DECO3800

Milestone 2

Interim Project Critique

Team 2: Tofu Metaverse
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1.0 Overview

University students often experience sleep deprivation due to the challenges of balancing academic responsibilities, leisure activities, employment, and social life. This issue is often magnified by poor habits that undermine sleep quality. These poor habits, such as late-night screen time, significantly worsen sleep deprivation, the consequences stemming from the lack of addressment having potentially profound, and wide-ranging negative effects on academic performance and personal well-being.

When discussing sleep in a general manner, two key concepts are considered: sleep quantity and sleep quality. Sleep quantity refers to the amount of sleep a person gets each night, typically measured in hours and is a straightforward metric. Sleep quality, on the other hand, is more qualitative and encompasses several factors, including sleep's physical and psychological effects, its depth, and how quickly one is able to enter it. There are countless variables of varying prevalence and specificity across all walks of life that have the potential to disrupt or influence the quality and quantity of one's sleep. Despite this, poor sleep hygiene seems to be a commonality and stand-out reason among the myriad which plague university students across the world.

Maintaining consistent sleep hygiene can be hard and is affected by a number of factors, including **excessive screen time** before bed; which disrupts the natural sleep cycle due to blue light exposure, **irregular sleep schedules**, often caused by academic demands or social activities; **caffeine and stimulant use** to stay awake for late-night study sessions; **stress and anxiety**, particularly from exams or deadlines; **unhealthy sleep environments** with too much light or noise, and **late-day napping**, which reduces sleep pressure at night.

Many students that struggle with sleep hygiene are either unaware, uncaring or do not have the drive or knowledge to fix the problems associated with lack of good sleep, this is particularly prevalent in freshman and sophomore students due to the relatively recent shift in the nature of their lives leaning towards more freedom and autonomy. As such we're striving to create a solution which aims to foster and facilitate good sleeping habits in these sorts of students in particular.

Therefore, we are targeting first- and second-year university students whose reduced sleep quality is caused by neglecting sleep hygiene, whether intentional or otherwise.

2.0 Academic Research

Feedback: Since the past milestone, we have greatly expanded and homed in on the nature of our academic research. The express purpose of this research was to provide the necessary foundations of knowledge such that we could have a solid basis to guide and justify the numerous decisions we would have to make throughout the design process.

There are numerous key relationships that we have identified are relevant to understand regarding our problem space, and as such, these relationships will be explored in the following sections.

It is also to be noted that the PSQI (Pittsburg Sleep Quality Index) is a commonly used questionnaire and standard used throughout the majority related studies to provide a quantitative measure of sleep quality based off a variety of factors, being: “subjective sleep” quality," "sleep latency," "sleep duration," "habitual sleep efficiency," "sleep disturbances," "sleeping medications," and "daytime dysfunction". A PSQI score can range from 0 to 21, with 0 indicating no sleeping difficulties, 3 indicating severe difficulty and greater than 5 indicating a pattern of significant sleep disturbance.

2.1 Sleep quality and university students

It is to be made explicitly clear that lack of sleep quality is not a problem solely relegated to 1st and 2nd year university students, there is a clear stigma and prevalence in general academic research pointing towards the fact that poor sleep quality has the potential to affect all types of students. The origin of the issue stems from the notion that university students have their own sets of relatively unique, yet common circumstances that increase their susceptibility.

In particular, a study done by Racheal K. Humpries, et al, on sleep hygiene and quality in university students had stated, from other referenced sources, that 50% to 80% of university students in countries like Australia, Portugal, England, and America apparently suffer from poor sleep quality. Where consistent findings across multiple studies show that there is a link between poor sleep and lowered academic performance and diminished life satisfaction. This is because students facing the impairments that arise, such as daytime dysfunction (characterized by difficulty staying awake and alert during the day), reduced cognition, and excessive sleepiness struggle to meet the academic and social demands of university life, further compounded by external responsibilities, such as part-time jobs or family obligations. (Ali et al., 2023, Humphries et al., 2021).

Key studies indicate that sleep quality issues such as sleep latency (the time it takes to fall asleep), sleep quantity, and sleep depth (often inferred by the frequency of dreams and periods of REM sleep) are some of the most significant sleep problems faced by university students (Qiu et al, 2019).

2.2 Sleep quality and first/second year university students

When looking at specific subsets of university students however, it can be seen that some groups, in turn, are even more susceptible than the rest. Several studies highlight that 1st and 2nd year students are more likely to suffer from poor sleep quality compared to upper-year students.

This is highlighted in a few sources, one of the more notable being a study conducted b Correa et al on 540 university students undergoing medical degrees. With conclusions being drawn that first and second year students had worse subjective sleep quality and greater daytime dysfunction compared to the year levels above(that is not to say the other year levels did not suffer from these negative effects, they certainly still did).

The underlying reasoning being that transition from high school to university, marked by an increase in personal freedom and a decrease in structured schedules, encourages the formation of poor sleep hygiene habits (discussed more in depth next section)**.** With these students often mismanaging their time, delaying sleep for academic, social or leisure activities and failing to prioritize adequate rest. As such, the fact that this vulnerability is prevalent most particularly in the early stages of a university student's career, makes intervention essential for this target group, helping students establish healthy habits that will serve them throughout their university careers (Correa et al, 2017, Ali et al., 2023).

2.3 Influencing factors of sleep quality

As stated before, studies indicate that university students' decline in sleep quality are typically related to the factors of sleep latency, quantity and depth, the cause of these issues in particular however, are found in a number of subsequent reasoning with the handling of sleep hygiene being a significant contributing factor.

Sleep hygiene refers to behaviors and habits that affect sleep, most notably screen time, caffeine and stimulant use, irregular sleep schedules, and environmental factors like light and noise, with a significant number of studies emphasizing poor sleep hygiene as a major contributor to poor sleep quality among students. Many of these habits, when exacerbated, also tend to destabilize the circadian rhythm which can lead to extended periods of poor sleep if not managed, some of the most common being:

Screen Time

Extensive use of phones or laptops in the hour before bed significantly delays sleep onset and reduces overall sleep quality, a habit that many students our generation have. In a 2011 Sleep in America Poll, Generation Y'ers (19-29 years old at the time) were found to be heavy users of technology before bed, with 67% using cell phones, 60% using computers, and 18% playing video games before sleep.

Blue light exposure and proximity plays a big part in the severity and impact, but overall technology usage is a key and repeatedly mentioned factor when discussing sleep hygiene. (Herschner. S et al, SciFlo Brazil, 2010).

Revenge bedtime procrastination

This is the behavior common in students where after spending their day on academic and personal responsibilities, they intentionally stay up late engaging in leisure activities (e.g. social media, video games) to reclaim lost personal time. (Kroese et al., 2014).

Irregular Schedules and Caffeine Use

First- and second-year students are especially vulnerable to **irregular sleep schedules**(typically defined by continual variances of 1-2 hours in wakeup and sleep times) due to fluctuating academic workloads and increased social freedom, with the use of **caffeine** and other stimulants to maintain focus for late-night study sessions further impairing sleep quality. (Herschner S. et al, Humphries et al., 2021).

Stress

High levels of academic stress—particularly from deadlines, exams and course load—can lead to increased sleep disturbances and anxiety, further exacerbating issues like sleep latency and overall sleep quality. (Correa et al, 2017).

Napping

Naps, when done right can actually negate, somewhat, the effects of a bad night of sleep, however, research shows that napping effectiveness is highly dependent on timing. Short, strategic naps (10–20 minutes) can counteract the negative effects of sleep deprivation and improve daytime alertness, but in contrast, longer naps (>30 minutes) or naps taken late in the day can result in sleep inertia (a period of grogginess after waking) and further disrupt nighttime sleep. This distinction is important as students with **chronic poor sleep quality** often use naps to compensate for insufficient nighttime sleep, leading to inflating the cycle of poor sleep habits (Lovato N et al, 2014).

2.4 How this may affect our design

Again the aim for this academic research is to provide justification and basis for our design choices, with our solution hopefully aiming to tackle some of these key factors prevalent in our target audience. Overall we hope to provide features that will serve to address, counter and progressively wane the negative impacts arising from the mishandling of the causes stated.

It is likely our end product will aim to reduce sleep latency, and increase quantity and depth through the adjustment and encouragement of good sleep hygiene habits and education.

3.0 Stakeholders

3.1 Primary stakeholders

First and second year university students

The primary demographic the design will be focused around. This group has shown in study to be particularly vulnerable to poor sleep quality due to having to adapt to and juggle their newly gained social and academic responsibilities, leading to the increased chances of developing poor sleep hygiene habits.

The solution we would create aims to put more focus on their sleep issues, improving academic performance, mental health and overall life satisfaction through encouraging better sleep hygiene and improving sleep quality.

Within this primary demographic it is important to consider the sub groups by the manner in which they could be affected by a solution relating to sleep. In particular this includes: the sub group who could see beneficial sleep improvement through habit change, this would be the targeted group. Another group would be those who suffer from insomnia, this is a notably different condition from poor sleep hygiene, and often requires a heavily involved solution. It is also important to not market an ill-fit solution to this group as this could potentially worsen their condition.

Upper year university students

Although first and second year students are the main focus, students of all years have shown struggles with poor sleep hygiene and attaining consistent/adequate sleep quality. While our solution may design leaning towards discipline and early organization elements helpful for freshmen, it would still be applicable to those with the same problems.

University admin and student health services

University faculties or administration may support such a solution should it lead to healthier, more productive students. If our proposed solution is able to noticeably improve student wellbeing or academic performance, it may be recommended or endorsed by academic institutions. Furthermore, if the solution proves effective, it could be extended to the workforce. Employers might then take interest, as it could enhance productivity, workplace culture, and employee well-being.

3.2 Secondary stakeholders

Parents and families

Families would be indirectly impacted as they would, ideally, be concerned about their children's well-being and academic performance. Families of first and second years students could have increased relevance in particular as these students may still have some instability regarding such aspects.

Parents and guardians may benefit from knowing their children are adopting healthier habits in attempts to maintain and improve their academic and mental health outcomes.

Medical professionals

With regard to medical professionals or sleep experts, ilt may be to the detriment if students utilizing the solution neglect medical treatment where necessary, lessening the demand for such services. Contrarily, if the proposed solution is successful, it may be recommended by professionals to students or others as a supplement to professional treatment which may be to the benefit of both stakeholder groups, where additionally, our solution could potentially be integrated into current treatment plans, enhancing the effectiveness of medical care.

The development team

The development of the solution's various components and functionalities, app, physical component, etc would require the involvement of developers who understand the needs of the target audience and understand the baseline requirements and implications associated with its release.

Developers' input is important in the formation of the app as they are the ones maintaining its' usability, accessibility and ethics.

Sleep researchers

Public health professionals or researchers looking into the field of sleep quality may be interested in the solution itself, using it to inform broader studies of sleep health.

The research data that they acquire could potentially contribute to the larger body of knowledge about sleep hygiene and its' impacts on academic performance and mental well-being in students, or other target audiences they attempt to use it on.

3.3 Persona Scenario

Persona 1: Max Chen

User Persona

Name: Max Chen
Age: **18**
Major: **Master of ID**
Location: Brisbane, QLD
University: UQ

Goals

- **Improve Sleep Quality and Quantity:**
  - Max wants to feel more rested and alert during the day and she aims to reduce the time it takes to fall asleep and sleep through the night without disturbances.
- **Achieve Academic Success:**
  - Strives to maintain high grades and absorb course material effectively.
- **Maintain an Active Social Life:**
  - Wants to participate in social activities without compromising her health.
  - Aims to balance leisure time with responsibilities.

Milestones to achieve goals:

- Establish a Consistent Sleep Schedule
- Reduce Screen Time Before Bed
- Create a Relaxing Pre-Sleep Routine
- Improve Sleep Environment

Pain points:

- Lack of Knowledge on Sleep Hygiene
- Daytime Fatigue and Reduced Concentration
- Irregular Sleep Patterns

Scenario

Max is an 18-year-old freshman. She shares a room with a roommate who has a different schedule than her. Excited by her newfound freedom, Emily is eager to excel academically while also embracing social opportunities and extracurricular activities. She often spends her evenings in bed browsing social media, streaming shows, and studying late at night on her smartphone and laptop. Her sleep schedule is highly irregular, varying by several hours each night due to late-night studying and socializing. As a result, she has trouble falling asleep, feels fatigued during the day, and has trouble concentrating in class.

Max Chen is a freshman at the University of Queensland who shares a room with a roommate on a different schedule. Emily is ecstatic about her newfound freedom and wants to excel academically along with partaking in social and extracurricular activities. However she often stays in bed at night checking social media. Watching web series and studying on her phone and computer. Her sleep schedule is very irregular due to nighttime reading and social activities. As a result, she has a hard time falling asleep quickly, affecting her ability to focus in class.

Persona 2: Rocky Lorry

User Persona

Name: Rocky Lorry
Age: **19**
Major: **Master of IT**
Location: Brisbane, QLD
University: UQ

Goals

- **Increase Sleep Duration and Quality:**
  - Aims to get at least 7-8 hours of uninterrupted sleep per night. Wants to wake up feeling refreshed and energized.
- **Effective Time Management:**
  - Wishes to balance his academic responsibilities, job, and hobbies without sacrificing sleep. Aims to allocate time efficiently to reduce stress.
- **Adopt a Healthier Lifestyle:**
  - Wants to reduce dependence on caffeine and energy drinks.
  - Interested in improving overall well-being and preventing burnout.

Milestones to achieve goals:

- Set a Regular Sleep Schedule
- Limit Late-Night Gaming
- Create a Sleep-Conducive Environment
- Monitor and Reduce Caffeine Intake

Pain points:

- Chronic Sleep Deprivation
- Normalization of Poor Sleep Habits
- Daytime Sleepiness and Cognitive Impairment

Scenario

Rocky, 19, is a sophomore majoring in IT. He lives with two roommates in a busy apartment complex off campus. He attends classes and works part-time at a tech store. Alex loves online games, and he often plays games with friends at night, sometimes until the early hours of the morning. His sleep schedule is very irregular, and he often drinks energy drinks during the day to stay awake. Lately, he has noticed that his academic performance has declined, he often feels tired, and he has frequent headaches.

Rocky Lorry, 19, is a sophomore. He lives in a one-bedroom apartment in a busy building off campus. He goes to class and his part-time job every day. He is addicted to online gaming and plays video games with his friends at night, sometimes until the early hours of the morning. He has an irregular sleep schedule and often drinks energy drinks to stay awake during the day. Recently, he has noticed that his grades have dropped and is often tired and has frequent headaches.

Key Problems within each User Persona

Max:

- Spends a lot of time watching movies before bed and her sleep schedule is very irregular with her bedtime varying by several hours every night.
- Suffers from anxiety related to academic performance and adjusting to university life.
- Is impaired during daytime activities by fatigue and inability to concentrate
- And She lacks knowledge on how to effectively improve her sleep hygiene.

Rocky:

- Rocky does not get enough sleep because he plays games late at night.
- He uses caffeine and energy drinks to help him take naps.
- Has trouble concentrating during lectures
- Lack of sleep has become a norm in college life.

The user needs derived from the scenario are:

Screen Time Manager:
Use features to reduce the use of electronic devices before bedtime such as notifications or app blockers.

Sleep Time Helper:
Use a scheduler or habit tracker to help Emily maintain a consistent sleep schedule.

Stress reduction:
include information and activities that help you manage anxiety.

Improve your environment suggestions:
Provide tips on how to create an environment that is conducive to good sleep. Even if your roommate is an influence. Features may be based on some reality interventions

Track caffeine intake:
Provide the ability to track and reduce caffeine consumption. Especially at night

4.0 User Research

To better understand the target audience, we began a user research phase focused on understanding the quality and quantity of sleep among college students. The goal was to identify key issues and possible solutions in this area. In particular, psychological factors, behaviors, and habits that affect sleep.

4.1 Interviews

In the first stage of our user research, six interviews were conducted with university students to obtain a foundational understanding of the issues and potential solutions pertaining to sleep quality and quantity.

A standardized interview protocol was developed to ensure that the responses remained consistently relevant across participants. The questions were designed to elicit detailed insights into participants' sleep schedules, associated habits, and the consequences of those habits. The primary aim of this protocol was to identify and examine surface-level patterns in sleep quality and quantity, specifically within the target demographic of university students.

The interviews adhered to a structured methodology, facilitating the collection of consistent and comparable data. The questions focused on exploring sleep schedules, behaviors, and their respective impacts on participants' overall sleep patterns. For a comprehensive list of the interview questions, please refer to 12.1 Interview Protocol in the appendix. And for the transcripts of the conducted interviews refer to 12.2 Interview Transcripts in the appendix.

A preliminary analysis was performed on the results of the interviews, several key factors associated with positive and negative sleeping patterns were identified. Students are not the only group affected by these factors; individuals in other occupations can also be influenced by them.

Some of the most important conclusions made however were that:

- Late-night thinking and anxiety. Many college students report having late-night thinking, which is often associated with anxiety and difficulty concentrating. It affects your ability to fall asleep on time.
- Use of technology like phones/computers/laptops could impede timely sleep, linked primarily to a lack of self-control and discipline (social media, YouTube, etc).
- Obligation was an important factor when considering a "sleep schedule" and in maintaining consistency. Obligation could be both beneficial and detrimental to timely sleep. Obligation primarily being associated with university class timetables as well as work/life responsibilities.
- Some individuals' sleeping habits could be more “circadian rhythm” based, only deciding to fall asleep when they feel tired. With circadian rhythm misalignment also being a prevalent factor in lack of sleep. A consistent circadian rhythm is intrinsically linked to a sleep schedule’s efficiency.

- Students may know that "not enough sleep is bad" but may not fully comprehend its negative consequences and importance especially relating to their cognitive ability. (Students staying up and ruining their schedules for finals)
- Having ambient noise at night could positively influence the speed of sleep, preventing negative thoughts from spiraling.
- Dedication and consistency. Commitments such as college course schedules and work responsibilities. It's a double commitment. This can help you maintain a consistent sleep schedule, but it can also be disruptive. This is especially true as deadlines approach.

According to the Interview results, the main issues affecting student sleep are related to responsibility, habits, behavior, and cognition, which are rooted in psychology. This suggests that any solution aimed at improving sleep quality must take these psychological aspects into account. The relationship between student psychology and sleep quality has been reinforced across the board by academic research. This consistency suggests that solutions involving cognitive or psychological interventions may be particularly effective.

While from the discussion and conclusions drawn, most of the more general ideas and issues related to the behavior of “keeping a sleep schedule” or “going to bed on time” seem to be primarily related to concepts such as responsibility, habits, behavior (discipline), and perceptions, which are all fairly firmly in the realm of psychology. Therefore, when combined with the academic data that has been found referencing the correlation between psychology/behavior and sleep quality in college students, it can be seen that concepts that influence perception or behavior may be particularly useful in terms of the domain/nature of solutions.

4.2 Interview Results Analysis

The interview results were thematically analyzed using an affinity diagram. This was done by reading through the interviews and extracting the idea/sentiment of presented information. These sentiments were then compiled into groups of similar ideas within a sticky note. These groups of ideas were then further grouped into groups of broader themes relating to sleep.

According to the data we collected from the interviews, we broke them down into six themes. And we listed factors which related them.

Sleep Habits and Patterns

1. **Consistent schedule:** Most participants try to maintain a consistent schedule. And all participants would like to have a schedule.

2. **Sleep duration:** our participants usually take 7-10 hours for their sleep. And they will have more sleep on holiday and after submitting assessments.

3. **Sleep conditions:** Pitch black with music, soft light with music and pitch black with music.(All participants pointed out that music means white noise.)

Factors impacting sleep

1. **Phone usage**: All participants admit to phone usage before bed. Also one participant notes that social media keeps him up, sometimes until 2 AM, which prevents him from maintaining his desired sleep schedule.

2. **Caffeine:** All participants wouldn't like to take caffeine in the evening

3. **Stress and overthinking:** University students usually feel stress when due day is coming.

Preference for improvement

1. **Ideal wake-up goals**: one of the participants dreams of an ideal sleep schedule where he's in bed by 10:30 PM and up at 6:30 AM, feeling refreshed. another 2 participants have earlier wake-up goals, and another participant prefers to sleep late and wake up late.

2. **Consistency**: participants strive for a consistent sleep schedule but find it difficult due to his social life and study habits.

Naps and Sleep Recovery

1. **Afternoon naps**: some participants frequently naps after work for 2 hours, and also there are participants who note that they rarely have naps. One of the reasons is that participants often feel the urge to nap in the afternoons.

2. **Sleep recovery:** struggling to recover after hectic periods of work or study. The sleeping schedule is erratic during finals, but recovers quickly after exams.

Control and Regulation of sleep

1. **Self-regulation tools**: comfortable environment(with a cool temperature and minimal light etc.), stretches before bed, avoids caffeine late in the day, tries to stick to a bedtime routine, and uses white noise and melatonin supplements when needed.

2. **Solutions for improvement:**
    a. cutting back on phone use
    b. limiting phone use would help
    c. self-awareness about phone usage
    d. establishing a more consistent bedtime

Sleep Challenges

1. **Difficulty falling asleep**: All participants have challenges falling asleep. A interviewee reports that on good nights, it takes about 20 minutes to fall asleep, but on bad nights, he can be up for an hour.

2. **Oversleeping**: 2 participants oversleep on non-workdays. Another participant said oversleeps when he's tired or after pulling late-night study sessions.

3. **Tiredness in the morning:** One of the participants often feels tired and sluggish when he wakes up, especially on weekdays, similar to another Participants' reluctance to get out of bed.

4.3 Interview Correlations

Common thoughts and ideas were then correlated to help look for links between the different themes.

The usage of phones and other technology before bed is the top reason which could directly cause a negative effect on sleeping.

***"If I'm not careful, I'll scroll through TikTok for hours and the next thing I know, it's 1 AM. But my favorite trick is listening to music before I sleep."* – interview 2**

***"I use my phone a lot before bed. Sometimes I lose track of time scrolling through social media or watching videos, which is why I end up staying up so late."* – interview 5**

In interview 2 and 5, the participants indicated that they couldn't realize and control how long he used the phone before sleeping. There is a dramatic problem we identified is that most apps or games won't notify you what time it is and how long you have spent on the app or game so far (since the user opens it). The discussion result from our team is that an app solution is not recommended. The biggest problem with sleeping late is using technology. Therefore, apps as subproducts of technology are logically not able to against usage of technologies.

"It's tough to maintain a schedule with work and uni.

***I try, but sometimes I'm up until 2 AM playing video games."* – interview 3**

Objectively, technologies are not meant to be against discipline and avoid reality. However, a participant pointed out that "It's tough to maintain a schedule with work and uni". We can understand it will cause stress which could influence sleeping quality, but sometimes participants choose to use technology for alleviating stress before sleep. Unfortunately, the effect is not ideal. Gaming could relax people, but also let users forget time then they sleep late.

Napping is a solution for some people to deal with poor sleep quality. However, according to our interview results, napping could cause sleeping issues in the evening.

"I always hit a wall around 3 PM and feel like taking a nap.

***But if I do, then I can't sleep at night."* – interview 3**

***"I just have to push through. I can't afford to take naps because that makes me feel worse in the evening."* – interview 1**

Some participants state that they don't like napping, most of them would take a nap if tomorrow is a holiday, otherwise it will affect the next morning's energy because they couldn't fall asleep easily the previous night.

4.4 Autoethnography - Sleep Diary

For the second stage of our user research our team conducted an autoethnography in the form of a sleep diary, where our members were tasked with completing five entries documenting their night time activities, describing their sleep and how they felt the next morning, the full protocol can be found in appendix 12.3 Sleep Diary Protocol and the full diary of each team member can be found in appendix 12.4.

The autoethnography was conducted in order for us as designers to connect with our target audience and future user base. It is important to us that we practice user-focused design, and experiencing and identifying in our own lives the issues we are trying to address will provide us primary insight. It may be easy to identify solutions to common issues through academic research, such as the minimizing of blue light consumption within an hour before bedtime as was discussed in section 2.3. However, in practice it may be difficult for students to implement these solutions. With this study we aim to identify potential bottlenecks to improving sleep that may not be measurable or revealed in academic research. There may be extra considerations that we can identify from this experience to guide us through our design process.

4.5 Autoethnography Results Analysis

One of the most obvious patterns is that all participants had significant screen usage before bed. This may have affected their sleep quality again due to the research outlined in section 2.3, and as participants stated “woke up unnaturally to their alarm clock” or “woke up feeling groggy/dizzy.” It is apparent that most of the group would be working on university assessments or coursework leading into their bedtime, often for over an hour. Additionally, participants would use their devices to unwind or do something unrelated to their academics before bed in order to wind down. For instance, person 1 and 6 would play a game or watch videos, person 3 would read on their device or also watch videos, person 3 would watch an episode or two from a streaming service. Many of these routines involving screen time were habitual and would span over multiple entries.

Many participants in their entries stated that they received less than the recommended amount of sleep, which the PSQI (Buysse et al., 1989) states is greater than 7 hours per night. Participants averaged 5-7 hours per night, and despite this, showed little urgency or effort to improve this figure. Person 3 wrote that they “hate the alarm clock in the early morning,” after stating that they did not have enough sleep. Person 1 and 4 often had 6 hours of sleep or less, with person 4 even recording an entry with 4 hours of sleep. Due to obligations such as assignments and work, participants had trouble prioritizing their sleep, often simply tolerating the tiredness or had grown accustomed to it. As one participant wrote, “I think the lack of sleep might have passively affected me at work, but I generally don't feel tired when working, only when I get home does it actually hit.” In one entry after only 5 hours of sleep, person 1 wrote, “I feel mostly rested.” From this experience we as designers have personally struggled with prioritizing our sleep over obligations, and as a result we tolerate lack of sleep or poor sleep quality. This has provided insight into the difficulty our target audience faces.

The sleep diary was an important tool in understanding and experiencing the connection between daily obligations and stress with sleep patterns, providing insights that are hard to capture with other research methods such as surveys or interviews. As Person 1 pointed out, "Sometimes I stay up even when I'm tired because I'm worried about unfinished work." This reflects how students' sleep habits are shaped by stressors in their immediate environment, such as academic pressures, which are often neglected in broader research.

In addition to this, Person 3 highlighted how upcoming deadlines and obligations can interfere with sleep, stating, "Because there is a due on 12 Sep, still have a lot to do, stressful, can't have a good sleep." By documenting such moments, the diary provides a real-time narrative that connects the weight of obligations with poor sleep quality. This realization is especially valuable for our design project, as it provides us with direction to potentially target underlying causes of sleep disruption, such as stress. By integrating features that acknowledge these stressors, like academic deadlines or emotional strain, we could help users manage their responsibilities while promoting healthier sleep patterns.

4.6 Survey

For the third stage of our user research, our team conducted a survey to find the specific problems university students had in maintaining good sleep and methods they use to mitigate the effects of poor sleep quality. We asked our participants to answer 12 questions and complete a PSQI test. The full list of survey questions can be found in appendix 12.5 Survey Questions.

We sent out our survey through solicitations and a forum post and received 21 responses. We found that our participants have an average PSQI score of 7 out of 21 which might indicate poor sleep quality among University students. We also found that 17 participants (80%) reported that the main barrier they had to improving sleep quality is related to responsibility demands and time management. Other factors that impede the majority of our participants from getting good sleep includes stress or anxiety, irregular sleep schedule, and use of technology before bed. On the use of technology, 12 participants (57%) reported spending 45-60 minutes on a device with 11 of them reporting the purpose of the screen time being related to leisure.

Despite the fact that not all of those interviewed were of the specific target audience of first and second years (since we sent the surveys out after changing to our most recent audience), it is to be noted in research, the habits of first and second years are not indistinct from upper years (they are more at risk, and have more severe cases) so these results can be extrapolated to an extent. Overall, the firsthands results we’ve gained lined up with what we know and will help reinforce our decisions further.

4.7 Survey Results Analysis

57.4% participants indicate that they can't have 8 hours sleep

University students often face a heavy academic workload with assignments, exams, and projects that require them to stay up late to complete. Many students have difficulty balancing their academic responsibilities with their personal lives, causing them to sacrifice sleep time. Imbalances in time management force students to prioritize studying and neglect rest.

Students often have varying schedules for classes, extracurricular activities, and social activities, making it difficult for them to maintain a consistent schedule. This inconsistency often results in students not allocating enough time for sleep.

As mentioned, many students spend a lot of time on their devices before bedtime, usually for leisure purposes. This behavior not only reduces the time available for sleep, but also affects sleep quality due to the stimulating effects of screens, delaying sleep onset, and disrupting the body clock.

Napping is not a solution for recovery to everybody

Different people have different physiological and psychological states. Some people may feel refreshed after a nap, while others may feel more tired or sleepy. This difference may be related to personal sleep needs, physical health conditions, and lifestyle habits.

The effectiveness of naps often depends on timing and duration. Short naps (such as 10-20 minutes) may help restore energy, but longer naps (such as more than 30 minutes) may cause sleep inertia, making people feel more sleepy when they wake up. In addition, if the time of nap is close to bedtime at night, it may affect the quality of sleep at night.

Naps may not be suitable for people who suffer from insomnia due to anxiety, stress or other psychological factors. For these people, naps may increase their anxiety and even make them more worried about sleep at night, forming a vicious cycle.

57.1% participants state that they spend more than 45 mins on their phone in last hour before going to bed

Many students continue to use their phones, tablets, or other electronic devices after going to bed, causing them to spend a lot of time in non-sleep activities within the first hour after going to bed. This behavior may be related to entertainment activities such as social media, video watching, or gaming, which delays the onset of sleep.

Spending too much time in bed without effectively preparing for sleep may cause individuals to fail to fully relax. Ideal pre-bedtime activities should include reducing screen time and engaging in relaxing mind-body activities such as reading or meditation, rather than increasing stimulation and stress. Many students may use screens during the evening to complete homework, study, or socialize, causing them to appear rushed and disorganized when preparing for sleep. This poor time management may reflect their challenges in using time effectively.

5.0 Market Research of Existing Solutions

There are existing digital solutions that address common sleep-related problems. Market research was done to investigate what technological solutions exist to aid users sleep. This was done with a primary focus on solutions that are implemented through a mobile application. The solutions were found through ranking websites that compile lists of various solutions to problems. This was then supplemented by keyword searches on the google play store. The market research mainly comprises the more popular applications from these two discovery methods but also includes less popular solutions where the implemented ideas are deemed unique and novel. The full list of solutions along with the relevant links used to evaluate them can be found in appendix 12.6.

While this method is not scientific or rigorous the focus of the market research was the ideas and tools presented by the app as opposed to the specific implementation details within the app and therefore this more open and broad research allowed for a wider range of design ideas to be collected.

This section will begin with a broad overview of selected solutions consisting of the app's purpose, its implemented tools along with a rough gauge of these tools based on user reviews (This will ignore reviews based on app usability & pricing). (A small note in hindsight is that pricing should not have been ignored when doing this research)

5.1 Solutions with Detailed breakdowns

Solution 1: Apple Watch

The Apple Watch (Apple) is a smart watch with the capability to capture sleep data and implement a sleep schedule for its users. With a simple, small interface the device captures and displays data describing sleep duration, sleep stages, heart rate, motion during sleep and more. This technology could be useful for students who rely on knowledge of their body’s processes in order to better understand their sleep cycles. Apple IOS supports a ‘sleep sleep focus,’ which implements settings to reduce notifications and distractions before a user’s specified bedtime in order to reduce screen time before bed. This vaguely addresses the common issue discovered in both our academic and user research.

For Apple’s features to be utilized users would need to invest in an Apple watch, which for university students, may not be financially feasible. Additionally, the sleep focus feature does not address the common issue of ‘late night thoughts,’ and students can easily ignore the suggestions of the application.

Solution 2: Sleep Ninja

‘Sleep Ninja’ (Black Dog Institute, 2024) is a free mobile application developed by the Black Dog Institute which aims to help young people aged 12-16 years old address mild to moderate sleep difficulties. The application is recommended to be used for approximately six weeks where users work through six learning modules, input data relating to their sleep, and have access to personal guided routines. The application may be effective in addressing some of the problems in our user base such as lack of knowledge about sleep and tracking consistency. Additionally, the application has optional features such as relaxing audio and reminders to wind down before bedtime, which may be effective in addressing late night thoughts, and screen time before bed.

Because the application is aimed at a younger audience it may not be engaging or suitable for university students. It does not address the common scattered schedules of university students, or how challenging STEM coursework can affect a student’s ability to wind down. However, the application is a valuable example of how a free mobile application can be used to address sleep issues.

Solution 3: Calm

Calm (Calm, 2024) is advertised as a mental health app helping to manage stress and improve sleep.

Tools:
The primary tools are different audio files to help users relax, these include: “Sleep Stories”, Soundscapes, guided meditations, Music, ASMR and more. With the consensus being that different forms of audio help people to relax and unwind.

Solution 4: MUSE

Muse (Muse, 2024) is advertised as a meditation assistance tool and can either be used during the day or when falling asleep. The solution makes use of a head band for various forms of tracking.

Tools:
The app makes use of EEG tracking data to create adaptive soundscapes that change based on EEG tracking data with the consensus being this feedback makes mediation a more enjoyable experience that users are more likely to return to. However, the extra data that is tracked is not utilized very meaningfully and merely exists.

Solution 5: Sleepon

Sleepon (SLEEPON, 2024) is advertised as a sleep tracking tool. It makes use of a wearable ring to track data that is then compiled in an associated app.

Tools:
Lots of tracking capabilities. The app itself primarily only provides the data to the user and it is on the user to obtain meaningful insights with the census being that this tracking capability is useful for monitoring the effect of other solutions. So, while the ring itself isn't a solution to sleep problems it can help guide the treatment to problems and in some cases the data has been passed on to medical professionals to help track and guide intervention treatments.

Solution 6: Sleep as Android: Smart alarm

This app is used for compiling tracked data from 3rd party wearables. But really does a bit over everything when it comes to sleep tracking.

Tools:
Anti Snoring technology, Sleep tracking of different parameters, Sleep Goals + (A deposit that is refundable once the goal has been met), Sleep noise analysis, Smart Alarm clock to wake you at an ideal time (during a light sleeping phase), support for napping and polyphasic sleep alarms, + more. Generally the app is liked for sleep tracking and some people make use of the plethora of additional features.

Solution 7: RISE

Rise is a habit and sleep tracking app. With a focus on circadian rhythm, energy levels and sleep dept.

Tools:
Daytime habit tracking, Manual or integrated sleep tracking, Calendar integration, Sleep education, Soundscapes and Energy Schedules. Between the daytime habit tracking, sleep tracking, calendar integration and energy schedules the app helps people manage their sleep and improve their overall sleep hygiene.

Solution 8: Stellar Sleep

Stellar Sleep (Twenty Nights, 2024) is an app implementation of CBT-I (Cognitive Behaviour Therapy for Insomniacs) which is a therapy that focuses on cognitive restructuring and changing the way people think about sleep. The app offers an 8 week program to help insomniacs.

Tools:
The program includes Scheduled Sleep protocol, Sleep education by providing a collection of research-backed information and tips to support better sleep. A human accountability coach, relaxation library and a sleep tracker either manual or through fitness trackers. The implemented approach makes use of sleep restriction. Overall, the implemented approach works for some to help overcome their insomnia with many success stories but as with most therapies' success is not guaranteed and there are many unsuccessful stories.

A small note – out of the 3 CBT-I apps looked at, this one generally seemed to be the highest regarded in regard to user reviews which is why it has been included but at a surface level they seem similar.

Solution 9: Bía

Bia (Bía Neurotechnology, 2024) is an unreleased solution with all listed details in regards to advertised capabilities. Despite being in development the solution introduces many novel ideas that are worth including.

Bia is proposed as a face mask and associated app that make use of daytime habit tracking, sleep tracking, and various electronics installed in the face mask to help users to improve sleep, with a focus on helping users control their circadian rhythm.

Tools:
Daytime: Manual Daytime habit tracking along wit subjective score metrics
Falling Asleep: Soundscapes based on fNIRS (I believe this is similar to how MUSE implements adaptive sound scapes), the mask itself is advertised as being blackout.
During Sleep: Sleep tracking through sensors installed in the mask.
Wake up: Gradual wake up, Sunrise Wakeup (using lights installed inside the mask)
Additionally: The app claims to provide correlation between daytime habits and tracked sleep data

Solution 10: StayOff: Screen Time Control

This app tracks phone & app use in real time and allows users to block apps from being used

Tools:
App usage tracking and app blocking by either time limit or between certain times and for the most part only serves as a useful reminder requiring the user to still exercise self-control as it is quite easy to bypass the blocking mechanism.

5.2 Minor Notes on Additional Solutions

Along with the solutions looked more deeper into there were many solutions that shared many commonalities with covered solutions but had 1 or 2 unique ideas that are worth including. So the next section will be a quick overview of these solutions in less detail:

Solution 11: Sleep Tracker - Sleep Recorder
This app appears similar to RISE but also includes nighttime audio recording allowing users to discern these noises, - this can be useful for sleep apnea. The app also includes a smart alarm to gradually wake users up.

Solution 12: Headspace – Sleep & Meditate
Headspace is similar to calm but also includes education on general mindfulness along with the education behind the ideas of mediation.

Solution 13: Beltone Tinnitus Calmer
Similar to calm but allows for customisable soundscapes

Solution 14: Pocket Kado
A gamified version of a habit tracker that is similar to RISE but also has the user engage with a Koala that struggles with a minor eating disorder.

Solution 15: Cognitive Behavioural Therapy for Insomnia in Veterans
This is not a digital solution but a therapy implementation of CBT-I and is what some/many CBT-I app implementations are based on.

5.3 Analysis of Market Research

A thematic analysis was performed on the tools of the solution. And most implemented idea broadly fit into one of the following themes:

Education

Anything app inclusion that is intended to educate the user with “static” knowledge – information that is independent of any tracked/personal data

Auditory Relaxation

This includes soundscapes, guided meditations and any form of audio that is intended to help users relax.

Daytime Habit tracking

This includes devices that have you manually log different activities performed throughout the day.

Sleep Data Logging

This includes any tool either manual or automatic that records parameters of a user’s sleep and is intended to be analyzed later. These usually cover sleep duration, sleep phase but some solutions include use case specific data anywhere from O^2 levels to nighttime audio recording. This is a very broad category and groups a lot of distinctly different use cases into one category as certain sleep issues can require very specific tracked metrics.

Insight Metrics

This includes any synthesis of logged data either being habit tracking, sleep data logging or the combination.

Wake up assistance

This includes technology and provides a gentler wake up than the traditional alarm such as devices that monitor the user's sleep phase and wait for an ideal moment to devices that gradually wake the user. Note These features generally aim to prevent over sleeping

Accountability

These are tools that help to offer the user an extra incentive to either follow routine or maintain habits. This includes Stellar Sleeps Accountability coach and “Sleep as Android” payment deposit goals. While not mentioned in the market research, an important accountability tool for CBT-I solutions is the high price point, usually $200 - $300, for most this makes them a large commitment helping with accountability.

6.0 Possible Design Directions

6.1 Key Issues and Associated Design Ideas

The key identified issues include excessive use of phones before bed and the effects of stress while falling asleep. While less pervasive some other notable observations include: Poor utilization of napping either being unused or with too much duration, Oversleeping on weekends/free days and poor sleep hygiene habits such as stimulant use.

We then derive our design direction through applying potential remedies to these identified issues, with remedy ideas coming from either existing solutions outlined in market research or new ideas thought of within the group that while untested have theoretical merit.

Excessive use of phones before bed.

This is the most prevalent finding throughout all the research, it is also thought that this usage not only occurs before bed time but actually eats into bed time itself with activities such as revenge bedtime procrastination and doom scrolling. It is notable that most users are already educated on the ill effects of this detrimental habit ruling out education as a remedy.

Idea 1.1

One design direction idea would be to incorporate a form of accountability assistance, help users stick to and maintain habits and bed times. This could be implemented through a digital solution such as “StayOff” or through a refundable deposit or even by making use of physical solutions such as a blue light detecting device which warns users about phone usage by speaking using the users (or their fathers) voice from pre recorded prompts. With the use of the user's own (or users fathers) voice being used to help build a sense of accountability.

Idea 1.2

Another design direction would be a device that helps to bridge the gap between the high stimulus offered through phone usage and the low stimulus incurred when falling asleep. This could be through gradually transitioning the users tik tok feed to a form of auditory relaxation or through using an audio filter that converts the traditionally firm text to speech voices to more soothing and sleep inducing voices allowing the user to fall asleep to calm AI voices reading reddit stories. This design direction is also supported by the fact that stories are commonly used to help certain demographics fall asleep.

The effects of stress while falling asleep is another key issue.

Idea 2.1

As this in itself can be viewed on the spectrum of insomnia this would lead in the design direction of a form of CBT-I, and would make use of tools such as cognitive restructuring to help how users think about bedtime and to see it as a positive experience helping to reduce this anxiety. For most this is a much milder version of diagnosable insomnia and therefore the developed solutions would be made to be a more accessible version of this approach. This approach would also make use of some form of basic sleep tracking and daytime habit tracking.

This accessible form of CBT-I would also be paired with some form for auditory assistance to help dull negative thoughts such as (Gemini, 2024):

i. "I just can't see the point of doing this anymore."
ii. "I'm a burden to everyone."
iii. "No one cares about me."
iv. "I feel so empty inside."
v. "Nothing brings me joy anymore."
vi. "I'm constantly tired, even though I'm sleeping enough."
vii. "My body hurts all the time."
viii. "I just want the pain to stop."
ix. "I'm so tired, but I can't seem to fall asleep."
x. "I have so much to do tomorrow. I'm not going to get enough rest."
xi. "What if I'm late for work?"
xii. "I wish I could just turn off my brain."
xiii. "Why can't I sleep?"
xiv. "I'm never going to fall asleep."
xv. "I'm so stressed."
xvi. "This is never going to end."
xvii. "I'm going to be exhausted tomorrow."
xviii. "I'm so overwhelmed."
xix. "I'm never going to finish this assignment."
xx. “I’m beginning to enjoy deco courses”
xxi. "I'm failing this class."
xxii. "I'm not smart enough."
xxiii. "Why do I have to do so much work?"
xxiv. "This is unfair."
xxv. "I'm tired of studying."
xxvi. "I just want to give up."
xxvii. "I'm so angry."
xxviii. "I hate this."
xxix. "This is stupid."
xxx. "I'm going to fail."
xxxi. "I can't do this."
xxxii. "I'm going to drop out."
xxxiii. "I'm not good enough for this program."

xxxiv. "I'm behind in my classes."
xxxv. "I'm going to fail my exams."
xxxvi. "I don't know how to manage my time."
xxxvii. "I'm never going to graduate."
xxxviii. "I'm lonely."
xxxix. "I don't have any friends."
xl. "I'm not good at socializing."
xli. "I'm not in a relationship, and I should be."
xlii. "My relationship is falling apart."
xliii. "I can't afford my tuition."
xliv. "I'm broke."
xlv. "I'm going to have to drop out."
xlvi. "I'm drowning in debt."
xlvii. "I'm never going to be able to afford my own place."
xlviii. "I'm sick and tired."
xlix. "I'm not taking care of myself."
l. "I'm gaining weight."
li. "I'm worried about my mental health."
lii. "I'm not getting enough sleep."
liii. "I'm not sure what I want to do with my life."
liv. "I'm going to regret choosing this major."
lv. "I'm not happy here."
lvi. "I miss my family and friends."
lvii. "I'm not good enough for anything."
lviii. "I'm a failure."
lix. "I'm never going to find a job."
lx. "I'm going to be homeless."
lxi. "I'm never going to be successful."
lxii. "I'm not smart enough."
lxiii. Along with other various negative thoughts thought by first and second year university students

Underutilised Napping

It is notable that research results suggest napping is poorly utilized either being unused or with too much duration.

<u>Idea 3.1</u>
This poor utilisation could be improved through an educational app to encourage users to incorporate napping into their own schedule or through a form of nap scheduling similar to how the app “RISE” helps users to schedule sleep but also include options for daytime napping.

Weekend Oversleeping

Another minor issue is oversleeping on weekends, while this can help users fix their sleep dept it also can be detrimental in resulting in the user shifting their sleep scheduling to an amount that is difficult to recover from.

Idea 4.1
One solution covered in the market research would be offering a more gentler/gradualler wake up. This would aim to reduce the chance that the user goes back to bed after an alarm. The market research included a range of different gentle wake up methods, all of which have little research based backing. So while this idea is novel and sounds plausible more research is required for proper justification.

6.2 Idea Compilation Design Direction

The main idea centers around a more accessible CBT-I app (Idea 2.1), this would be done by focusing on including educational material, while most users are aware of most basic knowledge it would be too strong of an assumption to have this as prerequisite knowledge. The CBT-I approach is useful as it has a heavy emphasis on building lasting sleep habits along with cognitive restructuring to help change how users subconsciously think about sleep. This is an important dictionion between sleep hygiene education, as many people are consciously well versed with sleep hygiene but don't act on it and repeat poor habits..

The app would help users manage and track their sleep along with relevant daytime habits and provide a sleep schedule similar to "RISE" but would also include soft forms of accountability (idea 1.1), such as "sleep goals" which allows users to deposit money that become refundable once a goal has been achieved. This design direction could also incorporate physical devices that help to build a sense of accountability, such as the aforementioned device that detects phone usage and results in user recorded audio as a warning.

While not discussed in market research, many CBT-I apps are in the price range of $200-$300, with the high price point (assumed to be) a result of human accountability coaching. This high price by itself is also useful for accountability. The intended design direction would be made more accessible through softer (cheaper) forms of building accountability. It is also of note that some CBT-I apps impose somewhat difficult remedies such as sleep restriction which can be brutal to begin with. The design direction would aim to offer a more gradual transition into habit building while maintaining user accountability.

These ideas comprise the core of the design direction. However there would also be consideration for Including ideas 3.1 and 4.1 as extra features. Idea 3.1 would be included as part of the education material along with optional functionality of nap scheduling. Idea 4.1 would be implemented as an optional alarm clock feature.

It is of note that not all the presented ideas are currently backed by conducted research and these will be discussed in further direction.

7.0 Ethical Considerations:

7.1 UI Ethical Considerations

There are several ethical considerations that must be taken during the design process of UI. The main of which will be discussed in this section.

The first is user data privacy (Falbe, 2018), at minimum any design will need to adhere to any relevant country specific regulations such as the Australian Privacy Act or the European General Data Protection Regulation (GDPR). These regulations establish baseline requirements for areas such as data collection, protection against data breaches and explicit user consent before collecting data. These regulations lay a strong baseline for any privacy related ethical considerations but notably do not by themselves necessarily constitute an ethical design.

On top of the ethics of data privacy any solution should adhere to elements of ethical design (Asscheman, 2024) this requires being user focused to the intended user audience. This user focus will require in-depth knowledge of the audience (Dagfinrud, 2024) and ensure that any design caters for this audience along with ensuring that the design is actually able to perform its intended solution and properly solve the intended problem.

The next aspects of an ethical design are requirements for usability (Asscheman, 2024). This is an important aspect for inclusive design and seeks to avoid overly bearing design aspects that can make a design cumbersome. The next is accessibility, this aspect of design seeks to avoid isolating groups of the intended audience. Both Usability and Accessibility will require targeted user testing for different aspects of the solution.

Lastly for a design to be ethical it should account for broader considerations of societal impacts (Asscheman, 2024). This focuses the designs impact on the world's environment, resources and climate and will require considerations about a solution/products lifecycle and its resultant impacts.

While not comprehensive these 5 aspects of Privacy, User Focus, Usability, Accessibility and Societal implication will be a baseline for any design to be developed and judged. Along with this any user interactions through development should be conducted ethically, this will require that research and testing that includes users is done in an ethical manner relating to privacy and intrusiveness of inquiries and tests, along with any specific ethical concerns of a given test subject/group.

7.2 Design Ideas Ethical Considerations

This section will cover ethics of the design direction on an idea to idea basis.

Idea 1.1 is a tool to help users take accountability for their habits. Functionality such as those featured in *StayOff* that limit the usage of other applications must recognise when a user should be able to bypass these features, such as in an emergency. It is important that a mechanism is designed into the application that will allow the user to ultimately stop the functionality.

Idea 1.1 also introduces the idea of accountability through monetary deposits. This may pose ethical concerns should the user be financially vulnerable, irresponsible, or uneducated. Such a design choice may even result in additional stress upon the user, if a user feels obligated to contribute funds to the application in order to improve their sleep hygiene.

The last design mentioned in idea 1.1 is in regards to a physical device that alerts the user using their own (or their fathers) voice, this is an idea that ventures into a more strange territory of design. One concern could be that some users are not comfortable being disciplined by their own voice, and this drives them away from the device's functionality.

Idea 1.2 is in regards to having tik toks of reddit story readings be done by a calm AI voice as opposed to the firm and slightly rushed voice usually used for these forms of tik tok. Again this idea ventures into the realm of being slightly strange with the main ethical concerns being in regards to inadvertently keeping the user awake depending on the genre of reddit stories being read through TTS.

Idea 2.1 relates to implementing a more accessible form of CBT-I making use of cognitive restructuring, sleep and habit tracking. This idea introduces many ethical concerns into the design. This includes:

- If not made clear the app could be mistaken as a full implementation of CBT-I and maybe be used by users who suffer from more severe sleeping conditions.
- How sleep and habit tracking can be implemented ethically. Certain habits may be a very sensitive subject for people and they may not want to disclose this within the app, scenarios like this should be designed around ensuring that the user feels they are able to utilise the application to its full ability while not having to disclose information they feel uncomfortable with.

Idea 3.1 relates to Napping, while a useful tool it is notably already widely misused and poor educational material may increase the abundance of this misuse by users over napping. In certain design situations users may feel compelled to nap even if it is in a suboptimal scenario, such as users opting to nap while in a car, or at work either of which could be potentially dangerous situations to be asleep in.

7.3 Ethical Engagement

Surveys and interviews were conducted ethically by first formulating a procedure to conduct the user research which included obtaining interviewee/surveyee consent for the collection and use of the gathered data along with anonymization of data after collection.

Sleep diary data was the most invasive form of user research and for this reason was chosen to be done auto ethnographically within the team, this was done to limit ethical concerns with each team member acknowledging the use and purpose of this data and is in a position to raise any concerns.

8.0 Questions/areas of Investigation

Within design direction the issues discussed are strongly supported by both user and academic research as this has been the primary focus of the groups design activities. However there is a distinct lack of support for many of the ideas discussed in the design direction, being presented with little to no supporting evidence of their proposed functionality with the report primarily focusing on outlining the issues of our target audience. So while many of the ideas are scoped from existing solutions this does not inherently mean they are scientifically supported or ideal for the targeted demographic.

These specific unsupported ideas include:

- Idea 1.1: It is mentioned that phone usage eats into users bed time and results in the high (45min+) bedtime usage, this is an assumption as it could be that in most cases users are actually adhering to their intended bedtime and choose to be on their phone until this time. This idea is supported by bedtime procrastination but this is a specific form and might not generalize to more users.

- Idea 1.1: The use of accountability for habit tracking (And specifically the softer forms of accountability proposed) are presented as being able to successfully actually maintain accountability however the specific ideas are currently unsupported.

- Idea 1.2: This idea isn't actually included in the overall design direction but could be a novel idea. However the ideas behind gradually reducing user stimulse are unsupported.

- Idea 2.1: While CBT-I is generally considered the gold standard for Insomnia treatments, this report does not present any studies on effectiveness and specifically on its effectiveness for milder sleeping problems. This includes its specific components of: cognitive restructuring, Sleep + habit tracking and the effectiveness of different forms of auditory assistance.

- Idea 4.1: While many existing solutions offer gentler wake up they are not currently supported by research within this report. And certain implementations may not even elicit the result of preventing oversleeping as intended.

These points all provide additional question areas of investigation each in a few possible ways.

- Firstly what are other possible ways to achieve this design objective that would be more aligned with our target audience?
- Secondly does the proposed design have any existing research to support the claims that it does what it is intended to do?
- Thirdly, is it possible to conduct mockup user testing for the proposed solution?

Additionally certain design directions lack any substance when it comes to how they are to be implemented. This includes the different aspects of the CBT-I implementation in idea 2.1 including Effective manners to implement cognitive restructuring, the specifics of what data should be tracked and whether this should be done manually or recommend a fitness tracker. Along with aspects of daytime habit tracking and determining what habits are relevant to sleep. These different design directions will require additional academic and user research to hone in on implementations that best align with the target demographic and effectively achieve the intended design goal.

9.0 Project plan

1. **Organizing and Refining Design Concepts (Week 11)**
    - **Task Description**
        1. Review existing research and insights.
        2. Key design concepts were prioritized and selected based on relevance and feasibility (e.g., CBT-I app, accountability feature).
        3. Identify assumptions and gaps in the design (note any areas that are lacking in research but not investigated further).

2. **Crafting the Proposal and Design Plan (Week 12)**
    - **Task Description**:
        1. Detail the core design elements, focusing on the benefits and rationale for each feature (e.g., CBT-I, sleep tracking, accountability tools).
        2. Justify design choices with current research and insights, noting areas where further testing may be required.

3. **Finalizing and Presenting the Proposal (Week 13)**
    - **Task description:**
        1. Write and finalize the proposal, ensuring clarity and logical flow.
        2. Review and refine documentation with the team to address any gaps or room for improvement.
        3. Refine and prepare final documents or presentation materials, giving them the finishing touches.

10.0 Team reflection:

10.1 Project direction and focus - Perspective 1

We had a clear goal from the beginning. The goal was to promote good sleep habits among students with poor sleep hygiene. The first meeting was a success. All team members participated in brainstorming. We conducted background research together, but initially disagreed on the scope of the target audience.

However, the impact on the project workflow and progress also became an issue as we progressed. A major issue was inconsistency between team members, for example, in week 7, a key member of the team was unable to attend the meeting due to personal reasons. This delayed coordination and prevented timely decision-making, and some members, including Miguel (team leader), needed to take on additional responsibilities to ensure the project went smoothly.

This situation highlighted the weaknesses of this basic approach to communicating with the agency. We found that relying on ad hoc meetings and informal communication channels was effective. Unity alone is not enough. Unless all members are on board without a clear plan for emergencies your team will not be able to adapt to what is happening. We redefined job roles to reduce the burden on overworked members. Helped those who disengaged to reengage.

Even with these improvements Even at the beginning we spent a lot of time thinking about the idea. We disagreed on some issues, such as whether individual names should be used or other clinical research methods? Is there such an approach in the design manual? Or will it be choosing a physical or digital solution for your theme design? Wrong decisions slow down the development process and reduce the time required to achieve significant results. Therefore, after recognizing these weaknesses, we implemented a more decisive decision-making process. It set strict deadlines for choosing ideas to follow.

Some key takeaways from this experience It is important to strike a balance between critical thinking and timely action. Always be careful when considering options. But uncertainty can hinder long-term progress. Setting clear goals and sticking to them over the long term will increase your efficiency and enable you to fully focus on all aspects of the project.

All in all, our team's journey on this project was a challenging but rewarding experience. Working together enabled us to achieve our goals. At the same time, we also acknowledged and corrected our weaknesses. When you reflect critically on your work and processes, we improve teamwork and communication. And learn valuable lessons about project management. This experience not only contributes to the success of the current project. But it also provides valuable skills and insights for future collaborations.

10.2 Project direction and focus - Perspective 2

Since deciding on our initial domain, our team has always had a firm grasp of our overarching problem we'd eventually want to try and solve. Even before doing any research, we'd known that there was a common stigma surrounding the "common university student", sacrificing sleep for uni work and the balancing of their lives.

We went into the problem identification milestone trying to gain a very broad understanding of why lack of sleep was a problem to university students in particular, trying to find out relevant relationships and patterns. Our whole approach to doing this subsisted around splitting the team into half; half doing user research via interviews to gain insights into the causes; half doing background and literature research.

From doing this we were able to gain a foothold into the domain itself. While our research was very honed in what knowledge and patterns it provided, our academic research was very disjoined and sparse in terms of focus. Mainly it consisted of looking at studies based on some keywords we'd identified and listing the findings down. We never really got to a point before submitting our report, to where we cohesively stitched together and combined these findings into a chain of logic we could use to support the rest of our decision.

This impacted us in that we didn't have an entirely solid foundation to which to base our overall decisions and line of thinking, and as such we were somewhat unfocused in what we exactly knew and needed to know to continue onwards towards refining our report.

From then establishing a good overall knowledge base (regarding the causes of sleep deprivation in university students and the various associated relationships) to draw from became an important factor for improvement, to which we eventually did try to do for this milestone in particular. Based on this we had also attempted to incorporate more user research to support our findings as well as grasp at any other alternative insights. But at least for this milestone we have definitely narrowed down what we were looking for out of a solution, at least compared to milestone 1.

Overall we had tried to incorporate segments of the feedback we'd received, particularly trying to enhance our logical reasoning from our academic research, selecting a better target audience(as we were wishy-washy on that for a while), and representing the breakdown of our design activities more thoroughly, it's to be stated that there's definitely a lot we still have to do in terms of linking all the information we have cohesively report-wise, and creating a singular final solution from what we have now.

10.3 Team process and collaboration

Our team hasn't officially adopted any standard design process, but if we were to liken what we've done to anything it would lean more towards being "Incremental" or "Agile".

What we'd do was meet every Monday, detail out what we'd need to accomplish as a whole e.g. do user research, do academic research, work on the report, etc, and then break it down into individual tasks that we'd delegate to each person in the team.

From then on that person would work towards that goal, and during our Wednesday class, we'd catch up on progress or affirm what needed doing, and continue on until the next week to where we'd have another meeting about what would need to be done.

The only downside to this however is that we really only delegated these short timeframes (1 hour roughly) to really thinking about what we'd need to accomplish next as a group, which leaves much to be desired when trying to figure out a solid and airtight plan of action, especially when factoring in the timeframes we need to get work done in.

Other than that we'd also use Discord to communicate amongst one another if there were any other outstanding questions, but thus far we haven't had too much overlap between one another when working on our respectively assigned tasks (which might have lead to some disjointedness in what we all know cohesively at a team).

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12.0 Appendix

12.1 Interview Protocol

Introductory Questions

1. How old are you?
2. What do you study in university?
3. Do you think you get enough sleep?
4. What else do you do outside of university?

Questions about sleep

1. Describe your current sleeping schedule.
    1. Time wake up/time sleep
    2. Use phone before bed?
    3. What conditions (lights, etc)
2. How long roughly does it take you to fall asleep?
3. Do you wake up tired from sleep? (Quality of sleep)
4. Do you frequently wake up during the night?
5. Are you happy with it? If not, what would you change? Describe your ideal sleeping schedule.
6. What are the main factors that prevent you from maintaining your ideal schedule? Is there anything specific that make you stay up late?
7. Has there been a time where you have ruined your sleep schedule? How/for how long did it effect you (mood, energy levels etc.)? How did you recover from it?

Question about lifestyle?

1. Do you often feel tired?
2. Do you have trouble waking up early?

Questions about solutions

1. What are some things you do to help with maintaining sleep schedule?
2. What are some things that you think may help you sleep better?

Ask additional questions where relevant
Try to have a diverse interviewee base

12.2 Interview Transcripts

Interview 1

Speaker 1:
Yo, Speaker 2! What's up, man? How's life treating you? Ekka is coming, any plan for it?
Speaker 2:
Haha, Life's alright, just trying to survive university. My friends call me to the Ekka tomorrow, but not interested.
Speaker 1:
Same here, just trying to stay awake long enough to ask you a few questions.
Speaker 2: Oh, Uq ask for it ? Shall we talk in English?
Speaker 1: Na, it doesn't matter, I will translate it and write a transcript.
Speaker 2: OK, what you wanna ask.
Speaker 1: how old are you now? Like, 40?
Speaker 2:
Ha! Not quite. I'm 21, thank you very much. Just a young buck compared to you.
Speaker 1:
And what's the latest? Still majoring in Psychology, or have you decided to become a professional napper?
Speaker 2:
Oh, definitely sticking with Psychology, but professional napping sounds like a solid backup plan. Maybe it'll help me understand why I never get enough sleep!
Speaker 1:
Dude, I hear you. Do you even sleep, or do you just close your eyes and think about all the assignments you've got to finish?
Speaker 2:
Pretty much! I try to sleep, but my brain's like, 'Nah, let's think about that awkward thing you said five years ago instead.'
Speaker 1:
Classic! So what do you do when you're not pretending to sleep? Any wild hobbies?
Speaker 2:
Well, when I'm not at the gym trying to convince myself I like exercise, I'm either reading recipes or cooking. You know it, we both like cooking
Speaker 1:
Alright, real talk—what's your sleep schedule like? Or should I ask, do you even have one?
Speaker 2:
I try to go to bed around midnight and wake up at 7:30 AM, but honestly, it's more like midnight-ish to whenever my alarm decides to yell at me.
Speaker 1:
And please tell me you're not through your phone away before bed.
Speaker 2:
Uh, yeah… totally not. Except for when I do. Which is every night. Social media's just too good at keeping me up!

Speaker 1:
Right? It's like, 'I'm going to sleep,' and then bam! It's 2 AM.
Speaker 2:
Exactly! And then I wonder why I'm so tired the next day.
Speaker 1:
So, what's the sleep vibe? Lights out, or do you prefer that cozy, half-light thing?
Speaker 2:
Definitely lights out. But sometimes the streetlight outside is like, 'Hey, I'm gonna join you!'
Speaker 1:
Ugh, classic streetlight crashing the party. How long does it take you to actually fall asleep once you put the phone down?
Speaker 2:
On a good night, like 20 minutes. On a bad night, I'm up solving the world's problems for a solid hour.
Speaker 1:
And then you wake up like, 'Why do I feel like a zombie?' How's the quality of your sleep, though?
Speaker 2:
Well, let's just say I'm not winning any 'Well-Rested' awards. I'm basically the poster child for tired.
Speaker 1:
Do you wake up in the middle of the night, or are you a solid sleeper once you're out?
Speaker 2:
Mostly solid, but sometimes I wake up because my brain's like, 'Hey, did you forget to do that thing?'
Speaker 1:
Ugh, that's the worst! So, are you happy with this sleep situation, or are you dreaming of a better one—pun intended?
Speaker 2:
Ha! Definitely dreaming of a better one. Ideally, I'd be in bed by 10:30 PM and up at 6:30 AM, all bright-eyed and bushy-tailed. But who am I kidding?
Speaker 1:
What's holding you back?
Speaker 2:
late nights, social events, and my binge-watching habits don't exactly help.
Speaker 1:
Has there ever been a time when your sleep schedule was totally wrecked? Like, how bad was it?
Speaker 2:
Oh, finals week was a nightmare! I was sleeping at crazy hours, and it turned me into a grumpy, caffeine-fueled mess. Took me weeks to recover!
Speaker 1:
Yikes! Been there, done that, got the dark circles. So, do you often feel like you're running on empty?

Speaker 2:
All the time! Especially in the afternoons when I feel like I could just curl up under my desk and take a nap.
Speaker 1:
Do you have any tricks to keep your sleep on track?
Speaker 2:
Well, I try to avoid caffeine late in the day, and I've been doing some light stretching before bed. I also try—keyword: try—to put the phone away early.
Speaker 1:
And if you could magically improve your sleep, what would you do?
Speaker 2:
I'd definitely stick to a routine, maybe get one of those fancy white noise machines, and train myself to stop thinking about everything before bed!
Speaker 1:
Sounds like a plan! Alright, I'll let you get back to whatever it is you do when you're not chatting with me. Thanks for the laughs.
Speaker 1: do you think students like us came far away from home will have more stress than local students? So we much easier to be stressful, that will influence our sleep quality?
Speaker 2: will, I'm can't tell, but if my family is here, I can pay less tuition fee than international students, no culture shock, and I won't worry about fucked up with my GPA then go back to Malaysia with nothing. Yeah, I can have more good nights.
Speaker 1: dude..haha
Speaker 2:
Haha, I will find a time to call you for coffee. Next week.
Speaker 1:
yeah, we haven't met for two weeks, busy. Thanks by the way.

Interview 2

Speaker 1: Hi, Speaker 2. Thanks for taking the time to talk with me today. Could you start by telling me how old you are?
Speaker 2: Hi, Speaker 1. Sure, I'm 20 years old.
Speaker 1: Great, and what do you study at university?
Speaker 2: I'm studying psychology. It's really interesting to learn how the mind works.
Speaker 1: That sounds fascinating. Do you think you get enough sleep?
Speaker 2: I try to, but sometimes it can be a bit tricky with all the assignments and studying.
Speaker 1: What else do you do outside of university?
Speaker 2: I like to spend time with my family and friends. I also do some volunteering work and occasionally play some sports.
Speaker 1: Let's talk a bit more about your sleep. Can you describe your current sleeping schedule?
Speaker 2: I usually go to bed around 11 PM and wake up at 7 AM, so I get about 8 hours of sleep. Sometimes I stay up a bit later if I'm studying or watching something, but I try to stick to that schedule.
Speaker 1: Do you use your phone before bed?
Speaker 2: Yeah, I do. I often scroll through social media or watch some videos before I fall asleep. I know it's not the best habit, but it helps me wind down.
Speaker 1: What's the environment like when you're trying to sleep? Do you keep the lights on or off?
Speaker 2: I like to keep the lights off, but I usually have a small nightlight on. I also try to keep the room cool and quiet, which helps me relax.
Speaker 1: How long does it usually take you to fall asleep?
Speaker 2: On most nights, it takes me about 15 to 20 minutes to fall asleep. If I've had a busy day, it might take a bit longer.
Speaker 1: Do you wake up feeling tired, or do you feel rested?
Speaker 2: I usually wake up feeling pretty rested. If I've had a stressful day or stayed up too late, I might feel a bit tired, but overall, I think my sleep quality is good.
Speaker 1: Do you frequently wake up during the night?
Speaker 2: Not really. I usually sleep through the night unless something wakes me up, like a noise or if I'm feeling stressed.
Speaker 1: Are you happy with your sleep schedule? If not, what would you change?
Speaker 2: I'm mostly happy with it. I think if I could change anything, I'd try to use my phone less before bed and maybe go to sleep a bit earlier.
Speaker 1: What are the main factors that prevent you from maintaining your ideal schedule? Is there anything specific that makes you stay up late?
Speaker 2: The main thing that keeps me up late is usually studying or if I get caught up in watching something online. Sometimes it's just hard to put the phone down.
Speaker 1: Has there been a time where you've ruined your sleep schedule? How did it affect you?
Speaker 2: Yeah, there was a time during finals last semester where I was staying up really late to study. It definitely affected my mood and energy levels—I was more irritable and felt drained. It took a few days after exams to get back to my normal routine.

Speaker 1: Do you often feel tired?
Speaker 2: Not often. I think because I'm living at home with my family in Brisbane, I don't have to worry about things like rent or living costs, which takes a lot of stress off me. My parents help out a lot, so I can focus more on my studies and staying healthy.
Speaker 1: Do you have trouble waking up early?
Speaker 2: Not really. Since I don't have to worry about managing a household or anything, it's easier for me to get up early and start my day.
Speaker 1: What are some things you do to help maintain your sleep schedule?
Speaker 2: I try to stick to a regular routine, even on weekends. I also make sure my room is comfortable for sleeping and avoid having caffeine too late in the day.
Speaker 1: What are some things that you think might help you sleep better?
Speaker 2: I think using my phone less before bed would help, and maybe trying some relaxation techniques like deep breathing or meditation before going to sleep.
Speaker 1: Thanks for sharing all that, Speaker 2. It sounds like you have a pretty balanced lifestyle, which is great.
Speaker 2: Thanks, Speaker 1! I'm really grateful for the support I have from my family—it definitely makes things easier.
Speaker 1: Let's dive into your sleep schedule. Can you describe your current sleeping habits?
Speaker 2: My sleep schedule is pretty flexible. I usually go to bed around 11 PM, but there are nights when I stay up until 3 or 4 AM, especially if I'm on my phone or watching something interesting. If I stay up that late, I'll skip my 8:00 AM class to get more sleep and wake up naturally.
Speaker 1: Do you use your phone before bed?
Speaker 2: Yeah, I use my phone a lot before bed. Sometimes I lose track of time scrolling through social media or watching videos, which is why I end up staying up so late.
Speaker 1: What's the environment like when you're trying to sleep? Do you keep the lights on or off?
Speaker 2: I prefer to keep the lights off, but I usually have a small nightlight on. My room is pretty quiet, and I like it to be cool, which helps me relax.
Speaker 1: How long does it usually take you to fall asleep?
Speaker 2: If I go to bed at a reasonable hour, it takes me about 15 to 20 minutes to fall asleep. But if I've been on my phone a lot, it can take longer.
Speaker 1: Do you wake up feeling tired, or do you feel rested?
Speaker 2: If I've stayed up until 3 or 4 AM, I usually feel tired the next day. But if I sleep in and wake up naturally, I feel pretty rested.
Speaker 1: Do you frequently wake up during the night?
Speaker 2: Not usually. I tend to sleep through the night unless something wakes me up, like a noise or if I'm feeling stressed.
Speaker 1: Are you happy with your sleep schedule? If not, what would you change?
Speaker 2: I'm okay with it, but I know I could probably get more consistent sleep if I went to bed earlier. I should probably cut back on using my phone before bed, but I don't worry too much about it since I can adjust my schedule and sleep in if I need to.
Speaker 1: What are the main factors that prevent you from maintaining an ideal schedule? Is there anything specific that makes you stay up late?

Speaker 2: The main thing is definitely my phone. I get caught up in social media or watching videos, and before I know it, it's really late.
Speaker 1: Has there been a time where you've ruined your sleep schedule? How did it affect you?
Speaker 2: During finals, I stayed up late a lot, which definitely messed up my sleep schedule. I was more tired and irritable, but I bounced back pretty quickly once the exams were over.
Speaker 1: Do you often feel tired?
Speaker 2: Not too often. I think living at home with my family in Brisbane helps a lot. I don't have to worry about rent or living costs, so that reduces a lot of stress. My parents cover most of my expenses, so I can focus on my studies and keep a pretty relaxed lifestyle.
Speaker 1: Do you have trouble waking up early?
Speaker 2: I wouldn't say I have trouble, but I don't usually wake up early unless I need to. If I've stayed up late, I'll just sleep in and skip an early class if I need to.
Speaker 1: What are some things you do to help maintain your sleep schedule?
Speaker 2: I try to stick to a routine, but it's pretty flexible. I make sure my room is comfortable and avoid caffeine late in the day. If I know I've stayed up too late, I'll let myself sleep in the next morning.
Speaker 1: What are some things that you think might help you sleep better?
Speaker 2: Probably cutting back on my phone use before bed and maybe trying to set a more consistent bedtime. But honestly, I'm not too stressed about it since I can adjust my schedule as needed.
Speaker 1: Thanks for sharing all that, Speaker 2. It sounds like you have a good balance in your life.
Speaker 2: Thanks, Speaker 1! I'm really grateful for the support I have from my family—it definitely makes things easier for me.

Interview 3

Speaker 2
OK, this is an interview for Deco 3800 design proposal. Do you consent to your answers being used in the research for our design proposal?
Speaker 1
Yes, I consent.
Speaker 2
Thank you. How old are you and? What do you study?
Speaker 1
I'm 21 years old and I study commerce and IT dual degree.
Speaker 2
Thank you. Do you think you get enough sleep?
Speaker 1
Yes.
Speaker 2
OK. And what kind of other things do you do outside of university?
Speaker 1
I work. A lot

Speaker 2
Anything else?
Speaker 1
In terms of activities and hobbies, or?
Speaker 2
Yeah, basically things that that you think take up a significant amount of time.
Speaker 1
My work takes up a lot of it and I'm on my phone for the rest of it. I occasionally, Jim, but I wouldn't say that's the majority of my time.
Speaker 2
Ohh and and yeah. Sister, right. Who you also take care of.
Speaker 1
Right now my, my mum and dad are both here, so my dad is doing most of the caring right now. Hence why I can work more.
Speaker 2
OK. Can you describe your current sleeping schedule for me? So things like time that you wake up time, that you go to sleep and just overall pattern of your.
Speaker 1
Sleep. So it has stayed mostly consistent for the past few weeks. I try to go to sleep around 12 and wake up around 7:30, but I end up waking up like 729 to turn off the alarm and sleep till. 8. So I get a pretty decent amount of sleep because all my classes are planned. Like fairly late into the day and my dad is here to send my sister to school so I don't need to worry about that. Otherwise, normally I'd have to wake up fairly early, around 7:00 to. Wait for. Wait for my sister to get ready and send. Her. To school. So right now I do get like between 7:00 and 8:00 hours of. Sleep, yeah.
Speaker 2
OK. Thank you. Do you use your phone before bed?
Speaker 1
Most definitely an obscene amount my. From my screen time goes from one day to the next, my screen time begins with 30 minutes already done for the day.
Speaker 2
Oh.
Speaker 1
It's bad well.
Speaker 2
So so when you say you go to sleep at around 12, is that you falling asleep at 12 or you getting in bed?
Speaker 1
At 12, I guess this is where it's inconsistent. Sometimes I just go into bed earlier than 12, but I try my best to close my eyes around 12. I can try.
Speaker
Hmm.
Speaker 2
OK. And what kind of conditions do you sleep in? Like, is it pitch black or yeah, what kind?

Speaker 1
Of conditions. So sometimes the moon is a bit bright and like blinds don't shut fully. So I guess that'll depend, but usually I turn off all my lights or I always turn off. All. My lights and go to sleep. As as dark as I can of A room.
Speaker 2
OK. And can you estimate roughly how long it takes you to fall asleep from the moment you close your eyes until falling asleep?
Speaker 1
I do realise that sometimes if I'm more tired I can almost it feels like go to sleep instantly. Otherwise, if I'm on my phone for a while and I feel a bit drowsy, I put my phone down and it's almost instant. Well, but if I try to force myself to sleep, I'm not too sure. I've never checked. I just close my eyes and try. Not to open.
Speaker 2
Right. So so you have times where you know you're going to fall asleep really fast and then other times like you kind of have to convince yourself to fall asleep. Is that right?
Speaker 1
Yeah, like if I if I know I have to do something early in the morning, I try force myself to go to sleep before, like, the 12:00 that I. Usually plan, yeah.
Speaker 2
Do you find yourself waking up tired often?
Speaker 1
Surprisingly not. I used to when my sleep schedule was an absolute mess, but right now it's not that bad. Yeah, by by absolute mess, I mean, I didn't look at the time when I went to sleep. I didn't look at the time when I went, woke up, and usually always under 8 hours of sleep. Yeah. But now it's fine.
Speaker 2
OK, so if you if you feel OK, when you wake up, do you think that? It's cause you're getting good quality sleep.
Speaker 1
UM. The initial moments when I wake up, I guess it. Is. Because I feel I got enough sleep, but sometimes during the day I'm still forgetful. There's still, like the old habits. I don't know if that's sleep related or not, but. From thence, when I wake up, I feel like I can get out of bed if I wanted to, which is what I usually do for work, but if not, I might go on my phone for a bit.
Speaker 2
And do you wake up at all during the night?
Speaker 1
No, no, only only for toilet breaks.
Speaker 2
OK. Are you happy with your sleep schedule?
Speaker 1
Mostly yes.
Speaker 2
Is there anything that you would change about it?
Speaker 1

Not being able to sleep would be preferable, but because that would be more productive. However, I understand it is necessary that is why I've changed it.
Speaker 2
So would you say that your sleep schedule now is? Ideal or close to ideal or like can you see it improving? Further.
Speaker 1
It is close to my ideal, but since a lot of other things happened way early in the morning, I guess I would like to try to wake up earlier and most likely fall asleep earlier as well. So I guess my ideal would be. Wake up sometime around 5:00 to 6:00. So I'll see what to do in terms of falling.
Speaker 2
Asleep. So. So what would you say is the main factor or factors that are preventing you from having that ideal sleep schedule, like going to sleep earlier and waking up earlier?
Speaker 1
I guess just wanting to do more stuff, I feel I am a bit more. During the night. Excuse me, but I guess the sense of urgency that comes through me at night just makes me want to do more stuff at night and hence sometimes I have to stop myself to force myself to go to sleep.
Speaker 2
Yeah. So would would you in general say that you're a night person if you're more productive at?
Speaker 1
Night. Yeah, most definitely. And especially so closer to assignment times. If if I need to rush something overnight, I might not even sleep. But very, very rare cases.
Speaker 2
OK. Has there ever been a time or multiple times where you've just absolutely ruined your sleep schedule and because you did mention the overnight assignments, how did it affect you? And. For how long did it affect you, and did you recover from it? So so when I say affect you, so things like mood and energy levels and that kind of thing?
Speaker 1
I think energy levels is a major thing, which can be supplemented through coffee, but only to a certain extent. Caffeine, Red Bulls, monsters. It did help me get through, but I think having good sleep schedule is still. Much more desirable than like taking supplements, yeah.
Speaker 2
So. You kind of just recovered from it just by toughing it out and drinking caffeine and then eventually just getting back into the schedule slowly.
Speaker 1
Pretty much yes.
Speaker 2
Yeah. OK, so I'm going to ask you questions about like. Your day to day. So do you feel tired during the day?
Speaker 1
Yeah, sometimes during the day, if there's really nothing going on and my brain has nothing to do, I do feel very tired and yawn and feel drowsy. But if if something happens or have to do something, I'm usually very quick to wake back up. Yeah.
Speaker 2

And so you mentioned before that you don't usually have trouble getting out of bed, so you don't have any. Trouble waking up early, do you?
Speaker 1
UM. Because right now I'm trying to stick to the sleep schedule. I haven't really tried to wake up earlier than I've already set my alarm. So right now, 7730. But if I do need to wake up early again, I'd probably plan that the night before to either go to bed a bit earlier and probably set like five or six alarms for when. I do need to wake up. Yeah.
Speaker 2
And just out of curiosity, do you ever take? Naps.
Speaker 1
Very, very rarely, because I've experimented trying to take naps, I end up feeling way worse than if I were to just get a full night of sleep.
Speaker 2
OK. So what are some things that you do to help maintain your sleep schedule? If, if, and if you can. Think of anything.
Speaker 1
By don't really I've I've just taken the fall asleep naturally. Wake up naturally and I think that helps a lot. And my body's just gotten used to that. And again, like, it automatically wakes up right before the alarm. So I think what I've done so far is alright.
Speaker 2
So would you say like the consistency is what keeps you going? Because like your body is used to it.
Speaker 1
Yeah. The melatonin cycle is like it'll fix itself if you do it for long enough. So I think, yeah, consistency is key.
Speaker 2
And UM. Is there anything you think that would further help you with that like? For example, your desire to wake up earlier and sleep earlier, do you think? Like any tools or methods, would be always help you with that.
Speaker 1
So if all my alarm and self control has. Done wonders for myself, but I can also I'm looking back to when I had a messed up sleep schedule, mainly in high school. It if if something were to do it automatically for me, I guess that'll take my mind. Take stress knowing that it would be done for me and wake myself up, put myself to sleep automatically, but obviously that's ideal and everything comes down to. Self control, yeah.
Speaker 2
Could you elaborate on that a little? So like what exactly would you want to have done automatically?
Speaker 1
So.
Speaker
If.
Speaker 1

In the ideal world, it's like when you go to work. If you go to work, you're told what to do. You do that thing, you go home, you. Don't. Think about it anymore. So if something was to be able to just make that decision for me, I just needed to execute it. Then I. Wouldn't. Care if, like, say, I don't know an app or like a doctor in this case, maybe say, OK, go to sleep at 8 and wake up at six. That is optimal. Do that and stick to it. Turn your brain off and just do it and you'll feel better by the end of it. Something like that.
Speaker 2
OK, so so something to help regulate your cycle like give you advice about what might.
Speaker 1
Yeah, or even something that can, something that can record your sleeping data. Like I know there's, like some watches and whatever to, like, monitor your sleep. But I don't like wearing stuff to bed. Like a watch. It feels uncomfortable. So I.
Speaker 2
Be best for you.
Speaker 1
I don't wanna do that and I don't know if there's any like like body monitor that can do that without making it uncomfortable. But if you were able to track and record your like sleep data and look over it at some point and you can see, oh, I fell asleep really late that day and woke up very early and got no sleep, maybe that's why I feel drowsy, like being able to look into data like that I think would be very useful into either making decisions for yourself or letting the app make. This is for.
Speaker
You.
Speaker 1
Yeah.
Speaker 2
OK. Thanks for the interview. This concludes all the questions. Goodbye.

Interview 4

Speaker 1
OK, we're starting. This is an interview for the Decker 3800 design proposal. Do you consent to your answers being used in the research for our design proposal? Yes, thank you. OK. How old are you and what do you study in university?
Speaker 2
I am 21 years old. I study law and commerce.
Speaker 1
Thank you. And do you think you get enough sleep?
Speaker 2
Yes.
Speaker 1
And what other things do you do outside of university?
Speaker 2
I work part time and I also go to social events occasionally.
Speaker 1

OK. Can you describe your current sleep schedule for me? So what time you wake up, what time you go to sleep?
Speaker 2
I usually sleep around 12:00 AM and I usually wake up around 7:00 to 8:00 AM.
Speaker 1
Do you use your phone before bed?
Speaker 2
I try not to, but yes I do.
Speaker
Aye.
Speaker 1
And what kind of conditions do you sleep in like? Is it pitch? Black or? Not.
Speaker 2
So I do sleep in pitch black. I also need music playing from my phone in order to fall asleep. Well.
Speaker 1
That's a very interesting insight. Is there anything else that you do for your sleep routine to help you fall asleep or have a good night's sleep?
Speaker 2
I do find that I generally have difficulty falling asleep, and so if I do. In certain circumstances, if I especially have trouble falling asleep, then I just try and read a book or I just study a little bit more so that I make myself tired so that I can fall asleep much. Faster.
Speaker
OK.
Speaker 1
And so you said you sometimes have trouble falling asleep, so. On a bad day, how long roughly does it take you to fall asleep?
Speaker 2
On a bad day, it might be. Maybe an hour. It used to be quite bad. It used to be around two to three hours if that. If it was an especially bad day.
Speaker
Oh wow.
Speaker 1
And. Do you know of anything that might have made the change like so? It used to be a lot worse. Is there a reason why it's improved now?
Speaker 2
I think the main reason is consistently waking up around 7:00 or 8:00 AM. It used to be a lot more inconsistent even just last year. But this year I've been waking up a lot more consistently and I think that's helped me have a much better sleep routine and my body's gotten used to sleeping around a consistent time as well.
Speaker 1
And when you wake up in the morning, do you feel?Really tired.
Speaker 2

I think more often than not, I do feel very tired and that does lead me to fall back asleep, which for example, if I'm staying at home then it will lead me to wake up late. But. If it is a day where I need to go to work or I need to go to classes, then I will inevitably get out of bed. But there have occasionally been some days where I feel very, very tired in the morning and I just have to sleep. Until maybe even 11 or 12.
Speaker 1
Do you frequently wake up during the night?
Speaker 2
Lately I have been it has been around 3:00 to 5:00 AM where I wake up suddenly in the night. It used to never happened to me, but recently it has been. I'm not sure why. But fortunately I can just go back to sleep immediately.
Speaker 1
Are you happy with your sleep schedule right now, and is there anything that you would change about it?
Speaker 2
I do recognise that I get a lot more sleep than others, which can be a good thing, but for me personally I am the type of person that has a lot of difficulty. Getting out of bed in the mornings and so this usually leads me. To oversleep quite often, and so I am trying my best not to oversleep. So that's one thing that I'm quite unhappy about, but otherwise, I do sleep consistently at a set time, and I wake up generally around. A time that I'm happy with.
Speaker 1
So, are there any factors that are preventing you from improving your sleep schedule?
Speaker 2
I think the only thing is still trying to figure out how to make myself get out of bed in the mornings when my alarm goes off. For example, I don't have trouble waking up, but I have a lot of trouble getting myself out of bed, so that's still something that. I haven't really found a solution to and because I'm struggling with it a lot and I don't seem to. Have any ideas on how to solve it? That's the main thing that I'm kind of concerned about.
Speaker 1
Has there ever been a time where you've completely ruined your sleep schedule, and if so, how long did it affect you for in terms of your mood and energy levels?
Speaker 2
So the only times when I've ruined quote unquote my sleep schedule is generally over the holidays. For example, if I. I used to. Stay home and just play games all throughout the night and that would lead me to sleep very late hours or for example I was travelling a lot last holidays and. I got used to getting home around 3:00 to 4:00 AM. Over the holidays, for maybe a few weeks and. Although. I was used to that schedule by the time I got back to UNI. I didn't really have any difficulties going back to my old sleep routine and for example, back when I used to stay up playing video games I would. For example, sleep at. 3:00 PM and then wake up very late past dinner time. But if I wanted to fix my sleep schedule, I would just stay up until I slept at maybe 11:00 or 12:00 PM. So basically my normal sleep time and my body would generally adjust accordingly.
Speaker 1
Do you often feel tired throughout the day?

Speaker 2
I definitely do more so than, for example, back when I was in high school. Nowadays, I almost always need a coffee in the afternoons just to get through the day.
Speaker 1
OK, So what are some things that you do to help maintain your sleep schedule?
Speaker 2
I think the thing that helps me the most in maintaining my sleep schedule is sleeping at a consistent time. So I always aim for around 11:00 or 12:00 PM and I think. Also waking up around 7:00 or 8:00 AM that consistent time of sleeping and consistent wake up time really helps me.
Speaker 1
So consistency is the main thing. OK. Do you ever have trouble staying consistent?
Speaker 2
I generally don't because for example, I do study out late at night, but I always go back home around 10:00 PM so that I can sleep at a consistent time, and I do sometimes. Go out with friends and I do get home very late sometimes, for example 2 to 3:00 AM. But I do feel tired the next day. However, the next day I do consistently sleep at around 11:00 or 12:00, so I think that kind of. Maybe negates getting home late and sleeping late, so for me I don't really have a problem with consistency.
Speaker 1
So is there anything that you think might help you improve your sleep schedule or help you? Sleep better in general.
Speaker 2
I think the only thing that would improve my sleep schedule would be figuring out how to get myself out of bed in the mornings, I think. After I. Kind of solved that issue. I probably won't really have any issues sleeping. I used to have a lot of difficulty falling asleep, but I figured out that listening to music really helps me. So I think eventually I should be able to find a solution.
Speaker 1
OK. That concludes all our questions for today. Thank you.

Interview 5

Introductory Questions

1. How old are you?

22

1. What do you study in university

In doing a bachelor of IT

1. Do you think you get enough sleep?

Uhhh I do think I get a solid amount of sleep, probably around 6 to 8 hours a day depending.

1. What else do you do outside of university?

I work a casual job, generally during most of the weekdays .

Questions about sleep

1. Describe your current sleeping schedule.

I have different schedules I guess depending on if its a weekday or weekend. If I see that I have work the following day which is always rather early like 6am to 10am starts I always try to go to bed such that I get at least 6 to 8 hours of sleep when waking up, but there are times I don't really get to do that.

Thats probably because I use my phone waaay too much before bed. I like to read books and whatnot a lot so I'm usually in bed on my phone, but I always try to be conscious of the time, but yeah sometimes I just can't fall asleep and get back on my phone and I end up getting less sleep than usual. Not all the time though. I actually take melatonin supplements if I really feel that I want to get to sleep on time.

Uh my sleeping conditions, well when I'm on my phone I have my bedside lamp on, which I turn off when I feel that I need to try and get to sleep. Uh I also usually turn on some white noise so that I can fall asleep a bit easier since it occupies my background thoughts.It helps quite a bit so I'm not stewing in my thoughts you know.

On weekends I really just sleep when I feel tired, generally around 12am to like 3am. I kinda have to "force" my sleep a lot of the time, I don't really get super naturally tired during the night.

Actually when coming back from work I almost always take a 2 hour nap at like midday since I get really tired then, which probably messes up my circadian rhythm a bit. I always struggle a tiny bit when sleeping at night.

1. How long roughly does it take you to fall asleep?

When actually trying to sleep and not on my phone? Probably between 30 minutes to like and hour and a half, really depends how awake I feel.

1. Do you wake up tired from sleep? (Quality of sleep)

I always wake up in weekday mornings when working kinda reluctant? At least I'm not jumping out of bed and singing and stuff. Its not so bad that I fall back asleep though out of drowsiness, probably because I know I HAVE to wake up.

During weekends though I usually wake up once or maybe twice around 8am to 11am, look on my phone a bit then fall back asleep again and end up actually waking up at like 12pm or 1pm even.

Its probably my circadian rhythm for the weekday making me wake up kind of naturally and the since I don't NEED to wake up I just sleep again.

1. Do you frequently wake up during the night?

Not frequently, but it happens sometimes and I have trouble getting back to sleep, probably because I take naps in the afternoon I don't know really.

1. Are you happy with it? If not, what would you change?

Describe your ideal sleeping schedule.
Im okay with the times I have to sleep but the problem comes with not actually being able to sleep at those times I have set. I kinda don't like having to sleep "early" to wake up early but I have to so its not like I can change it. Ideally I would like to sleep late like 12am to 1am and wake up later like 10am or 12pm like 10 hours of sleep is nice.

1. What are the main factors that prevent you from maintaining your ideal schedule? Is there anything specific that make you stay up late?

Like I said before my phone and probably playing games on my laptop before that. Primarily my phone..

1. Has there been a time where you have ruined your sleep schedule? How/for how long did it effect you (mood, energy levels etc.)? How did you recover from it?

There are times I've stayed up late consistently during uni holidays and when I wasn't working where I'd wake up at like 2pm in the afternoons and sleep at like 3am around that time. I kinda had to fix it when I had obligations though, so I just forced early sleep either my just lying it bed till it happened or taking melatonin.

I've never really had a bad sleep schedule that affected my mood or energy levels I think though when I have a "bad schedule" its usually just me sleeping later and thus waking up later I pretty much always get like a solid number of hours rest, and even if I don't, like 2 or 4 hours, it doesn't feel like it affects me since I just fix it the next day or so. Never really turns into a schedule or consistency, getting low sleep.

Question about lifestyle?

1. Do you often feel tired?

Not necessarily I have afternoon naps a lot though, I get outside of drowsiness when I'm at home at those times and I sleep for like 2ish hours.

1. Do you have trouble waking up early?

Not when I HAVE to. When I don't have to I almost never stay awake during single digit times.

Questions about solutions

1. What are some things you do to help with maintaining sleep schedule?

White noise, supplements and being conscious of the time I need to work the next day and the current time.

1. What are some things that you think may help you sleep better?

Getting off my phone.

12.3 Sleep diary protocol

Sleep Diary

- Write one entry per day
- Write a rough diary entry or list detailing the actions you took before bed that could have influenced your sleep quality.
- Rate your own quality of sleep, from 1 to 5 the next morning.
- Repeat for 5 entries.

Entry structure

Thursday night 5th September

Before sleep

- Talk about the activities you did before bed, maybe an hour or two before actually falling asleep itself, record the rough time you plan to fall asleep or will sleep.

After sleep

- Estimate how many hours you spent sleeping
- Explain briefly how you feel.
- Give a score of your perceived sleep quality.

Write a brief paragraph about how you felt about the sleep diary activity as a whole and if it has affected your perceptions in any way.

12.4 Sleep Diaries:

Team Member 1:

PSQI Score: 6

- **September 5th, 2024**
  - **Before sleep**
    Went to bed at 12:30 am
    Watched YouTube for the past two hours
    Listened to a YouTube video to fall asleep
  - **After waking up**
    Woke up around 6 am
    Slept for 5.5 hours
    I feel rested, so I rate my sleep 4/5
- **September 6th, 2024**
  - **Before sleep**
    Writing at 12:32 am
    No naps today
    Worked on a personal project until 10 pm
    Played a game for the rest of the evening
    Listened to a YouTube video to fall asleep
  - **After waking up**
    Woke up at 5:30 am
    Slept for 5 hours
    I feel mostly rested, 3/5
- **September 7th, 2024**
  - **Before sleep**
    Writing at 1:20 am
    No naps today
    Spent a few hours playing a game and watching YouTube
    Listened to a YouTube video to fall asleep
  - **After waking up**
    Woke up at 7:30 am
    Slept for 6 hours
    I feel rested, 4/5
- **September 8th, 2024**
  - **Before sleep**
    Writing at 1:01 am
    No naps today
    Watched YouTube for a few hours, then did an assignment for the last hour
    Drank a bottle of Coke before bed
    Listened to a YouTube video to fall asleep

    - **After waking up**
      Woke up at 8 am
      Slept for 7 hours
      I feel rested, but my muscles feel sore, 3/5
- **September 9th, 2024**
    - **Before sleep**
      Writing at 12:36 am
      No naps today
      Spent a few hours watching YouTube and doing an assignment
      Listened to a YouTube video to fall asleep
    - **After waking up**
      Woke up at 8 am
      Slept for 7.5 hours
      I feel rested, but my muscles feel sore, 3/5
- **September 10th, 2024**
    - **Before sleep**
      Writing at 12:54 am
      No naps today
      Worked on assignments for three hours
      Listened to a YouTube video to fall asleep
    - **After waking up**
      Woke up at 6 am
      Slept for 5 hours
      I want to go back to sleep, 2/5

Team Member 2:

- **Entry 1 (5/9)**
  Finished classes at 3 pm
  Ate around 7 pm
  Went to sleep at 11 pm
  Sleep quality: 3/5
  Had trouble falling asleep (took 30 minutes), woke up twice but fell back asleep quickly
  Felt groggy in the morning
- **Entry 2 (6/9)**
  Worked on assignments until 6 pm
  Went to bed at 11:30 pm
  Sleep quality: 4/5
  Woke up once but still felt well-rested

- **Entry 3 (7/9)**
  Spent the day at home
  Went to bed at 11:10 pm
  Sleep quality: 5/5
  Fell asleep quickly, slept through the night
- **Entry 4 (8/9)**
  Worked at an event until 8 pm
  Got home at 9:30 pm
  Went to bed at 11:30 pm
  Sleep quality: 4/5
  Took a while to fall asleep, woke up at 4 am but quickly went back to sleep
- **Entry 5 (9/9)**
  Came home at 5 pm
  Took a short nap until 6 pm
  Went to bed at 11:50 pm
  Sleep quality: 3.5/5
  Slept soundly but woke up briefly at 2 am, then quickly fell back asleep

Team Member 3:

September 4th, 2024

- Finished studio work at 12:00 p.m.
- Drove to Fortitude Valley to pick up girlfriend
- Returned home at 5:00 p.m., did laundry, cooked dinner, showered
- Went to sleep at 6:30 p.m. for a long sleep (planned wake-up at 5:30 a.m.)
- Sleep quality: 4/5, woke up once at 1:00 a.m. to use the bathroom

September 5th, 2024

- Left UQ at 8:00 p.m., drove to Macca’s for a Happy Meal
- Set up laptop for an hour, took a shower
- Went to bed at 10:30 p.m., no screen time
- Sleep quality: 3/5, fell asleep quickly but didn’t get enough sleep, disliked early alarm

September 6th, 2024

- Picked up girlfriend at 3:00 p.m., went for a city walk (4:00-6:00 p.m.)
- Had pizza for dinner (6:30-7:30 p.m.), returned home at 8:00 p.m.
- Prepared tomorrow's lunch, showered, played mobile games for 30 minutes
- Went to bed at 10:00 p.m.
- Sleep quality: 3/5, woke up at 5:30 a.m., felt like the sleep duration wasn’t enough but fell asleep quickly

September 7th, 2024

- Finished work at 3:00 p.m.
- Attended a show about Japanese culture (4:00-6:00 p.m.)
- Returned home at 7:30 p.m., showered, studied for an hour before bed
- Went to bed at 10:00 p.m.
- Sleep quality: 3/5, woke up at 5:40 a.m., adapting to early wake-up routine but still dislike it

Team Member 3:

September 8th, 2024

- Finished work at 3:00 p.m.
- Picked up girlfriend at 5:00 p.m., went for dinner at Southbank (6:00-7:30 p.m.)
- Got home around 8:30 p.m., did some laundry and showered
- Went to bed at 9:30 p.m.
- Sleep quality: 4/5, fell asleep quickly, woke up briefly at 2:00 a.m. but managed to go back to sleep easily

September 8th, 2024

- Finished work at 3:00 p.m.
- Picked up girlfriend at 5:00 p.m., went for dinner at Southbank (6:00-7:30 p.m.)
- Got home around 8:30 p.m., did some laundry and showered
- Went to bed at 9:30 p.m.
- Sleep quality: 4/5, fell asleep quickly, woke up briefly at 2:00 a.m. but managed to go back to sleep easily

September 9th, 2024

- Finished work at 3:00 p.m.
- Attended a dinner party (6:00-9:00 p.m.), socializing with friends
- Got home at 9:45 p.m., watched a show for an hour before bed
- Went to bed at 11:00 p.m.
- Sleep quality: 3/5, woke up once during the night, took a while to fall back asleep

September 10th, 2024

- Picked up girlfriend after work at 4:00 p.m.
- Went out to a late dinner at 7:00 p.m., got home at 9:30 p.m.
- Spent some time relaxing and preparing things for tomorrow
- Went to bed at 10:45 p.m.

- Sleep quality: 4/5, felt refreshed in the morning, woke up briefly at 5:00 a.m. but managed to sleep well overall

September 11th, 2024

- Left work at 4:00 p.m., had a team meeting
- Went out to grab some dinner at 6:00 p.m., got home by 7:30 p.m.
- Watched Netflix for an hour, then showered
- Went to bed at 10:15 p.m.
- Sleep quality: 4/5, fell asleep quickly, woke up once but had a restful night overall

Team Member 4:

Sleep Diary Entry 1
Date: 5/9

- Spent the day working on assignments, finished by 8:00 p.m.
- Had a late dinner at 9:00 p.m., then watched TV for an hour
- Went to bed at 11:30 p.m.
- Sleep quality: 3/5, took a while to fall asleep

Sleep Diary Entry 2
Date: 6/9

- Had an early start with an 8:00 a.m. lecture
- Finished the day's work by 5:00 p.m., played video games in the evening
- Went to bed at 11:00 p.m.
- Sleep quality: 4/5, slept well but woke up briefly at 3:00 a.m.

Sleep Diary Entry 3
Date: 7/9

- Spent the day on campus working in the library
- Got home around 6:00 p.m., had dinner at 7:00 p.m.
- Watched Netflix until 10:00 p.m., then prepared for bed
- Went to bed at 10:45 p.m.
- Sleep quality: 5/5, slept through the night

Sleep Diary Entry 4
Date: 8/9

- Had a busy day with back-to-back meetings
- Finished work at 7:00 p.m., had a quick dinner at 8:00 p.m.
- Spent an hour reading before bed
- Went to bed at 11:00 p.m.
- Sleep quality: 4/5, woke up once but overall good sleep

Sleep Diary Entry 5
Date: 9/9

- Spent the day working on a group project
- Finished around 5:00 p.m., played some video games to relax
- Had dinner at 8:00 p.m.
- Went to bed at 11:00 p.m.
- Sleep quality: 3.5/5, woke up once during the night but managed to fall back asleep quickly

Team Member 5:

September 5th, 2024

- Spent the day working on a research assignment, finished around 6:00 p.m.
- Watched TV for 2 hours, had dinner around 8:00 p.m.
- Went to bed at 10:30 p.m.
- Sleep quality: 4/5, slept soundly, woke up feeling refreshed

September 6th, 2024

- Attended a full day of classes from 9:00 a.m. to 4:00 p.m.
- Relaxed in the evening, watched YouTube until 10:00 p.m.
- Went to bed at 11:00 p.m.
- Sleep quality: 3/5, woke up once during the night

September 7th, 2024

- Had a long day working on assignments
- Finished around 7:00 p.m., had dinner and relaxed for a bit
- Went to bed at 10:45 p.m.
- Sleep quality: 3.5/5, took a while to fall asleep but slept well after that

September 8th, 2024

- Spent the day out with friends, had dinner at 7:00 p.m.
- Watched a movie after dinner, got home around 10:00 p.m.
- Went to bed at 11:15 p.m.
- Sleep quality: 4/5, slept soundly

September 9th, 2024

- Worked on assignments during the day, finished by 5:00 p.m.
- Had a relaxing evening, played video games for a few hours
- Went to bed at 10:45 p.m.
- Sleep quality: 3/5, woke up once but managed to fall back asleep

Team member 1:

It is important distinction to note that ALL of my naps are SPONTANEOUS and NOT VOLUNTARY . They are a product of me feeling tired. This probably correlates me lacking in sleep quality overall as I need to compensate with a nap itself. So my perceived quality is probably off.

Team member 2:

I do think that this sleep diary has gotten me to at the very least be more conscious of my sleep quality and how I actually perceive my feelings on the matter. Makes me feel bad about my habits I guess, I felt bad about them before, but now even more so. Revenge bedtime procrastination is very key in my habits here.

Team member 4 PSQI

Component 1 - Subjective Sleep Quality: 1
Component 2 - Sleep Latency: 2
Component 3 - Sleep Duration: 2
Component 4 - Habitual Sleep Efficiency: 0
Component 5 - Sleep Disturbances: 1
Component 6 - Use of Sleep Medication: 1
Component 7 - Daytime Dysfunction: 1
Global PSQI: 8

Team Member 6:

PSQI: 4

4th - Wednesday Night:

- Spent the last few hours in VS Code.

- Went to bed later than usual—was a bit invested in finishing but it took longer than expected.
- Went to bed at 12:00.

5th - Thursday Morning:

- Woke up at 7:00 and watched YouTube Shorts until 8:00.
- Had breakfast and went back to VS Code.

  Thursday Night:

  - Started cooking dinner around 8:30.
  - Finished cooking by 9:15 and ate while watching YouTube until bedtime at 10:00.

6th - Friday Morning:

- Woke up to the alarm at 5:00.
- Felt well-rested.
- A bit tired on the bike ride to work.

  Friday Night:

  - Had dinner while watching YouTube around 7:30.
  - Went to bed at 8:00.

7th - Saturday Morning:

- Woke up by myself just before the alarm at 6:00.
- Felt really well-rested.
- Bike ride to work felt good.

  Saturday Night:

  - Played games on the PC for the last two hours and went to bed at 10:30.

8th - Sunday Morning:

- Woke up around 6:30 by myself.
- Watched YouTube Shorts until 7:45.
- Went to work.

  Sunday Night:

  - Watched YouTube Shorts for the last hour before bed.
  - Went to bed at 10:30.

9th - Monday Morning:

- Woke up at 7:00.
- Felt really well-rested.
- Watched YouTube.

  Monday Night:

  - Had a team meeting at 8:00 (-_-).
  - Finished the team meeting around 9:15.
  - Went to bed around 9:30.

12.5 Survey Questions

Survey was done in two parts, first the group's questions, followed by the PSQI test to gauge their sleep..

Groups Questions

1. Briefly Describe some habits and practices that are conducive to sleeping well on a regular basis.
2. What do you think are the biggest challenges or barriers to improving your sleep quality as a university student?
3. What are the most common reasons that impede you from getting good sleep, if ever? (Select all that apply)
4. During the past month, how many minutes did you spend on your devices within one hour before bedtime?
5. What is the main purpose of this screen time before bed?
6. During the past month, how often did spiraling thoughts (negative thoughts) increase the time it took for you to fall asleep?

7. During the past month, how often did late night thoughts (excluding negative) increase the time it took for you to fall asleep?
8. How often do you take naps during the day?
9. If you do nap during the day, how long do your naps usually last?
10. If you nap do they help your overall sleep quality more than they harm it.
11. Briefly describe any sleeping aids/methods to help you fall asleep?
12. Do you take any additional steps during the day to alleviate tiredness.

PSQI Questions

1. During the past month, how many hours per night do you spend in your bed?
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
3. During the past month, how many hours per night do you spend actually sleeping?
4. During the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes?
5. During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning?
6. During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom?
7. During the past month, how often have you had trouble sleeping because you cannot breath comfortably?
8. During the past month, how often have you had trouble sleeping because you cough or snore loudly?
9. During the past month, how often have you had trouble sleeping because you feel too cold?
10. During the past month, how often have you had trouble sleeping because you feel too hot?
11. During the past month, how often have you had trouble sleeping because you had bad dreams?
12. During the past month, how often have you had trouble sleeping because you have pain?
13. During the past month, how often have you had trouble sleeping because of any other reason not described above?
14. During the past month, how would you rate your sleep quality overall?
15. During the past month, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?
16. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?
17. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

12.6 Market research Links

Solution 1: Apple Watch
Website: https://www.apple.com/au/watch/

Solution 2: Sleep Ninja
Website: https://www.blackdoginstitute.org.au/research-projects/sleep-ninja/

Solution 3: Calm
Website: https://www.calm.com/
App: https://play.google.com/store/apps/details?id=com.calm.android&hl=en_AU

Solution 4: MUSE
Website: https://choosemuse.com/
App: https://play.google.com/store/apps/details?id=com.interaxon.muse&hl=en_AU

Solution 5: Sleepon
Website: https://www.sleepon.us/
App: https://play.google.com/store/apps/details?id=com.sleep.on&hl=en_AU
Solution 6: Sleep as Android: Smart alarm
App: https://play.google.com/store/apps/details?id=com.urbandroid.sleep

Solution 7: RISE
Website: https://web.risescience.com/offer/sf
App: https://play.google.com/store/apps/details?id=com.risesci.nyx&hl=en_AU

Solution 8: Stellar Sleep
Website: https://stellarsleep.com/
App: https://play.google.com/store/apps/details?id=one.slumber.client&hl=en_AU

Solution 9: Bía
Website: https://getbia.com/

Solution 10: StayOff: Screen Time Control
App: https://play.google.com/store/apps/details?id=com.app.floatingapptimer.com

Solution 11: Sleep Tracker
App: https://play.google.com/store/apps/details?id=sleeptrakcer.sleeprecorder.sleepapp.sleep

Solution 12: Headspace – Sleep & Meditate
App: https://play.google.com/store/apps/details?id=com.getsomeheadspace.android&hl=en_AU

Solution 13: Beltone Tinnitus Calmer
App: https://play.google.com/store/apps/details?id=com.beltone.tinnitus

Solution 14: Pocket Kado
App: https://play.google.com/store/apps/details?id=com.reverylab.pocketkado.prod

Solution 15: Cognitive Behavioural Therapy for Insomnia in Veterans
Document:
https://www.sleepmattersperth.com.au/wp-content/uploads/CBT-I-Therapist-Manual-vetrnals-Manber-2018.pdf