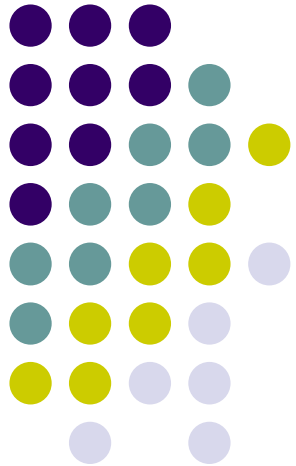
Ubiquitous and Mobile Computing CS 528:

"Be Consistent, Work the Program, Be Present Every Day": Exploring Technologies for Self-Tracking in Early Recovery [1]



Team 2

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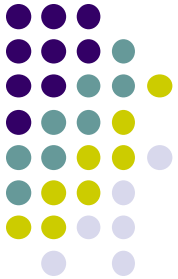
What is Substance Abuse?

- Substance use disorder is the medical term used to describe a pattern of using a substance (drug) that causes significant problems or distress.
- It encompasses the misuse of illegal substances such as marijuana, heroin, cocaine, or methamphetamine etc.
- Legal substances like alcohol, nicotine, or prescription medicines can also contribute to substance use disorder.

Problem Statement



- Over 20.3 million people aged 12 or older had a substance use disorder in the past year.
- Drug overdose is the leading cause of death between ages of 18 and 44 in the US with 106,699 deaths reported in 2021.
- Recovery from substance abuse disorders involves significant challenges in maintaining positive behaviors.
- Early recovery, especially the first year of abstinence, is a critical and challenging phase.
- High relapse rates (50% or more) hinder sustained recovery.

Vision

- Explore the potential of self-tracking technologies as a design space for aiding individuals in their recovery journey.
- Introduce a technology probe including a mobile app, wearable LED display, and ambient display.
- Facilitate tracking and reflection on activities adopted during the recovery process.
- Investigate the desired activities for tracking among individuals in early recovery.
- Contribute insights into designing technologies that specifically support and enhance the recovery experience.

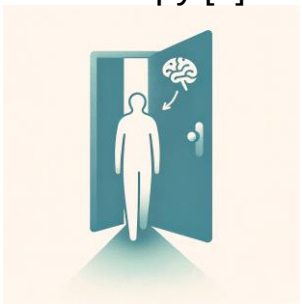
1- SUD Recovery – Beyond Abstinence

- **SUDs** are similar to **chronic diseases** requiring:
  - long-term, holistic treatment >> rather than a cure

- Recovery involves:

Taking medication [2]

Cognitive Behavioral Therapy [5]



Build Support Group [4]

Mindfulness practice[3]

1- SUD Recovery – Beyond Abstinence

- Important component in recovery:
  - **Sobriety** > more attention
  - **Well-being & Quality of life** > less attention> can lead to drop out from treatment

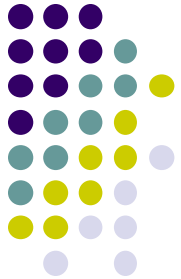
- To improve quality of life:

Work or education

Leisure activities

- Research Gap:
  - Gap in understanding which activities are meaningful in recovery.

2- Self-Tracking for Long-term Change

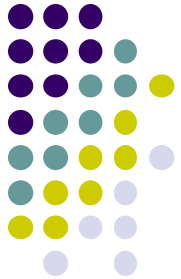


- Long-term, self-sustaining recovery depend on **recovery capital**

- Recovery capitals includes:
  - **Personal Recovery Capital:** Includes self-esteem, motivation, and personal health.
  - **Social Recovery Capital:** Encompasses support from social networks, family, and friends.
  - **Community Recovery Capital:** Involves external resources like housing and skills training.

- We hope that **self-tracking technologies** helps to expand personal recovery capital.

2- Self-Tracking for Long-term Change

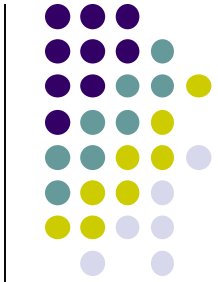


- **Focus on Sobriety:** Current research primarily targets the abstinence aspect of recovery.
  - **Substance Detection Methods:** Utilization of biophysical sensors, phone-based sensors, and social media traces >> late for prevent relapse

- **Preventing Relapse:**
  - **Behavioral Signs:** Identifying early signs like mood changes and cravings through self-report and sensor-based tracking.
  - **Geo-fencing Risky Locations:** Warning individuals and their care teams about potential triggering situations.

- **Research Gap:**
  - Limited understanding of how these tools (self-tracking) are used in practice

3- Considerations for Self-Tracking tools

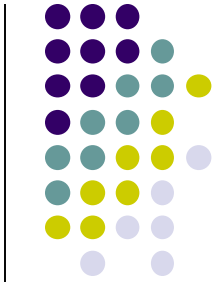


- **Self-tracking tools** vary from self-motivated to prescribed monitoring in healthcare contexts.

- Tools may vary in **usefulness** based on individual preferences and motivation in recovery.

- **Study Insights:** In *smoking cessation*, both use and non-use of self-tracking were strategies for behavior change.

3- Considerations for Self-Tracking tools



- **Design** approaches effective in other areas might be harmful in SUD recovery context.
  - Strategies like **gamification** or certain interface designs might be problematic or triggering.

- **Research Gap:**
  - How design of self-tracking tool can affect the long-term lifestyle of SUD users

Exploring Self-Tracking Tools for Recovery

Method: Design and deployment of an ensemble self-tracking system used as a technology probe.

Tools:

(a) Mobile App (WEconnect)

(b)Wearable LED Display

(c) In-Home Ambient Display

Study Participants: 17 individuals in early recovery from SUDs.

Duration: 4-week exploration of incorporating self-tracking into recovery routines.

Each Component synced

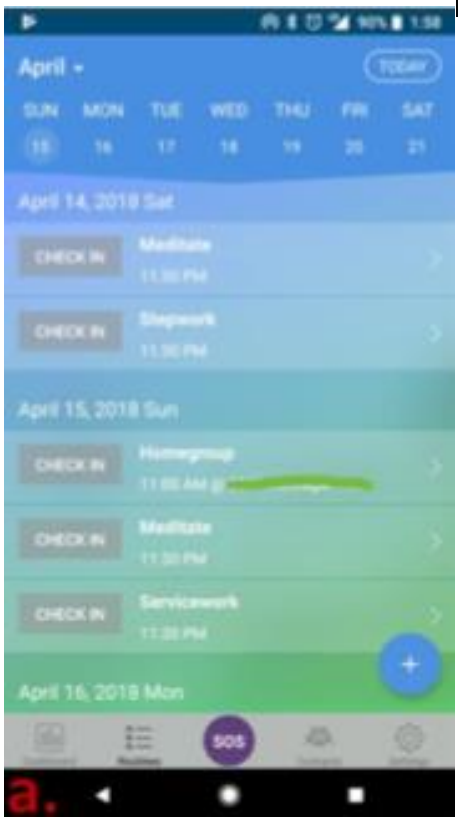
Objective: Process of change through which individuals improve their health and wellness, live self directed lives, and strive to reach to their full potential.

Technology Prob Design

- Use of "**piggyback prototyping**" method.
- Integration of **bespoke** and **off-the-shelf** components.
- Minimizing **technical failures** for uninterrupted study

Mobile App (WEconnect Recovery)

- Activity Logging App tailored for recovery.
- Features **just-in-time notification** for activity check-ins.
- **Location-based automatic** checks-in for events and meeting
- Allow, adding, deleting, and modification the daily activities.

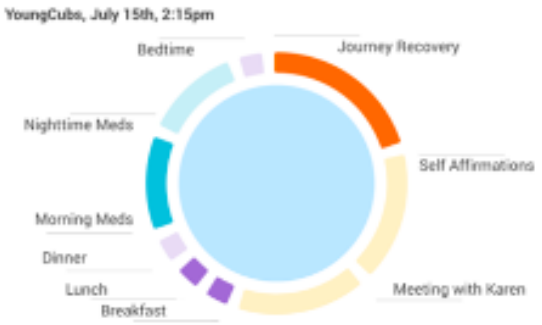


Wearable LED Display

- Wearable devices, modified **Fitbit Flex** [Ex, smartwatch or fitness tracker]
- Offering **real-time updates** with a glance.
- Less reliance on traditional, screen-based digital displays
- Syncs with the **WEconnect** app, updating every 15 minutes through the Fitbit Device API
- Tap activation leads to a visual display of progress using LED lights, showing the proportion of completed activities

In-Home Ambient Display

- **Design**: Aesthetic wooden frame with a stand, housing a Kindle Fire tablet, designed for easy placement in home settings.
- **Functionality**: Displays a live JavaScript animation connected to WEconnect app, updating every 15 minutes to track daily activities.
- **Visualization**:
  - providing an comprehensive visual summary like artistic representation of daily tasks, their status, and priority.
  - Dual-layer animation with a water motif indicating overall progress and colored arcs for individual activities' importance and completion.



Result (Participant Engagement with System Modalities)

App Utility:

- Stood out for organizing time and effort.
- Routine-tracking template for planning and structuring days.
- Recovery-specific language provided validation.
- Most convenient due to no additional hardware or maintenance.

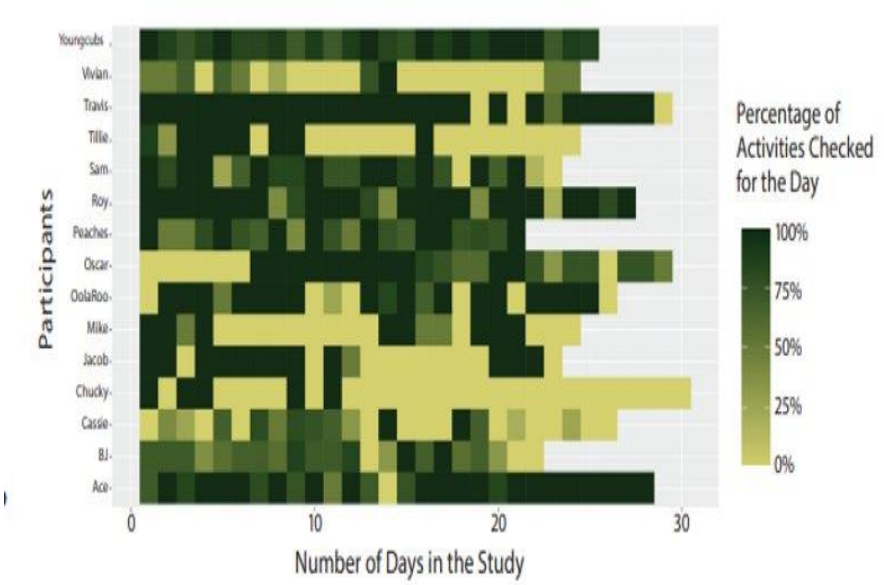
Wearable Display:

- Useful for those tracking activities toward a daily completion goal
- Exercise tracking on Fitbit received positive adoption.
- Potential for wearables with additional tracking functionality

Factors Influencing Modality Selection

Tabletop Display

- Provided visually interesting overviews at the beginning and end of the day.
- Useful for establishing routine and offering a gestalt picture.
- Visualizations focused on activity completion.



Important Considerations

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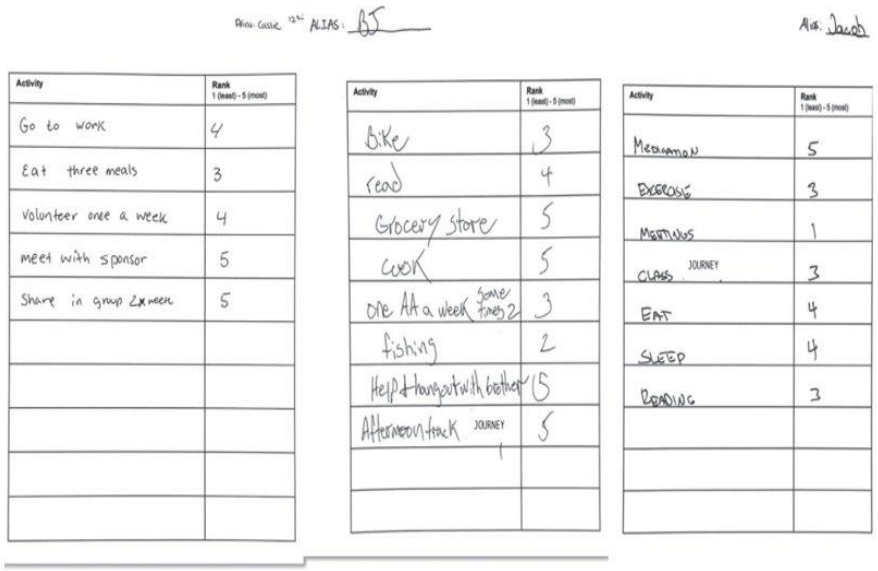
- Developers should consider data, power, and space constraints for people in recovery.
- System hardware intended to be discrete, but real-time update data consumption not considered.
- Participants in shared, temporary housing faced challenges due to limited physical space and bandwidth.

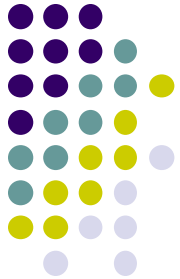


Activity	Rank 1 (least) - 5 (most)
Go to work	4
Eat three meals	3
Volunteer once a week	4
meet with sponsor	5
Share in group 2x week	5

Activity	Rank 1 (least) - 5 (most)
Bike	3
read	4
Grocery store	5
cook	5
one AA a week (some times 2)	3
fishing	2
Help Thompson with brother	5
Afternoon track JOURNEY	5

Activity	Rank 1 (least) - 5 (most)
Meeting	5
Exercise	3
Meetings	1
CLASS JOURNEY	3
EAT	4
SLEEP	4
Reading	3

Discussion

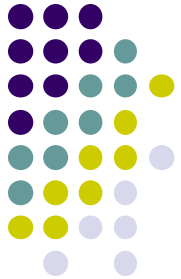


- **A Holistic Approach to SUD Recovery**
  - Comprehensive Self-Tracking: not just stopping substance use but also about rebuilding one's life
  - Critiquing Limited Technologies
  - Flexibility in Design
  - Value-Oriented Tracking
    - Essential activity: Log-term support
    - Important but less critical activities: Reminders and rewards for each success
    - Personal activity: Emotional support and celebration

- **Mitigating the Burden of Self-Tracking Slide**
  - Balancing Manual and Automated Tracking
    - Challenges of manual tracking: Inaccuracies from faulty memory or data entry
    - Challenges of automated tracking: reduce user's awareness of their activities, need a level of data collection and cause privacy concerns

- **Sensitive Groups and Autonomy Slide**
  - Constraints on Autonomy
    - Some people's choices are limited by socioeconomic factors or legal and medical requirements
    - Some tracking is self-chosen for personal care
    - Some other tracking is monitored by authorities

Conclusion



- **Purpose of Study**:
  - Examination of how self-tracking technologies can support individuals in substance abuse recovery and their whole life recovery
- **Methodology**:
  - Deployment of a technology probe for tracking daily activities in early recovery stages.
  - Identification of useful device features and the trade-offs encountered.
- **Achievement:**
  - Helping with recovery from substance use while focusing on important everyday tasks.

References

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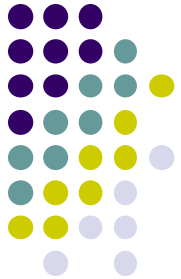

Thank you for your attention.