Project 3

Introduction

Sleep plays a vital role in maintaining overall health and well-being, yet it is often neglected by students due to academic pressures, social commitments, and inconsistent schedules. Poor sleep habits can lead to long-term health issues such as weakened immunity, cognitive decline, and chronic illnesses. As technology becomes increasingly integrated into daily life, wearable devices like smartwatches and fitness trackers offer an opportunity to improve sleep hygiene through data-driven insights and actionable feedback.

*This project focuses on designing a **sleep tracking application** tailored to students. The goal is to leverage existing wearable devices to help students develop healthier sleep habits by understanding their mental models about sleep, identifying barriers to better sleep, and encouraging positive behavior change. Through systematic user research, analysis, and iterative design, this project aims to create a solution that is both practical and engaging for students.*

Research Current Sleep-Tracking Technologies

1) Apple Watch

- **Features**: Tracks sleep duration and quality using the Sleep app, monitors heart rate variability, and integrates with the Apple Health app.
- **Strengths**:
  Integration with Health Ecosystem: Apple Watch integrates seamlessly with the Health app, which can be helpful for users already using the Apple ecosystem (iPhone, iPad).
  Smart Reminders: Reminders for bedtime help users stay on track.
- **Pain Points**:
  Limited Sleep Data: Earlier versions of the Apple Watch (Series 3 to 5) lacked detailed sleep stage tracking, offering only basic sleep duration monitoring. Though Series 6 and later include more in-depth data, it is still not as detailed as competitors like Fitbit or Garmin.
  Lack of Personalized Recommendations: The data is primarily descriptive with little actionable guidance to improve sleep hygiene. It does not educate users on specific actions they can take to improve sleep quality (better sleep environment or sleep consistency).
  Battery Life: Some users report the watch runs out of battery quickly, especially when used for sleep tracking, which can result in gaps in the sleep data.

2) Fitbit

- **Features**: Fitbit devices (e.g., Charge series, Versa) offer detailed insights into sleep stages (Light, Deep, REM), sleep duration, and restlessness. The devices also provide a sleep score based on these metrics.
- **Strengths**:
  Comprehensive data: Provides sleep stages and trends over time, which can offer a deeper understanding of sleep patterns.
  Simple UI: Fitbit's app has an easy-to-understand interface with a clean visual representation of sleep data.
  Silent Alarm: The feature vibrates to wake the user at an optimal point in their sleep cycle, preventing grogginess.
- **Pain Points**:
  Accuracy Issues: Fitbit's sleep tracking isn't always accurate when students have irregular sleep schedules, such as studying late or napping during the day.
  Overwhelming Data: While detailed, the vast amounts of sleep data can overwhelm users, especially those who don't know how to interpret it.
  Limited Actionable Insights: Users often receive a sleep score and some suggestions (like improve your sleep hygiene), but there's a lack of tailored advice to improve specific habits (e.g., lower caffeine intake in the afternoon).
  Lack of Long-Term Motivation: There are few features that encourage long-term commitment to improving sleep hygiene.

3) Garmin

- **Features**: Provides in-depth tracking of sleep stages (Light, Deep, REM), as well as pulse oximeter (oxygen saturation levels) and heart rate variability during sleep, which helps assess recovery.
- **Strengths**:
  Advanced Metrics: Garmin watches, such as the Fenix and Forerunner series, provide advanced metrics like oxygen levels and stress monitoring during sleep, offering a deeper understanding of overall health.
  Recovery Insights: Excellent for athletes, Garmin's sleep insights tie into broader recovery metrics, helping users optimize their training and sleep patterns.
- **Pain Points**:
  Complexity for Casual Users: Garmin's app can be overwhelming for non-athletes, with detailed metrics that can be difficult to interpret.
  Motivation & Engagement: Like Fitbit, Garmin lacks features that help keep users motivated over the long term.

Overemphasis on Fitness: The devices' focus on fitness and recovery means they often ignore the specific needs of a student, such as improving concentration or reducing stress related to studying.

Pain Points Across Technologies:

- **Accuracy Issues with Irregular Sleep Patterns**: Students, especially those with erratic sleep due to late-night studying or socializing, are often left with inaccurate or inconsistent tracking results.
- **Lack of Actionable Insights**: While sleep-tracking technologies provide raw data, there is a significant gap in actionable advice that guides users toward healthier sleep practices.
- **Engagement and Habit Formation**: Most wearable sleep trackers do not focus on habit formation or long-term engagement, leading to reduced adherence and improvement over time.

Mental Models

Students often have flawed or incomplete mental models when it comes to sleep hygiene and how it affects their health and academic performance. These perceptions influence how they engage with sleep-tracking technology.

1. **Common Misconceptions Among Students**:
    a. **Sleep Deprivation is Acceptable**: Many students believe that working late or sacrificing sleep for academic performance is an acceptable trade-off. There's a common belief that the catch-up sleep over weekends can make up for lost sleep during the week, although research shows this is not effective for long-term health.
    b. **Focus on Sleep Duration, Not Quality**: Students often focus only on getting a certain amount of sleep rather than on the quality of that sleep. For example, they may believe that sleeping for 8 hours, even if it's interrupted or poor quality, is sufficient.
    c. **I Can Sleep When I'm Older**: Some students might disregard the importance of sleep now, assuming that they can catch up on sleep later in life. However, chronic sleep deprivation can lead to long-term cognitive and physical health issues.

2. **Technology's Role in Shaping Mental Models**:
    a. **Data Overload vs. Simplification**: While sleep trackers often provide valuable data, they may not be effectively tailored to students' needs. Many apps simply display the raw metrics (e.g., sleep score, duration) without translating this information into clear, actionable advice.
    b. **Educational Potential**: Wearable sleep trackers could serve as a tool to educate students about the importance of sleep hygiene. They could shift mental models by emphasizing quality sleep over duration and helping students recognize behaviors that affect their sleep quality.
    c. **Behavioral Shifts**: Properly designed sleep apps could help students develop healthier sleep habits by focusing on consistent sleep schedules, reducing stress, and implementing proven sleep hygiene practices.

Opportunities to Influence Mental Models:

- **Personalization**: Providing tailored insights and recommendations based on the student's specific habits and goals could better engage users and change their behavior.
- **Simplified Communication**: Using visuals (e.g., sleep cycle graphs, energy levels) that highlight improvements could help students better understand the impact of sleep quality on their daily lives.
- **Behavioral Nudges**: Push notifications, reminders, or rewards systems can reinforce the importance of sleep hygiene, making it more engaging and easier to adopt positive habits.

Behavior Change

1. **BJ Fogg's Behavior Model (Behavior = Motivation × Ability × Trigger)**
    a. This model can be applied to sleep-tracking apps in the following way:
        i. **Motivation**: Reinforce the benefits of sleep through personalized feedback. For example, students could see the connection between better sleep and improved academic performance or mood.

ii. **Ability**: Make it easy for students to implement small, manageable changes to their sleep habits. This could include simple goals like try going to bed 15 minutes earlier or reduce screen time an hour before bed.
iii. **Trigger**: Use timely reminders and prompts to encourage action. For example, sending a notification when it's time to start winding down for bed based on their sleep schedule.

2. **Nudge Theory**
    a. **Using small, subtle interventions to guide students toward healthier behavior**:
        i. **Defaults**: Set healthy sleep goals as the default (e.g., aiming for 8 hours of sleep) but allow students to customize based on their needs.
        ii. **Social Influence**: Show how other students are improving their sleep, using social proof as motivation. For example, 80% of students who went to bed before midnight reported feeling more focused the next day.
        iii. **Positive Reinforcement**: Reward students with badges, streaks, or other incentives when they consistently meet their sleep goals.

To encourage long-term behavior change, the app should:

- **Set Clear Goals**: Create simple, achievable sleep goals tailored to the student's lifestyle.
- **Feedback Loops**: Provide regular feedback on progress (e.g., You improved your sleep quality by 10% this week! Keep it up!).
- **Continuous Motivation**: Use reminders, challenges, or gamification to keep students engaged and motivated.
- **Personalization**: Offer specific, actionable insights and tips based on a student's unique sleep patterns (e.g., You tend to get less deep sleep on weekends, try going to bed at the same time every night for better recovery).

Interview and Observe Stakeholders

This section provides an in-depth analysis of the interviews and observations conducted with two groups:

1. **Students without trackers (Group A)** – Understanding their perspective on sleep hygiene and their willingness to adopt sleep-tracking tools.

2. **Students with trackers (Group B)** – Evaluating how they use sleep-tracking features and their impact on sleep habits.

The objective was to identify pain points, behaviors, and needs that inform the design of an improved sleep-tracking solution tailored for students.

Questions for Students Without Trackers (Group A)

1. Can you describe your typical bedtime routine?

Common Answer: I usually scroll through my phone or watch serials before bed. Sometimes I study or finish assignments late into the night. I don't really have a set routine; it depends on my workload.

2. What challenges do you face in maintaining a consistent sleep schedule?

Common Answer: Balancing studies and social life is tough. Sometimes I stay up late to finish homework, and other times, I just lose track of time on my phone. Exams or deadlines often disrupt my schedule.

3. How do you currently track or assess the quality of your sleep?

Common Answer: I don't track my sleep. I just go by how I feel in the morning. If I'm tired, I know I didn't sleep well. Sometimes I count hours, but that's about it.

4. What do you think is the biggest factor affecting your sleep quality?

Common Answer:Stress from schoolwork or using my phone too much at night. Sometimes noise in my dorm or late-night conversations also keep me up.

5. What do you know about sleep-tracking technologies or apps?

Common Answer: I've heard of them, but I don't know much. I think they tell you how much you sleep and maybe when you're in deep sleep. I never really looked into them because I don't think I need one.

6. Do you believe understanding your sleep patterns could help improve your health or productivity?

Common Answer: Maybe. If I knew exactly what was wrong with my sleep, I could try to fix it. But I'm not sure how useful it would be for me unless it's really simple to use.

7. What type of feedback or advice would you find helpful from a sleep tracker?

Common Answer: Something easy to understand, like how to fall asleep faster or wake up feeling less tired. Maybe tips on avoiding distractions before bed.

Questions for Students With Trackers (Group B)

1. How often do you check your sleep data on your tracker?

Common Answer: I check it a few times a week, mostly when I feel extra tired. Sometimes I forget it's even tracking my sleep.

2. What specific features of your sleep tracker do you use the most?

Common Answer:I look at the sleep score and the time spent in deep sleep versus light sleep. The charts are interesting, but I don't spend much time analyzing them.

3. Do you feel the data provided by your tracker is accurate and actionable?

Common Answer:It feels accurate most of the time, but I'm not sure what to do with the information. It's interesting, but I don't always know how to improve my sleep based on it.

4. How does your tracker fit into your daily routine?

Common Answer:I just wear it all the time, so it tracks automatically. I don't really adjust anything specifically for sleep tracking.

5. What improvements would you like to see in the sleep-tracking features?

Common Answer:I'd like it to give clearer advice, like what time I should sleep or wake up. Maybe suggestions tailored to my schedule.

6. Do you feel more aware of your sleep habits since using a tracker?

Common Answer:Yes, I've noticed patterns, like I sleep worse when I go to bed late. But I haven't made big changes yet.

7. How do you interpret the metrics like REM sleep, deep sleep, and light sleep?

Common Answer: I have a rough idea of what they mean, but I don't know how much deep sleep I'm supposed to get or why it matters.

8. What prevents you from using the sleep tracker consistently (if applicable)?

Common Answer: Sometimes I forget to wear it to bed, or the battery runs out. Also, I don't always have the time or interest to check the data.

Observations Based on Interviews

Group 1: Students Without Trackers (8 Participants)

1. **Bedtime Routine**
    a. **Observation**: Most students (6 out of 8) lack a structured bedtime routine. Activities like scrolling through social media (TikTok, Instagram, Telegram) binge-watching shows, or last-minute studying dominate their pre-sleep habits. Only 2 students reported occasional efforts to relax, such as reading or meditating.
    b. **Insight**: The absence of a consistent routine reflects a reactive approach to sleep rather than a proactive one, highlighting a potential gap for educational interventions.
2. **Challenges in Maintaining Sleep Schedule**
    a. **Observation**: All 8 participants cited academic workload, social engagements, or distractions (like smartphones) as major disruptions to their sleep schedules. Stress during exam weeks was a recurring theme.
    b. **Insight**: External pressures significantly impact their ability to establish or maintain healthy sleep patterns, making stress management and time management key areas for improvement.
3. **Sleep Assessment**
    a. **Observation**: None of the students actively track their sleep. Most (7 out of 8) rely on subjective measures like how they feel upon waking or the number of hours they estimate they've slept. One student mentioned occasionally using a phone app to set alarms but not for tracking sleep quality.
    b. **Insight**: There is low awareness of sleep quality metrics among non-users, suggesting an educational opportunity about the benefits of tracking.
4. **Knowledge of Sleep Hygiene and Trackers**
    a. **Observation**: While all participants had a vague understanding of good sleep habits (e.g., get 7-8 hours of sleep), only 3 were familiar with specific sleep hygiene practices like avoiding screens before bed. Regarding sleep trackers, 6 out of 8 were aware of them but skeptical about their necessity or effectiveness.

   b. **Insight**: Students are aware of sleep issues but often lack detailed knowledge or motivation to adopt solutions.
5. **Interest in Sleep Tracking**
   a. **Observation**: Half of the participants (4 out of 8) expressed curiosity about sleep trackers if they could provide actionable advice or integrate seamlessly with daily routines. The others felt the technology might be unnecessary or too complicated.
   b. **Insight**: While there is interest, any solution must be simple, affordable, and results-oriented to appeal to this group.

Group 2: Students with Trackers (5 Participants)

1. **Usage Patterns**
   a. **Observation**: All participants wore their trackers daily, but only 3 actively checked their sleep data at least once a week. The remaining 2 viewed it sporadically, typically when feeling tired or unproductive.
   b. **Insight**: Passive tracking is common, but engagement with the data varies. Encouraging more active use could improve the effectiveness of tracking.
2. **Key Metrics Used**
   a. **Observation**: Participants primarily focused on overall sleep duration and sleep scores. Only 2 students had a clear understanding of advanced metrics like REM or deep sleep.
   b. **Insight**: Simplifying data presentation and offering context (e.g., You need more deep sleep for better focus) could enhance user understanding and engagement.

3. **Impact on Behavior**
   a. **Observation**: Three students reported making minor adjustments, such as going to bed earlier or avoiding caffeine, based on tracker feedback. However, none made significant lifestyle changes due to a lack of clear guidance from the tracker.
   b. **Insight**: Trackers are seen as informative but not transformative, indicating a need for actionable and personalized recommendations.
4. **Barriers to Consistent Use**
   a. **Observation**: Forgetting to wear the tracker (3 out of 5) or charging issues (2 out of 5) were common barriers. One participant mentioned losing motivation when data didn't align with their perceived sleep quality.
   b. **Insight**: Practical usability concerns and misaligned expectations can hinder sustained use.

5. **Desired Improvements**
    a. **Observation**: Participants wanted features like personalized bedtime suggestions, stress tracking integration, and actionable advice tailored to their schedules. One participant emphasized the need for simpler visualizations of data.
    b. **Insight**: Enhancing usability and providing clearer, personalized insights could drive better adoption and engagement.

General Observational Insights

1. **Comparison Between Groups**
    a. Students without trackers tend to have a more subjective and less informed understanding of their sleep habits, relying heavily on feelings and assumptions.
    b. Students with trackers appreciate the insights but often fail to translate data into meaningful actions.
2. **Technology and Accessibility**
    a. Cost and complexity were significant concerns for non-users, while users desired better integration with their routines.
    b. Both groups expressed a need for actionable guidance, suggesting that the existing gap isn't just technological but also educational.
3. **Behavioral Patterns**
    a. A recurring theme among all participants was the struggle to prioritize sleep amidst academic and social commitments.
    b. Stress and screen time emerged as the most common barriers to good sleep hygiene, indicating areas where interventions could have the most impact.

Analysis of Data

Data Collection Summary

- **Participants**: 13 students (8 without trackers, 5 with trackers).
- **Methodology**: One-on-one semi-structured interviews, each lasting 15-20 minutes.
- **Focus**: Sleep habits, perceptions of sleep hygiene, challenges in maintaining good sleep, and experience with or opinions on sleep trackers.

Step 1: Appropriate Methods for Analysis

Thematic analysis is employed to categorize and interpret data based on the interviews. Each observation is examined to identify patterns and anomalies, followed by synthesizing actionable insights for the design process. Key themes include bedtime routines, sleep challenges, tracking habits, engagement, and barriers.

Step 2: Explicit Design Insights Informing the Problem Frame

1. Addressing Bedtime Routine Challenges

Analysis:

- A lack of structured routines in Group 1 indicates insufficient awareness or tools to establish healthy pre-sleep behaviors.
- In Group 2, despite having trackers, participants are not leveraging the data to modify routines effectively.

Design Insight: Introduce features that encourage routine formation, such as an interactive app providing tailored bedtime recommendations, pre-sleep relaxation techniques, and gamification (e.g., rewards for consistent routines).

2. Bridging Knowledge Gaps on Sleep Hygiene

Analysis:

- Group 1 demonstrates low awareness of detailed sleep hygiene practices and potential benefits of tracking.
- Group 2 understands basic metrics but struggles to apply advanced insights effectively.

Design Insight: Develop an educational module integrated into the app or tracker, using simple language and visuals to explain sleep hygiene and tracking benefits. Provide actionable suggestions linked to sleep data (e.g., Try dimming lights 30 minutes before sleep to improve deep sleep quality).

3. Overcoming Barriers to Sleep Tracking

Analysis:

- Group 1 views trackers as complicated or unnecessary, indicating the need for low-cost, simple alternatives.
- Group 2 cites practical barriers like forgetting to wear trackers or charging issues.

Design Insight: Introduce a mobile app-based tracker for Group 1, emphasizing simplicity and affordability. For Group 2, implement reminders and battery management features (e.g., alerts for low battery or unused devices).

4. Personalization of Sleep Tracking Feedback

Analysis:

- Both groups express interest in actionable and personalized insights.
- Group 2 emphasizes the need for clearer visualizations and context for sleep metrics.

Design Insight: Leverage AI to deliver personalized advice, such as optimal bedtime recommendations based on individual schedules. Simplify data presentation with intuitive dashboards that include visual cues (e.g., You are 15% below your weekly deep sleep average—consider reducing caffeine).

5. Stress and Time Management Integration

Analysis:

- Stress and academic workload are recurring themes disrupting sleep schedules in both groups.
- Current solutions do not address these external pressures effectively.

Design Insight: Incorporate stress management tools within the app or tracker, such as breathing exercises, relaxation playlists, or a journal to log stressors. Tie these features to sleep tracking insights, showing how stress impacts sleep quality.

6. Motivating Adoption and Sustained Use

Analysis:

- Group 1 is curious about trackers but skeptical of their necessity.
- Group 2 faces engagement issues due to perceived lack of impact or misaligned expectations.

Design Insight: Enhance adoption by emphasizing the value of tracking through user stories, educational campaigns, and trial experiences. Maintain engagement by offering immediate feedback and relatable success metrics (e.g., Your sleep efficiency improved by 10% this week!).

Step 3: Informing the Problem Frame and Design Process

Problem Frame Refinement

The analysis reveals that the core problem is not only the lack of awareness and tools but also a disconnect between data collection and actionable insights. Solutions must be simple, engaging, and personalized to drive behavior change.

Design Process Directions

- **User Education:** Focus on bridging knowledge gaps with bite-sized, engaging educational content.
- **Behavioral Nudges:** Use reminders, gamification, and rewards to promote healthy routines and sustained use.
- **Personalization:** Ensure that recommendations are tailored to individual needs, increasing perceived value.
- **Integration:** Combine sleep tracking with stress management and scheduling tools to address broader lifestyle issues.

Storyboard 1: Student with Tracker

Title: *Aruzhan's Sleep Tracking Experience with Personalized Insights*

Scene 1: Early Evening - Checking Sleep Data

- **Visual:** Aruzhan sits at her desk, checking her wearable tracker on her wrist. The tracker shows a summary of her sleep data for the night (e.g., sleep duration, sleep score, REM, deep sleep).
- **Text:** Aruzhan looks at her sleep tracker to see how well she slept last night.
- **Insight:** *Personalized feedback on sleep patterns can engage users and help them understand their sleep quality*.

Scene 2: Analysis of Sleep Data

- **Visual:** Aruzhan's tracker app displays a simple, visually clear graph with her sleep efficiency, highlighting areas of improvement. A pop-up notification offers a suggestion: Your deep sleep is lower than the weekly average. Try reducing caffeine in the evening for better sleep quality.
- **Text:** Aruzhan notices her deep sleep score is below average and receives a suggestion to cut back on evening caffeine.
- **Insight:** *Personalized advice tied to sleep metrics helps users take actionable steps to improve their sleep*.

Scene 3: Engaging with Actionable Insights

- **Visual:** Aruzhan follows the tracker's suggestion. She prepares a cup of herbal tea instead of coffee and sets a reminder in the app to wind down 30 minutes before sleep.
- **Text:** Following the suggestion, Aruzhan opts for a relaxing tea and sets a reminder for a bedtime routine.
- **Insight:** *Integrating features like bedtime reminders and relaxation techniques promotes healthy habits and builds a consistent routine*.

Scene 4: A Week Later - Improved Sleep

- **Visual:** A notification appears on her phone: Congratulations! You've improved your deep sleep by 15% this week.
- **Text:** Aruzhan receives a reward for her improved sleep score, reinforcing positive behavior.
- **Insight:** *Gamifying progress and providing positive feedback reinforces behavior change and increases engagement*.

Storyboard 2: Student Without Tracker

Title: *Samat's Struggle with Sleep and Lack of Tracking*

Scene 1: Late Evening - Scrolling on Social Media

- **Visual:** Samat is in bed scrolling through TikTok, Instagram, and responding to messages. His phone screen is brightly lit, and he is clearly distracted.
- **Text:** Samat struggles to wind down and often spends late nights scrolling through social media.
- **Insight:** *Lack of a structured routine or relaxation techniques before bed contributes to poor sleep hygiene*.

Scene 2: Waking Up Tired

- **Visual:** The next morning, Samat wakes up groggy and checks his phone. He estimates he slept around 6 hours, feeling tired but not sure why.
- **Text:** Samat wakes up feeling tired, but he can't track how well he slept, so he guesses it was around 6 hours.
- **Insight:** *Relying on subjective sleep assessments can lead to inaccurate conclusions about sleep quality*.

Scene 3: Frustration with Sleep Schedule

- **Visual:** During the day, Samat struggles to stay focused in class. He's often distracted by his phone and feels a lack of energy.
- **Text:** Samat finds it hard to concentrate and feels drained during the day. His sleep schedule is inconsistent.
- **Insight:** *External pressures and distractions like social media interfere with the ability to maintain a consistent sleep schedule*.

Scene 4: Discovery of Sleep Tracker

- **Visual:** While chatting with friends, Samat hears about a sleep tracker that offers insights and personalized recommendations.
- **Text:** Samat learns about a new sleep tracker that can help him better understand his sleep patterns.
- **Insight:** *Introducing sleep tracking technology could help Samat understand his sleep quality and create a more structured bedtime routine*.

Scene 5: Decision to Try the Tracker

- **Visual:** Samat downloads the sleep tracking app and sets up a simple bedtime reminder, along with a sleep goal for 7 hours.
- **Text:** After hearing about the benefits, Samat decides to try the tracker to improve his sleep.
- **Insight:** *The introduction of a simple, easy-to-use tracker can offer a clear entry point for those unfamiliar with sleep tracking*.

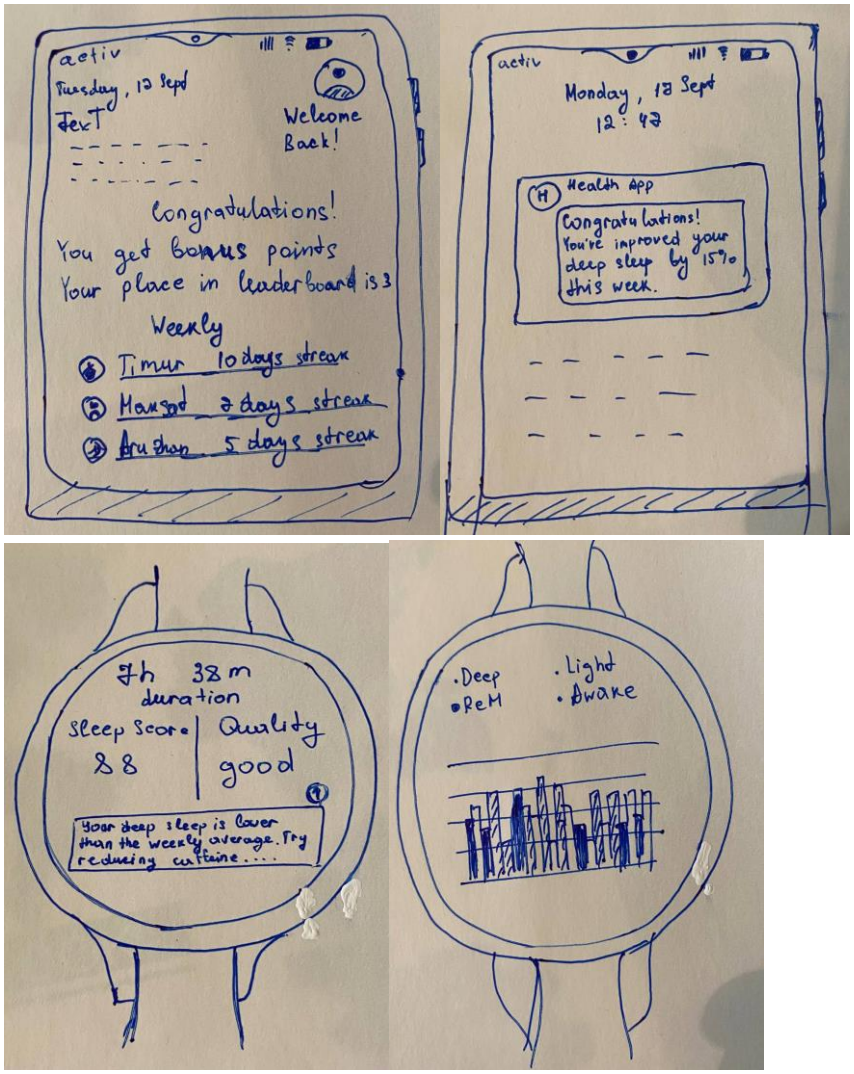
Scene 6: A Week Later - Improved Awareness

- **Visual:** Samat looks at the app, which shows his sleep duration and a simple suggestion: Try reducing screen time 30 minutes before bed for better sleep quality.
- **Text:** A week later, Samat reviews his sleep data and receives personalized recommendations to reduce screen time.
- **Insight:** *Clear, actionable suggestions can encourage users to improve sleep hygiene and develop better habits*.

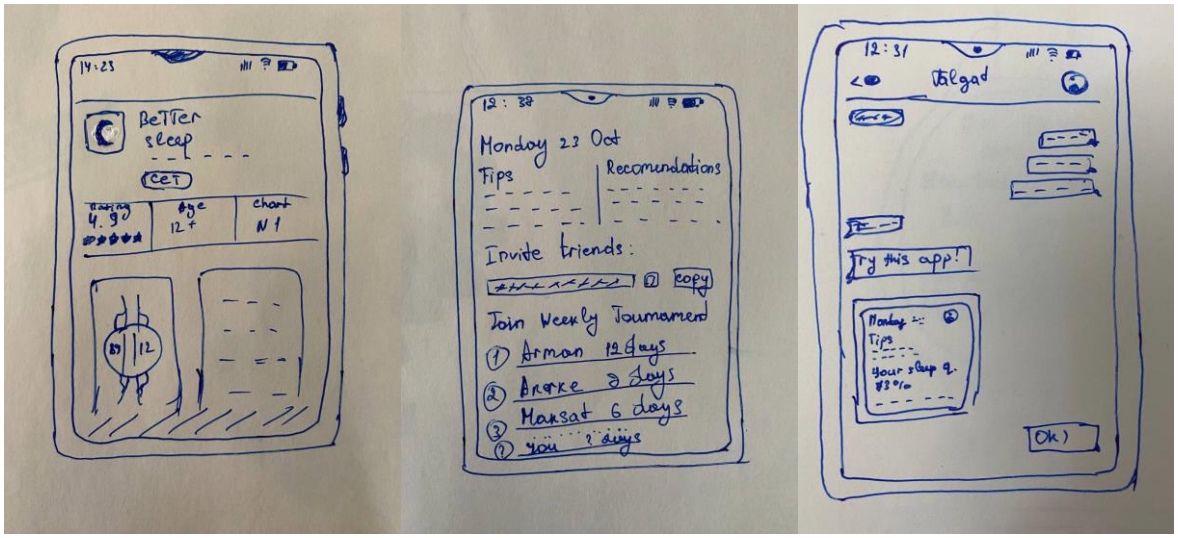
Scene 7: Potential for Positive Change

- **Visual:** Samat turns off his phone 30 minutes before bed, follows the suggestion, and sleeps more soundly that night.
- **Text:** By following the tracker's advice, Samat improves his sleep quality and feels more refreshed in the morning.
- **Insight:** *Simple interventions, such as reducing screen time, can have a significant impact on sleep quality*.

Sketches for Storyboard 1



Sketches for Storyboard 2



Conclusion

The analysis of students' sleep behaviors, both with and without trackers, revealed critical insights into their challenges and opportunities for improvement. By identifying key obstacles such as poor sleep hygiene, external stressors, and low awareness of sleep quality metrics, the study highlights the need for interventions that are simple, personalized, and actionable. These findings have guided the design process to create a more effective and engaging sleep tracking solution.

References to materials

Video:

https://drive.google.com/file/d/12t1ywJkF9MlzofEa_VGH-dvpvjP2t7mq/view?usp=drive_link

Presentation:

https://www.canva.com/design/DAGZE9WapLI/YHsMAxc7Jg1i4hdN7z4iBQ/edit?utm_content=DAGZE9WapLI&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Roles of team members

Tumabayev Ali: [220107023], I made sketches, wrote interview questions, and conducted those interviews. In general I did all the work.