

With your explicit consent, you can allow further people access to the data for educational purposes or the application of further scientific methods. Please sign with your initials next to the usage options you agree with:

- I allow the use of my anonymized data for educational purposes within the scope of classes/lectures offered at the University of Zurich.

Consent for Study Participation

Your participation in this study is entirely voluntary. You are free to withdraw your participation at any point during the study, without giving any reason and without any negative consequence. Any information you contribute up to your withdrawal will be retained and used in this study unless you request otherwise.

With your signature on this form, you confirm the following statements:

- I understand the goal and procedures of the study and the applicable conditions.
- I had the opportunity to ask questions.
- I understood the answers and accept them.
- I am at least 18 years old.
- I had enough time to make the decision to participate and I agree to the participation.

In no way does this waive your legal rights or release the investigators or involved institutions from their legal or professional responsibilities.

Particpant's name: _____

Location, Date: _____

Participant's signature: _____

Appendix B

Application setup and user study guide

User Study Guide: Shutdown Helper – Helping knowledge workers detach at the end of the workday

Before the study...

As a first step, please read and sign the **consent form** (downloaded from the same Google Drive Link as this document). You can send the signed consent form to me at the end of the study along with the data files (see section "After the study...").

Application Setup

1. **Download the respective zip file** (for Windows or for MacOS) from the following Google Drive link:
    https://drive.google.com/drive/folders/1l2RDdLqwGNxkjVjBCT6upaA2ftgOIAUM?usp=sharing

==For Windows==

2. **Right click** on the downloaded zip file and choose **Extract All...** or **Alle entpacken... /Alle extrahieren...**
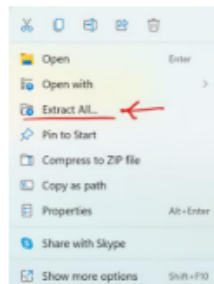
3. During extraction, if there is the **following warning**, you can **skip** the corresponding files:
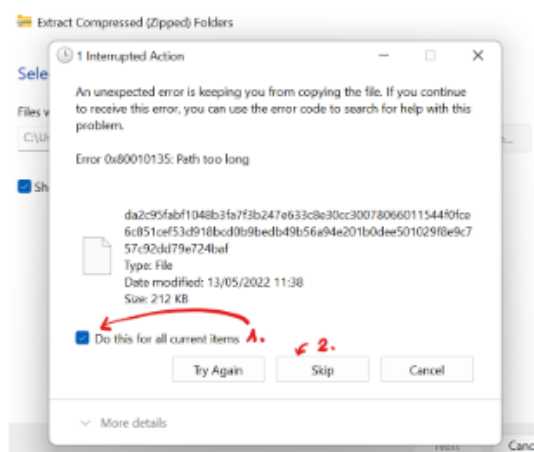
4. Open the extracted folder and navigate to *ShutdownHelper0.1.0* → *builds* → *shutdownhelper-win32-x64*

5. **Clicking on shutdownhelper.exe** should open the Shutdown Helper application that you can use for the study.
→ If there is a warning saying Microsoft prevented the app from running, you can click on "More info..." and then click on "Run anyway".

The warning appears because the app is not registered by a verified developer at Microsoft. This does not mean that the app will harm your computer. It is solely a precaution measure for Microsoft. The warning should not appear anymore, when you open the app the next time.

2. In "Finder", e**xtract the files by double clicking** on the downloaded zip file.

3. Open the extracted folder and navigate to *ShutdownHelper0.1.0* → *builds* → *shutdownhelper-darwin-x64*

4. To open the application:
→ Press down the **Ctrl-key and click on the *shutdownhelper.exe*** file in the current folder.
→ Choose "Open" or "Öffnen" in the options that appear:
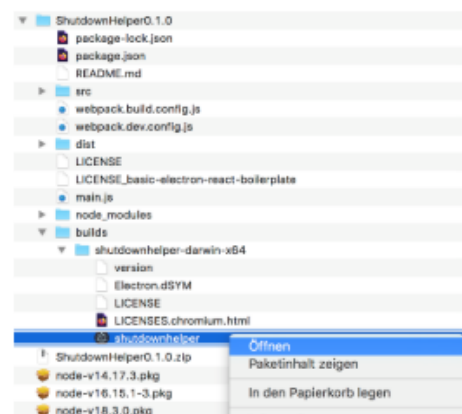
→ You can ignore the security warning that appears and continue to open the application. *The warning appears because the app is not registered by a verified developer at Apple. This does not mean that the app will harm your computer. It is solely a precaution measure for MacOS. The warning should not appear anymore, when you open the app the next time.*

→ If you still cannot open the app, go to Settings → Security & Privacy → General.
You will see the following message if you have tried to open the app before:
"shutdownhelper.app" was blocked from use because it is from an unidentified developer.
Choose the option "Open Anyway" next to it.
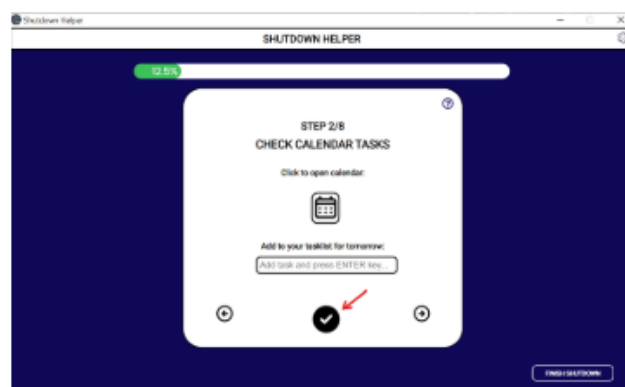
*IMPORTANT: Please **do not move the shutdownhelper.exe file** out of the folder it is in (on both Windows and MacOS). Otherwise, it might lead to the application not working anymore.*

During the study...

Every evening...

At each step:

- Follow the instructions for the step.
- Mark step as **done** (see red arrow below).

- At the end of the ritual, click on **Finish Shutdown**.

Every following morning...

- Open the application.
- Answer the **popup question** (will be used in the analysis done by the research team).
- **Review your tasklist** created on the previous day.
- *Optional: Review the evening intent (button on the bottom left of the home page).*

After the study...

1. Go to the data file on your computer where the app data for the Shutdown Helper application is stored (follow respective instructions below).

   On Windows
   Windows path to app data files:
   C:\Users\<youruser>\AppData\Roaming\shutdownhelper

   If you cannot find the folder "AppData" in your user folder, you need to display the "Hidden items" in your File Explorer window like so:
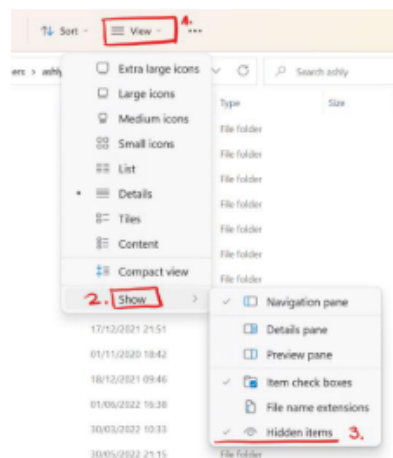
On MacOS

MacOS path to app data files:

C:/Users/*<youruser>*/Library/Application Support/shutdownhelper

To get to the above path, you can do the following:
➔ Right click on the "Finder" symbol
➔ Choose "Go to folder ..." or "Gehe zum Ordner ..."
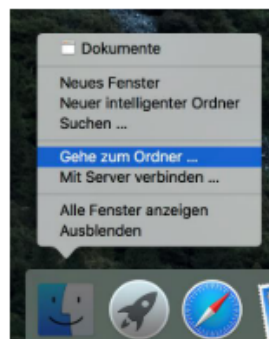
➔ Copy the above path with your username (on your computer) into the popup window that appears (see example below).
➔ Click "Open" or "Öffnen".
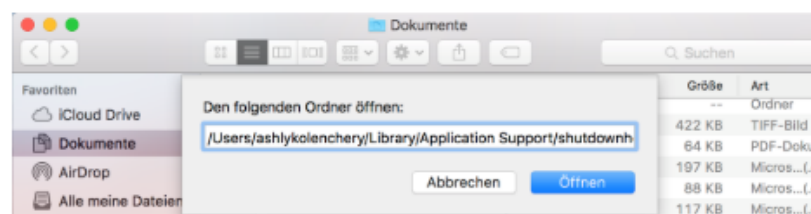
2. Please **send the following data files** from the Shutdown Helper data folder (that you opened in the previous step) **to my private email** (ashly.kolen@gmail.com).

   Data files to send me:
   - popupAnswers.json
   - stepsCompleted.json

   This data will be analysed as part of the study. It includes the answers to the popup question that you answered every morning and the information on which steps you marked as done on each day.

3. You will be contacted by me to find a time slot for the interview.

Thanks a lot for your time! I hope your participation in this study was useful to you too in some way. 🙂

Post-study interview questions

Shutdown Helper: User Study - Interview Questions

Warm up questions

1. What was your overall experience in the study?
2. What was your experience like using this tool?

General Questions – Situation before the study

3. Do you ever find yourself thinking about work after working hours? How often, is it worried/happy?
4. Are there any characteristics of your job that may hinder you leave work behind?
5. What measures do you take that help you detach from work?
6. When working from home, what additional challenges do/did you face regarding disconnecting from work?

Study/Ritual-specific Questions

7. How did you feel during the two weeks of the study?
8. In the two weeks of the study, did you notice any changes in how well you were able to detach from work at the end of the day? If so, what led to these changes?
9. Which steps from the Shutdown Ritual do you think were the most helpful for you?
10. Which steps did you find yourself skipping often and why?
11. Is there anything you would change about the order of the steps? (remind interviewee of the 8 steps, if necessary)
12. What step(s) would you add to the Shutdown Ritual?
13. Would you use (elements of) the ritual in the future for detaching from work?

Specifics of using the app

14. How did you like doing the Shutdown Ritual using a desktop application?
15. Which features of the Shutdown Helper application did you like/dislike and why?
16. Which additional features would have enhanced your experience using the application?
17. Would you use the Shutdown Helper application in the future?

Closing remarks

18. Is there anything you want to mention that we did not discuss yet?
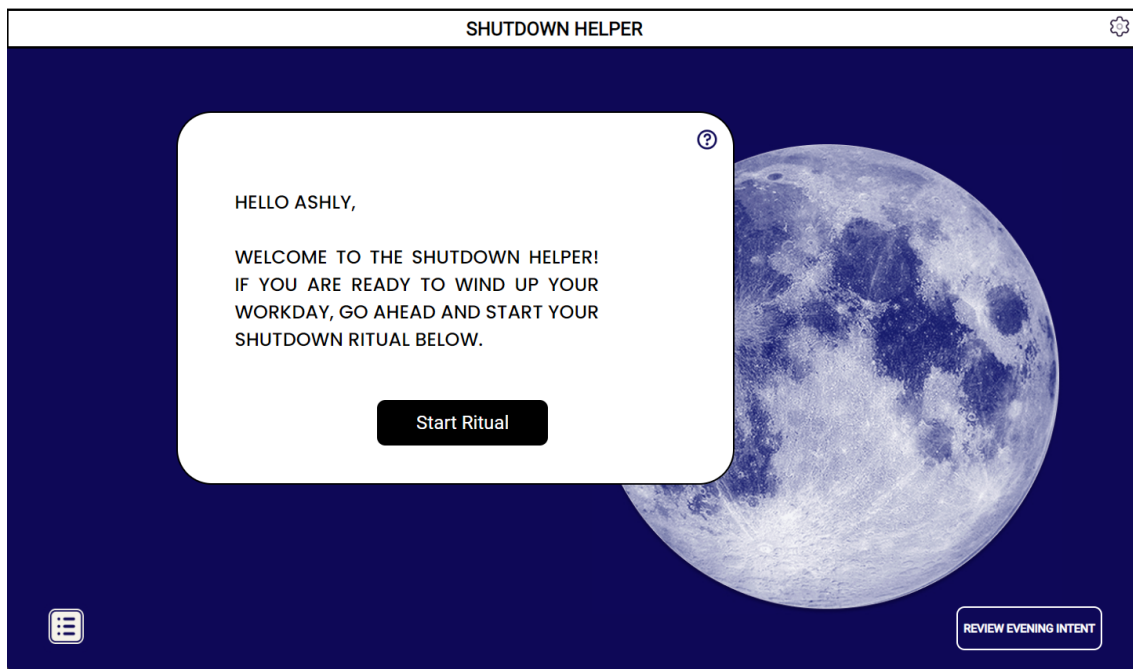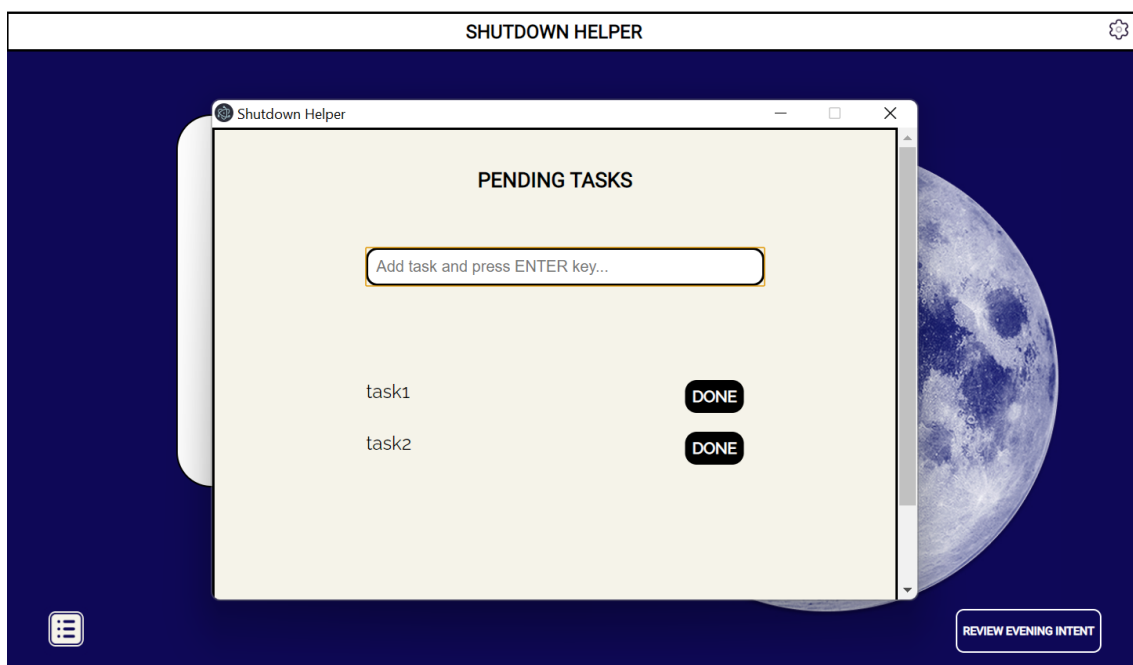
Shutdown Helper Application Images

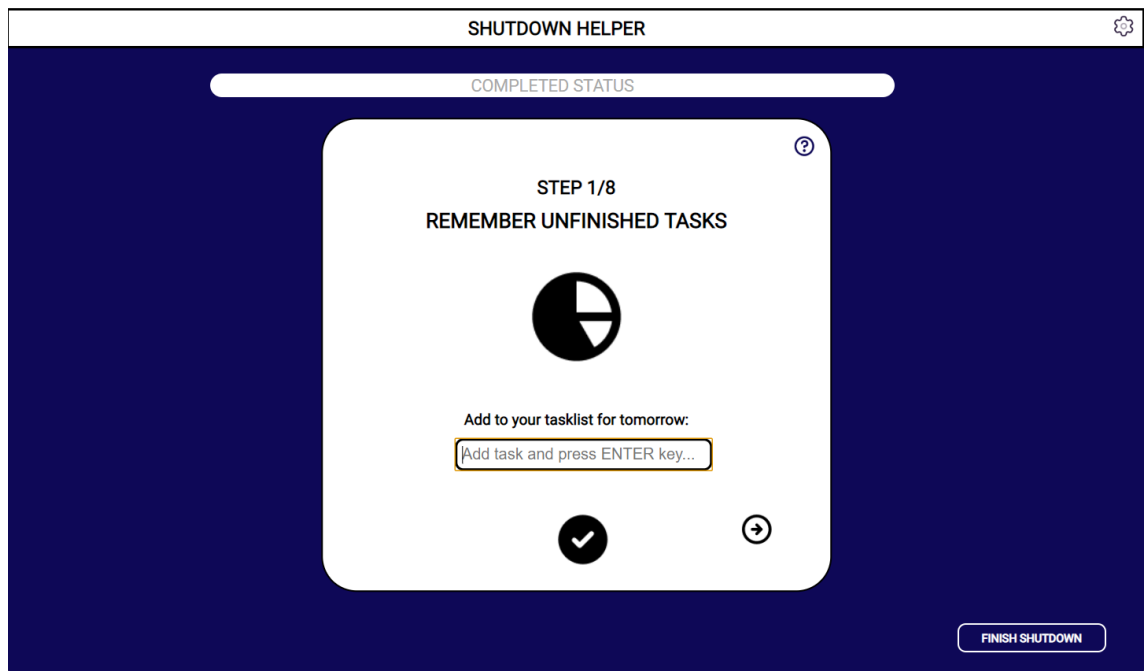Figure D.1: Homepage

Figure D.2: Tasklist window
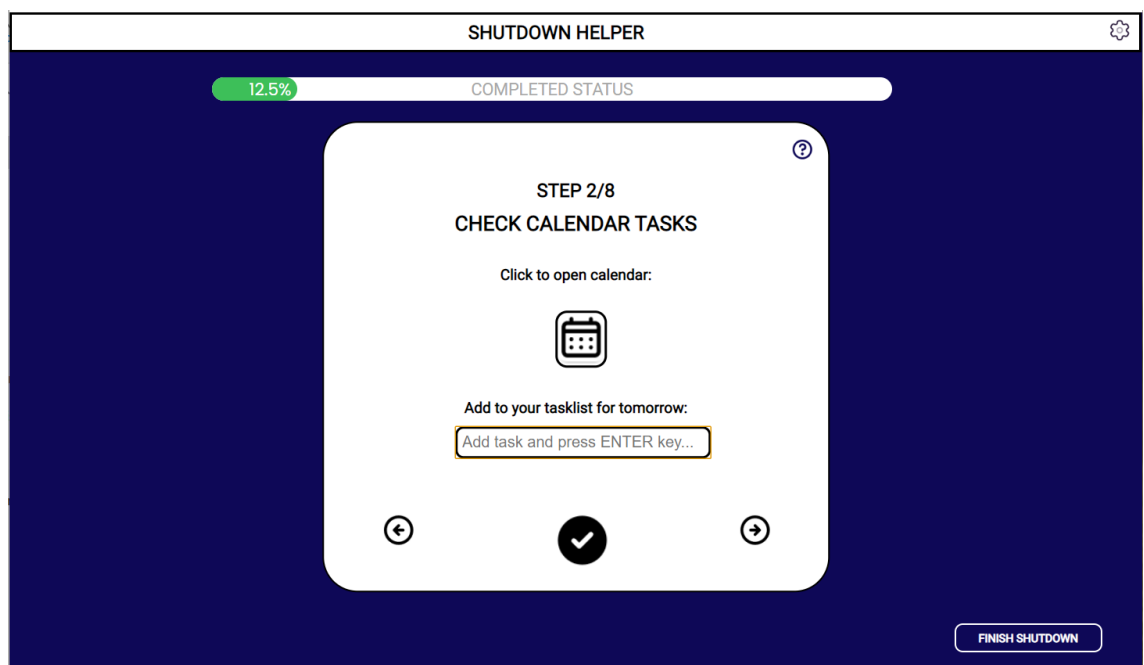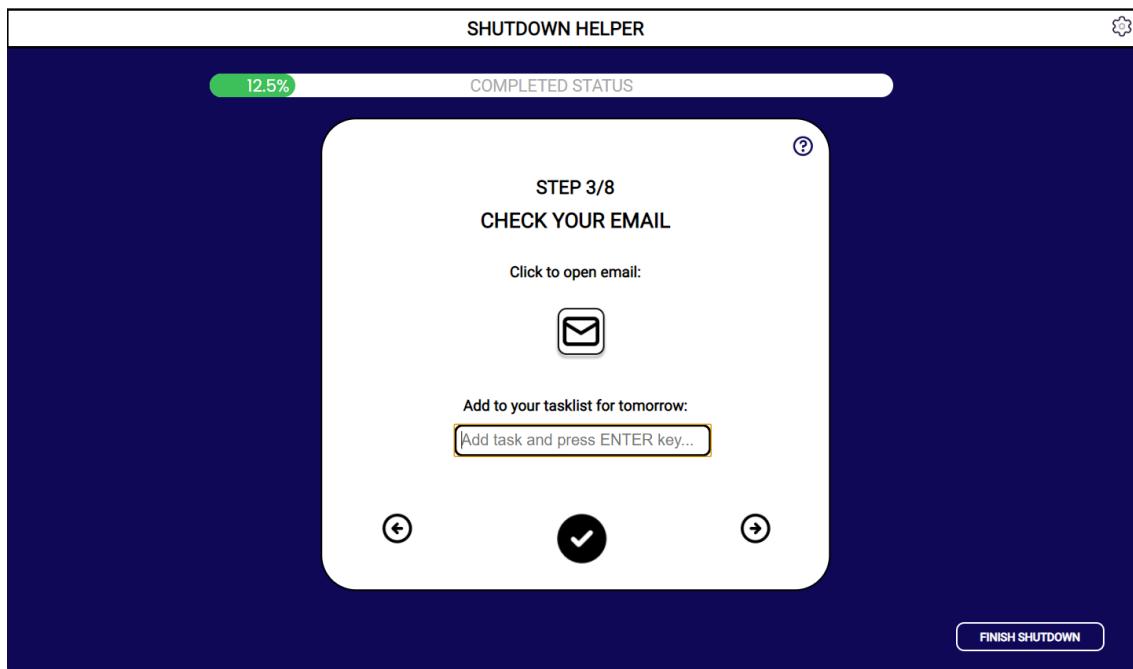
Figure D.3: Step 1
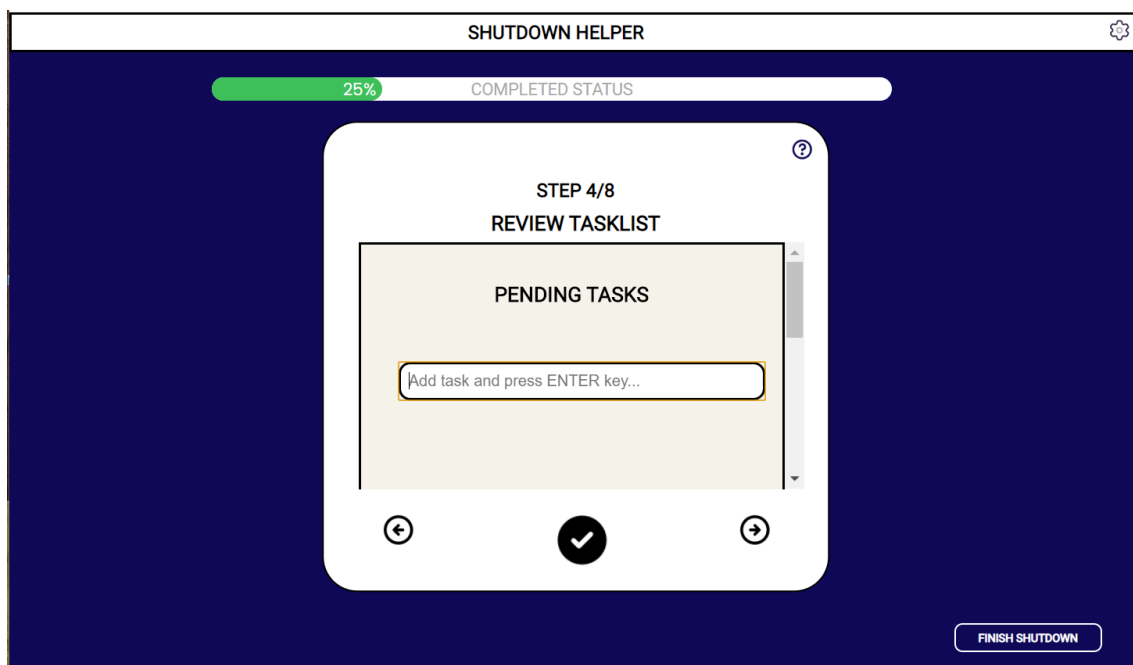

Figure D.4: Step 2

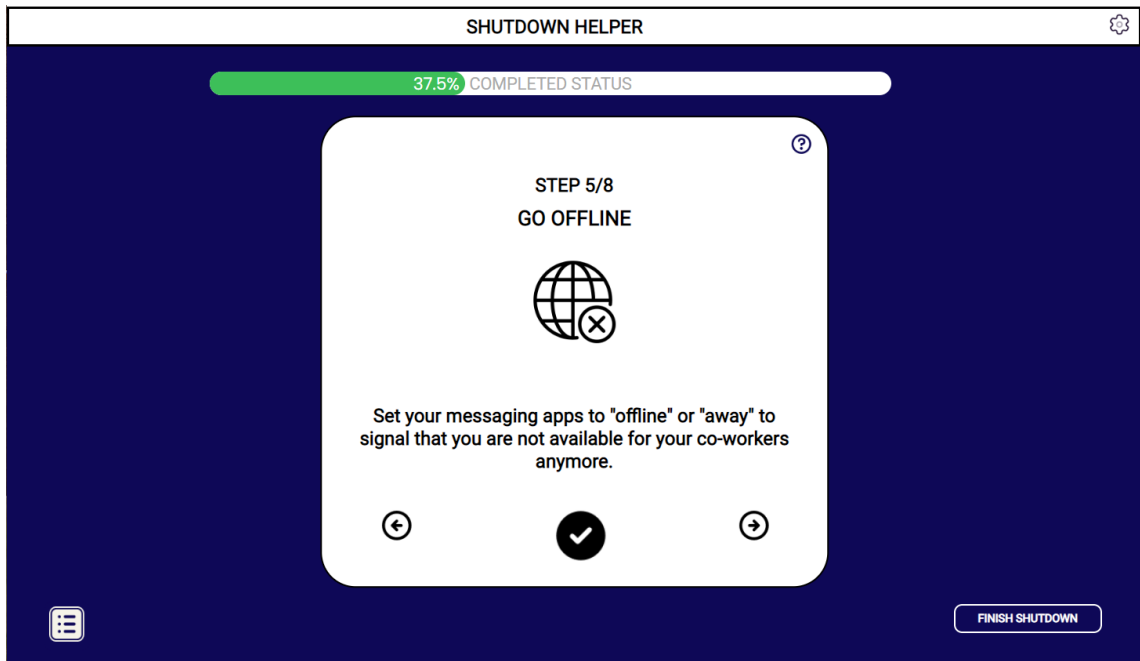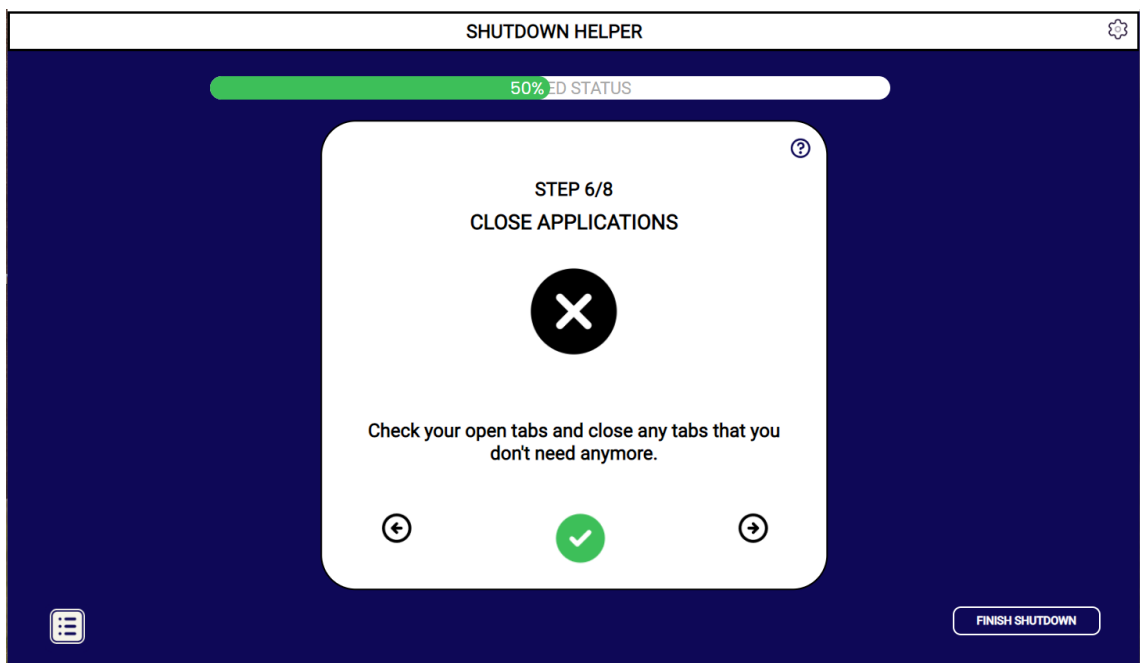Figure D.5: Step 3

Figure D.6: Step 4

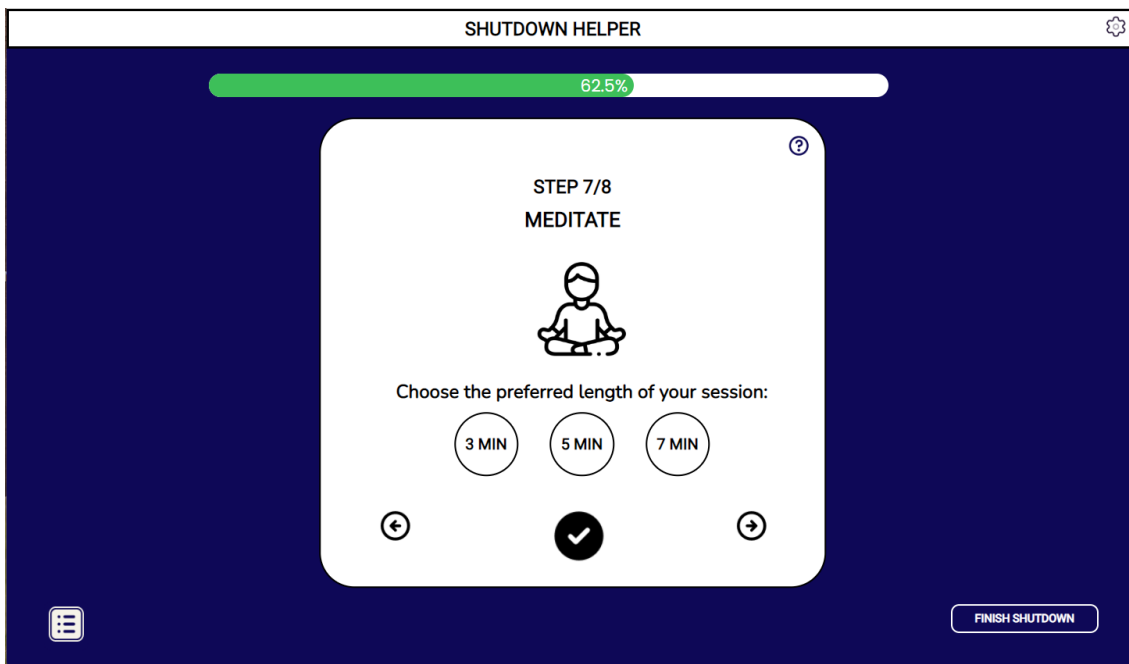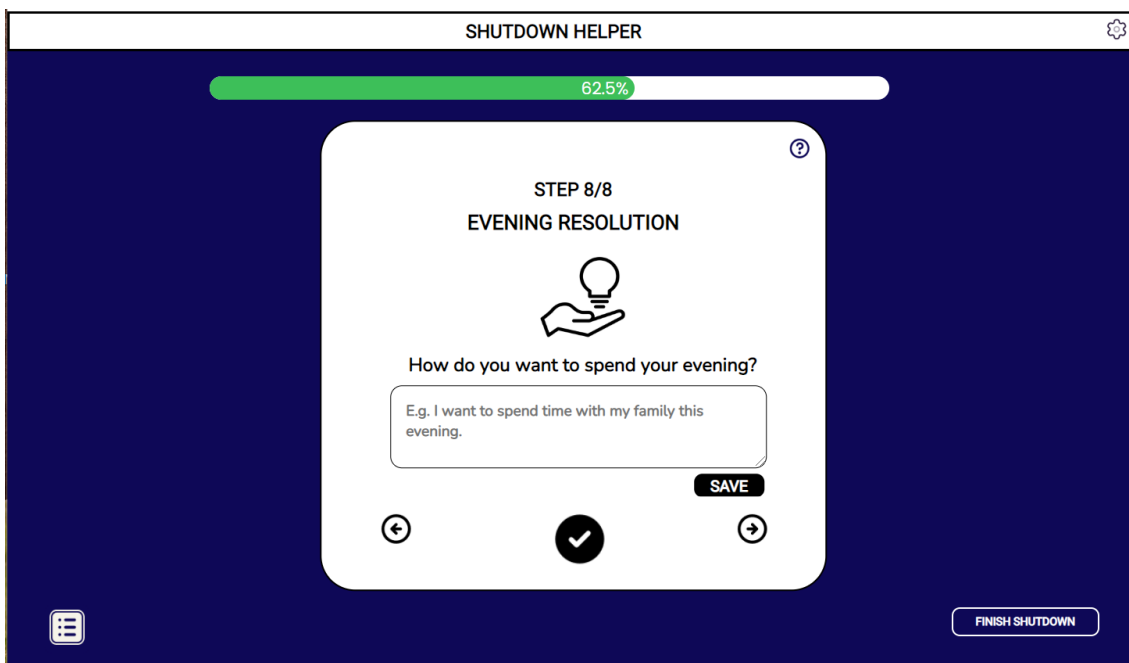Figure D.7: Step 5

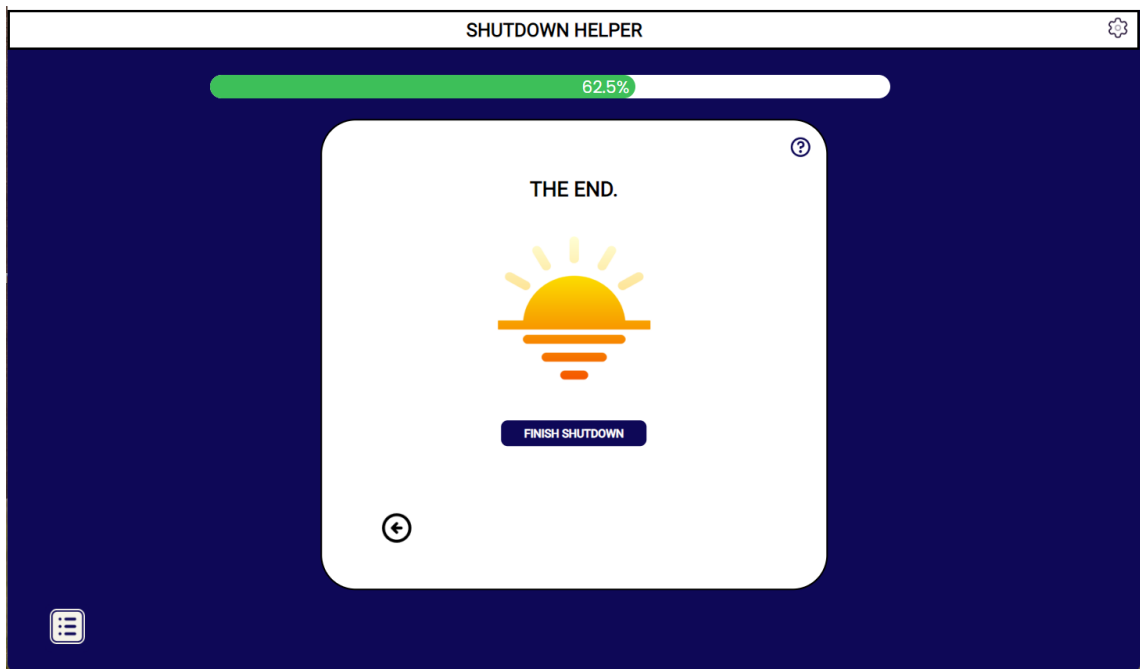Figure D.8: Step 6

Figure D.9: Step 7
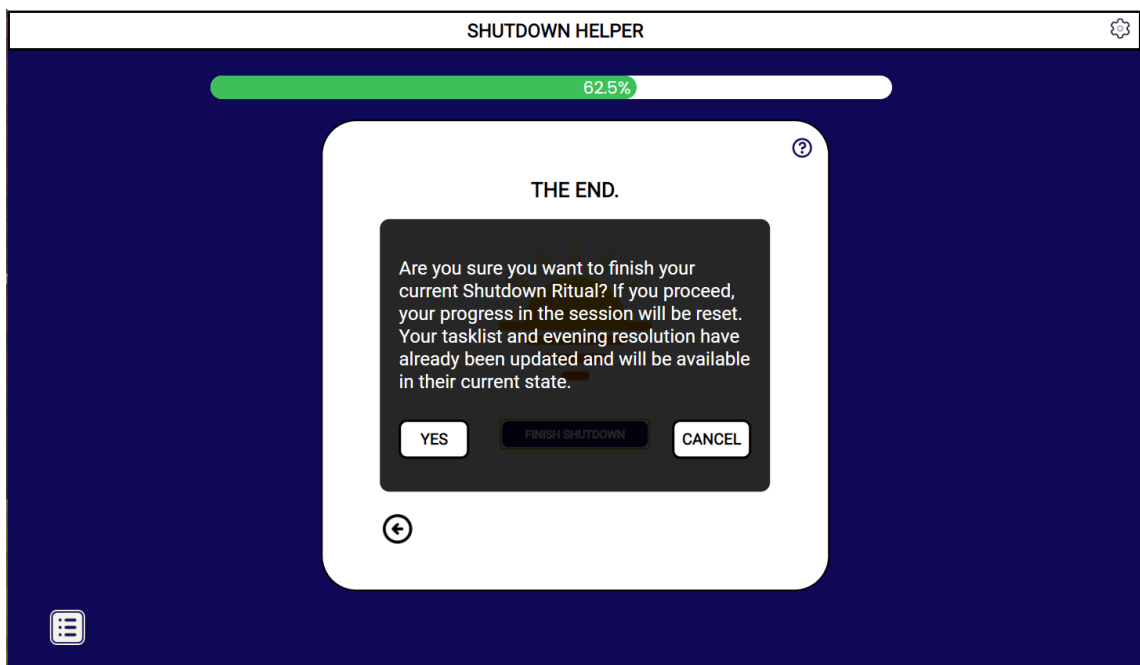

Figure D.10: Step 8

Figure D.11: Termination step

Figure D.12: After clicking on the button "Finish Shutdown".

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