Design for Digital Mental Health Interventions: Optimizing Engagement & Implementation

Andrea K. Graham, PhD

Center for Behavioral Intervention Technologies (CBITs)
Center for Human-Computer Interaction + Design
Fellow, Implementation Research Institute

PSMG • January 18, 2022

@andreakgraham

Northwestern
Challenges to Addressing Mental Health

**Process Requirements**

- **KNOW**
  - care is needed

- **WANT**
  - care

- **GET**
  - care

- **STAY**
  - in care

**Process Barriers**

- **Person Has Mental Health Problem(s)**
  - Unaware of problem
  - Denial
  - Stigma
  - Disinterest
  - Waiting lists
  - Clinic schedule
  - Reduced motivation
  - Perceive care as irrelevant or unhelpful

**Outcome**

- Improve Mental Health

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The Promise of Digital Technologies

Process Requirements

Person Has Mental Health Problem(s)

KNOW care is needed

WANT care

GET care

STAY in care

Process Barriers

- Unaware of problem
- Denial
- Stigma
- Disinterest
- Waiting lists
- Clinic schedule
- Reduced motivation
- Perceive care as irrelevant or unhelpful

Mobile Technology Solutions

- Comprehensive screen
- Precise and immediate results
- Private intervention
- Offered via ubiquitous device
- Intervention rapidly available
- Access anytime, 24/7
- Tailored, interactive content
- User-driven symptom tracking
- Real-time updates

Outcome

Improve Mental Health
The disruptive innovation of digital interventions is extending treatment beyond in-person sessions into the fabric of people’s lives.

But:

If they are not engaging, people will **stop using** them.

Implication:

Must be **engaging** to have clinical impact.
Engagement is a Problem

• When digital services have moved from research settings to real-world settings, implementation has frequently failed
  – Low rates of use and retention among patients
  – Failed integration within their systems of care
What’s the Disconnect?

Cannot simply translate a face-to-face treatment to a digital format

How DMHIs are Designed

- Rely heavily on psychoed
- Require 30-45 min use/week
- Typically for 6+ weeks
  - Engagement is challenging

How People Use Apps

- Single purpose
- Short bursts of time
- Sometimes frequently throughout the day
  - Action > Psychoeducation
The User Experience Matters

Figure. Conceptual Model for Experimental Therapeutics to Target Engagement as a Mediating Mechanism for Digital Mental Health

Engagement
Subjective: design targets
- Usefulness
- Usability
- Satisfaction (user experience)

Objective: use metrics
- Technology use
- Contacts with health care clinician/system manager

Interventions
- User-centered design
- Comparison with expert design

Clinical outcome
- Change in symptomatology

Graham, Lattie, & Mohr, 2019, Experimental therapeutics for digital mental health, *JAMA Psychiatry*.
Graham et al., 2021, Targeting subjective engagement in experimental therapeutics for DMHIs, *Internet Interventions*.
User-Centered Design: A Model

### Investigate
Learn the goals, needs, and preferences of target users and relevant stakeholders

### Ideate
Generate concepts and ideas for a product design

### Prototype
Create iterative options for a product design

### Evaluate
Iteratively test prototypes with stakeholders

### Refine & Develop
Optimize the design and develop the product

### Validate
Test the product design in practice

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Graham, Wildes et al., 2019, User-centered design for technology-enabled services for eating disorders, *Int J Eat Disord*
Why User-Centered Design

Great advantage to up-front efforts

• Enables rapid learning
  – Numerous design methods, most can be implemented relatively quickly

• Saves money and “rework”
  – Many problems are avoidable if given adequate attention (Boehm & Basili, 2001, Computer)

Graham, Wildes et al., 2019, User-centered design for technology-enabled services for eating disorders, *Int J Eat Disord*
Designing a Mobile Intervention for Binge Eating & Weight Management

K01 DK116925
# My Originally-Proposed Intervention

<table>
<thead>
<tr>
<th>Tools &amp; Features</th>
<th>Delivered to All</th>
<th>Behavioral Weight Loss Intervention Components</th>
<th>Randomly Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Psychoeducation</td>
<td>• Regulate Eating Patterns</td>
<td>• Decrease overvaluation of weight &amp; shape</td>
</tr>
<tr>
<td></td>
<td>• Eating &amp; activity tracking (USDA’s SuperTracker tool)</td>
<td>• Improve Dietary Intake</td>
<td>• Cognitive restructuring</td>
</tr>
<tr>
<td></td>
<td>• Weekly log to monitor weight &amp; binge eating</td>
<td>• Increase Physical Activity</td>
<td>• Improve valuation of other domains</td>
</tr>
<tr>
<td></td>
<td>• Exercises for goal-setting; planning &amp; problem-solving</td>
<td></td>
<td>• Address “feelings of fatness” &amp; body checking behaviors</td>
</tr>
<tr>
<td></td>
<td>• 24/7 access by mobile phone or computer</td>
<td></td>
<td>• Decrease meal-skipping &amp; fasting</td>
</tr>
<tr>
<td></td>
<td>• Personalized username and password</td>
<td>• Increase unhealthy weight control practices</td>
<td>• Decrease “dieting”/restraint &amp; promote eating in moderation</td>
</tr>
<tr>
<td></td>
<td>• Log-in reminder emails</td>
<td>• Decrease negative affect</td>
<td>• Reintroduce “feared foods” &amp; challenge rules about eating</td>
</tr>
<tr>
<td></td>
<td>• Feedback email messages from a coach</td>
<td></td>
<td>• Engage in rewarding, non-food activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Identify &amp; address triggers for low mood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Improve interpersonal functioning</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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The Clinical - Design Chasm
UCD Activities

111 end-users
- Needs assessments
- Prototyping
- Co-design workshops
- Field test

54 intervention users (so far)
- Randomized pilot trial

Initial Design Activities & Implications

• Question: How do binge eating and weight impact day-to-day life?

• Users present to treatment with wide variation:
  – In past intervention experiences, interests, needs (e.g., variety of triggers, ways binge eating impacts their lives)
  – Some facility with behavior change techniques (e.g., goal setting, action planning)

• And, 100% endorsed past attempts to lose weight + 91% endorsed past attempts to stop binge eating

Graham et al., 2021, *JMIR Form Res*; Graham et al., 2021, *Front Dig Health*; Weinheimer et al., 2020, *Int J Eat Disord*; Fu et al., 2021, *Eat Behav*
Low Fidelity Prototyping: What Do You Want to Work on?

<table>
<thead>
<tr>
<th>Intervention Target</th>
<th># of Options</th>
<th>Times Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve Dietary Intake</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Increase Physical Activity</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Reduce Over-valuation of Weight and/or Shape</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Reduce Unhealthy Weight Control Practices</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Decrease Negative Affect</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Now, go do it for 1 week!

Graham, et al. (2021). Integrating user-centered design and behavioral science to design a mobile intervention for obesity and binge eating: A mixed-methods analysis, *JMIR Formative Research*
What Happened?

• How did it go?
  – 41% as planned
  – 41% somewhat as planned
  – 18% not as planned

• Did it help?
  – 82% said yes

• Will you keep it going?
  – 86% planned to continue practicing

• Average within-subject changes in weight (-2.2 [SD -5.0] pounds) & binge eating (-1.6 [SD -1.8] episodes)
Design Implications

• Offer choice in selecting skills to practice
  – Guided customization: personalization within a defined array of credible options

• Offer support in problem solving
  – Importance of positivity and reinforcement
Personas

The Snacker

“When I try to watch what I eat, then I get really really hungry.”

About Me:
I feel like I am constantly eating. My day consists of eating between meals. I am trying to limit my calories, so I eat a small breakfast and lunch. Throughout the day, though, I get hungry for more food. I get bored sitting at my desk all day, and it’s hard to resist the temptation to buy something from the vending machines. Office birthday parties and donuts at meetings also make it hard to stay on track. I like joining my coworkers for happy hour, and we share appetizers and drink beers. Once I get home, I don’t eat much for dinner, but tend to snack again while relaxing and watching TV.

Motivations:
- Structure my eating and reduce my desire for snacks
- Learn to resist available food

Pain Points:
- I have constant cravings
- I never feel particularly hungry or full
- I feel unsatisfied after meals
- I eat when I’m bored

The On-The-Goer

“Try to go all day; I’ll eat light, and then binge at the end of the night, because I’m bored…”

About Me:
I barely have time to eat throughout the day. Then I eat most at night. Iibusy between responsibilities all day, I want fast food, and often don’t have time in the morning to pack a lunch. I rely on pre-packaged or leftover snacks to get through the day. After work, I pick up kids and bring them to soccer practice or doctor’s appointments. By the time we get home, I have to make dinner before the kids are hungry. It’s not until I have a moment to myself at the end of the day that I can notice I haven’t eaten much at all and am starving. It’s hard not to binge in these moments.

Motivations:
- Plan meals in advance and structure eating
- Provide for my family, while also care for myself

Pain Points:
- Up too late without eating
- I don’t have enough time for meal planning, but feel unresilient and helpless to make a change
- I need help and my health after other responsibilities

The Emotional Eater

“It’s just a constant downward spiral. And yes, when I go depressed, I eat more and that causes me to get more depressed, and I just don’t want to do it.”

About Me:
I am very depressed when I am stressed or anxious. When I get overwhelmed about a work assignment, I eat to calm myself down. Unfortunately, this makes me more interested in eating my assignment, which causes more stress. Because my life gets out of control, I can’t think of a way to stop on my own. I have sometimes always been there when I have anxiety and feel stressed on the counter, and I can’t resist the urge to eat. I struggle with depression and anxiety, and the initial onset of eating calories is a fulcrum. I feel unwell and guilty after a binge. I don’t want people to know this is my pattern, so I try to hide evidence of my binge.

Motivations:
- Manage sadness and emotions without food
- Improve my mental health and binge eating

Pain Points:
- I am eating to cope
- I feel a lack of control, then withdrawing

The Enthusiast

“It’s really difficult and discouraging whenever I’m putting a much weight loss program through the paces, and I just don’t have a lot of longer eating for a few moments of happiness.”

About Me:
I am very aware of my weight and binge eating, and I’m always looking to make changes. I have tried a lot of times researching different solutions as I am known about new foods to lose weight. I have tried to read weight loss books and follow influencers’ recipes and tips on social media. I am good about creating weight loss plans, but I don’t seem to follow through on my plans and set results.

Motivations:
- Set realistic goals to help support success
- Make better food choices

Pain Points:
- I eat during the week but can’t stop on a plan
- I put in effort that is not rewarded with success

The Planner

“[I] tend to plan most of my meals and life around when I can binge out next.”

About Me:
I have plans for eating, so eating is going to happen. I have planned my eating days ahead. I own things and plan out activities. I have to be able to plan my eating days ahead. I check out my favorite foods, but I don’t eat until I have my meal. I don’t eat breakfast, and I hate to get back on track—Oh, no, I’m going to eat.”

Motivations:
- Reduce stress and food cravings
- Improve mental health

Pain Points:
- I feel guilty about my eating habits

Graham et al., 2021, Frontiers in Digital Health

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From Design to Development: FoodSteps
What Can You Work On in FoodSteps?
(From 21 → 10 Skills)
Multiphase Optimization Strategy (MOST) Framework

- Manipulating 3 components in a factorial trial

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>Weight Loss</th>
<th>Decrease Overvaluation of Weight &amp; Shape</th>
<th>Decrease Unhealthy Weight Control Practices</th>
<th>Decrease Negative Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>5</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>6</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
How It’s Going
(Preliminary Data: Trial in Progress)

• Usage is high: users complete 80% of the program on average
  – Completing ≥75% of sessions has benefit in weight management interventions

• Compliance is high: target selected and assessment completed on 94% of sessions completed

• Greater precision is needed: average weekly reductions in weight and binge eating
  – But, suboptimal proportion with weekly improvement
## Future Design Crossroads

### How to Sequence Targets Week to Week: Same Target or New?

<table>
<thead>
<tr>
<th>“It seemed like I was picking the same goal over and over again, but that’s what I needed.”</th>
<th><strong>Behavior Theory:</strong> Continued practice facilitates learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Maybe [add] a feature to help encourage people to diversify, if they’re not doing it already.”</td>
<td><strong>Measurement-based Care:</strong> Modifying treatment when progress stalls prevents failure and accelerates change</td>
</tr>
<tr>
<td>“Having it switch around could be beneficial. So, if it's like, ‘Okay, you did this kind of a goal last week, so we're going to limit the number of goals you have.”</td>
<td>****</td>
</tr>
</tbody>
</table>
### Future Design Crossroads

**How to Deliver Targets Each Week: Free Choice, Recommend, or Assign?**

<table>
<thead>
<tr>
<th>How to Deliver Targets Each Week: Free Choice, Recommend, or Assign?</th>
<th>Nudge Theory, Behavioral Economics: Nudging influences decision-making and behavior without restricting choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I personally liked being able to use my own judgment if I wanted to focus on something week to week or if I wanted to diversify. [...] If it’s not forced on them and they can do it all alone, then that’s very helpful for them.”</td>
<td>“Maybe you could have a branch. So, on a week, you could say, ‘Okay here’s a pre-set goal you can pick, or you can pick this one, or you can pick your own’.”</td>
</tr>
<tr>
<td>“It’s probably easier to have preset goals than to have to come up with my own, just for me. Like, ‘Okay, this is what we’re working on this week,’ as opposed to ‘Oh my gosh, how can I, what do I have to do?’”</td>
<td>“For weeks where I just have no motivation, it's easy to pick a goal that I think will be much easier to accomplish. [Free choice] runs into potentially avoiding some more challenging behavioral changes.”</td>
</tr>
<tr>
<td></td>
<td>Choice Overload, Behavioral Economics: Too many choices (overload) leads to faulty decision making over time</td>
</tr>
</tbody>
</table>
Areas for Future Optimization

• Stress from social determinants of health
  – Venkatesh, et al, 2021, Perceived facilitators and barriers to engaging with a digital intervention among those with food insecurity, binge eating, and obesity. *Nutrients*
  – Kosmas, Wildes, Graham, & O’Connor, In preparation

• Managing expectations for weight loss
  – Voss, et al., Under review, The impact of binge eating and overvaluation of weight and shape on weight loss expectations

• Self-determined monitoring metrics
  – Liu, et al., Under review, Understanding self-monitoring preferences and behaviors to inform the design of a mobile intervention for binge eating and weight management: A proof-of-concept randomized trial.
Customizing Monitoring

The Importance of Starting With Goals in N-of-1 Studies

Sean A. Munson 1, Jessica Schroeder 2, Ravi Karkar 2, Julie A. Kientz 1, Chia-Fang Chung 3 and James Fogarty 2

1 Human Centered Design and Engineering, DUB Group, University of Washington, Seattle, WA, United States, 2 Computer Science and Engineering, DUB Group, University of Washington, Seattle, WA, United States, 3 Informatics, Indiana University Bloomington, Bloomington, IN, United States

N-of-1 tools offer the potential to support people in monitoring health and identifying individualized health management strategies. We argue that elicitation of individualized goals and customization of tracking to support those goals are a critical yet under-studied and under-supported aspect of self-tracking. We review examples of self-tracking from across a range of chronic conditions and self-tracking designs (e.g., self-monitoring, correlation analyses, self-experimentation). Together, these examples show how failure to elicit goals can lead to ineffective tracking routines, breakdowns in collaboration (e.g., between patients and providers, among families), increased burdens, and even designs that encourage behaviors counter to a person’s goals. We discuss potential techniques for eliciting and refining goals, scaffolding an appropriate tracking routine based on those goals, and presenting results in ways that advance individual goals while preserving individual agency. We then describe open challenges, including how to reconcile competing goals and support evolution of goals over time.
Broader Vision
Next Step: Designing for Implementation

• Integrating new interventions into existing workflows is challenging
  – Especially true for digital, whose delivery differs from in-person by design

• For clinicians to use digital interventions, these tools must be embedded into the natural flow of patient care

Applying Service Design Methods for FoodSteps

- Design **service blueprints & implementation roadmaps** with 3 clinical settings

Example Service Blueprint

<table>
<thead>
<tr>
<th>Screening &amp; Diagnosis</th>
<th>Treatment Decision</th>
<th>Intervention Onboarding</th>
<th>Intervention Delivery</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Actions</td>
<td></td>
<td></td>
<td></td>
<td>Line of interaction</td>
</tr>
<tr>
<td>Patient goes to clinic</td>
<td>Patient has height &amp; weight measured</td>
<td></td>
<td></td>
<td>Line of interaction</td>
</tr>
<tr>
<td>Frontstage Actions</td>
<td></td>
<td></td>
<td></td>
<td>Line of Visibility</td>
</tr>
<tr>
<td>Admin checks patient in</td>
<td>Clinician measures height &amp; weight</td>
<td></td>
<td></td>
<td>Line of Visibility</td>
</tr>
<tr>
<td>Frontstage Technologies</td>
<td>Medical record</td>
<td>Scale; Stadiometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backstage Actions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinician inputs into medical record</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backstage Technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical record; BMI calculator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policies &amp; Support Processes</td>
<td>BMI cut-offs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
“...workflow considerations remain among the least explored but most needed factors towards facilitating implementation...”

Torous et al., 2021, *World Psychiatry*
Workflow Integration: An Example

IntelliCare

Mohr, et al., 2017, IntelliCare: An eclectic, skills-based app suite for the treatment of depression and anxiety, *JMIR*
“Implementing an Innovative Suite of Mobile Applications for Depression & Anxiety”

• SBIR R44 MH114725 (PI: Naik)
  – Collaboration between Actualize Therapy, Northwestern University, & the University of Arkansas for Medical Sciences

• First trial:
  – Comparing IntelliCare to treatment-as-usual
  – Evaluating a mental health app *platform*
  – Evaluating a mental health app with primary care patients
Results

• Effect sizes of 0.78 and 0.64 for depression and anxiety

Graham, et al., 2020, Coached mobile app platform for the treatment of depression and anxiety among primary care patients: A randomized clinical trial, *JAMA Psychiatry*
## Engagement

### Table 3. App Use Metrics for the Full IntelliCare Platform and Each Individual App

<table>
<thead>
<tr>
<th>Group</th>
<th>Mobile app&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Sessions</th>
<th>Days used</th>
<th>Time to last use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depression (n = 122)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suite (all apps)</td>
<td>93 (51-133) [0-333]</td>
<td>27 (17-35) [0-50]</td>
<td>43 (32-48) [0-56]</td>
<td></td>
</tr>
<tr>
<td>Hub</td>
<td>20 (11-30) [0-102]</td>
<td>12 (7-17) [0-39]</td>
<td>40 (28-45) [0-56]</td>
<td></td>
</tr>
<tr>
<td>Daily Feats</td>
<td>26 (11-44) [0-94]</td>
<td>17 (8-26) [0-50]</td>
<td>36 (19-45) [0-53]</td>
<td></td>
</tr>
<tr>
<td>Day-to-Day</td>
<td>16 (6-25) [0-90]</td>
<td>11 (5-16) [0-40]</td>
<td>29 (9-41) [0-52]</td>
<td></td>
</tr>
<tr>
<td>MyMantra</td>
<td>9 (2-19) [0-59]</td>
<td>6 (2-10) [0-37]</td>
<td>15 (2-28) [0-50]</td>
<td></td>
</tr>
<tr>
<td>Thought Challenger</td>
<td>8 (3-16) [0-74]</td>
<td>6 (3-12) [0-41]</td>
<td>16 (6-29) [0-51]</td>
<td></td>
</tr>
<tr>
<td>WorryKnot</td>
<td>5 (0-11) [0-29]</td>
<td>4 (0-8) [0-23]</td>
<td>9 (0-19) [0-46]</td>
<td></td>
</tr>
<tr>
<td><strong>Anxiety (n = 131)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suite (all apps)</td>
<td>98 (46-146) [0-321]</td>
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<td>4 (0-7) [0-23]</td>
<td>8 (0-17) [0-50]</td>
<td></td>
</tr>
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</table>

Graham, et al., 2020, Coached mobile app platform for the treatment of depression and anxiety among primary care patients: A randomized clinical trial, *JAMA Psychiatry*
Engagement: Designing for the User Experience

Figure. Conceptual Model for Experimental Therapeutics to Target Engagement as a Mediating Mechanism for Digital Mental Health

Engagement
Subjective: design targets
- Usefulness
- Usability
- Satisfaction (user experience)

Objective: use metrics
- Technology use
- Contacts with health care clinician/system manager

Interventions
- User-centered design
- Comparison with expert design

Clinical outcome
- Change in symptomatology
Engagement

- Objective use metrics (e.g., number of app sessions) were not significantly related to outcomes
- Subjective metrics were!

Graham et al., 2021, Targeting subjective engagement in experimental therapeutics for DMHIs, *Internet Interventions*
Workflow Integration: Referral Management

<table>
<thead>
<tr>
<th>Referral Strategies</th>
<th>Direct to Consumer</th>
<th>Provider Referral</th>
<th>Other &amp; &gt; 1</th>
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</thead>
<tbody>
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Graham, et al., 2020, Lessons learned from service design of a trial of a digital mental health service: Informing implementation in primary care clinics, *Transl Behav Med*
Workflow Integration

Graham, et al., 2020, Lessons learned from service design of a trial of a digital mental health service: Informing implementation in primary care clinics, *Transl Behav Med*
Interoperability with an EHR

Workflow Integration

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Yield: 82% (n=257) 4% (n=14) 14% (n=42)

Graham, et al., 2020, Lessons learned from service design of a trial of a digital mental health service: Informing implementation in primary care clinics, *Transl Behav Med*
Designing for Implementation

• Integrating new interventions into existing workflows is challenging
  – Especially true for digital, whose delivery differs from in-person by design

• There is a gap in knowing “how” (the methods and techniques) to implement digital interventions in health care settings
## Proposed Implementation Strategies across Phases of Implementation

### Exploration Phase
- Conduct needs assessments (e.g., among practitioners, consumers)
- Align practitioners on DMHI adoption (e.g., consensus discussions)
- Review DMHI evidence and content
- Aim to ensure equity in who can access the DMHI

### Preparation & Implementation Phases
- Create a business associate agreement to restrict data usage
- Determine who is appropriate for the DMHI, and create guidelines
- Create and distribute educational materials about the DMHI
- Be transparent about DMHI data security, privacy, & use
- Adopt DMHIs with demonstrated effectiveness
- Design the referral process & inform referring practitioners
- Have “champions” inform consumers about the DMHI
- Be transparent about DMHI requirements, promote autonomy
- Make technical assistance available
- Ensure practitioners are competent to deliver the DMHI
- Monitor practitioners’ fidelity to the DMHI protocol
- Make plans for safety monitoring transparent to consumers
- Conduct small tests of the new processes
- Track time & resources spent implementing the DMHI
- Create learning collaboratives to share resources & learnings

### Sustainment Phase
- Assist with onboarding (e.g., educational materials, point-person)
- Optimize the technologies & implementation plans over time
- Assess changing needs & preferences over time

Assist with Onboarding

- Referral management can be a pain-point in the “implementation cascade” for DMHIs
  - Who’s responsible?
  - Ethics and legalities (data sharing, endorsement)
  - Software integration challenges

<table>
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<th>Outcome</th>
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<td>Person Has Mental Health Problem(s)</td>
<td>Improve Mental Health</td>
</tr>
<tr>
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<td>STAY in care</td>
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<tr>
<td>WANT care</td>
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Person Has Mental Health Problem(s)

KNOW care is needed

WANT care

GET care

STAY in care

Outcome

Improve Mental Health
Designing Digital Health for All

For example: Some DMHI affordances could put rural communities at a disadvantage

- Fitting services into the fabric of people’s lives
- Facilitating seamless remote patient monitoring through interoperability
- Reducing reliance on licensed specialty clinicians
Conclusions

• Digital health interventions are effective
• But, they are not widely implemented in health care systems
• Successful integration requires designing these services to meet the needs of users and align with their implementation contexts
Recommendations for Clinical Researchers Doing UCD

• Get things in front of end-users
• Focus on the **minimally-viable product**
• Iterate, iterate, iterate
Thank You!

Want More User-Centered Design Resources?

• **Email:** andrea.graham@northwestern.edu
• **Visit:** cbits.northwestern.edu
  – Design for Digital Health Reading Course: syllabus + articles
  – Request Consultation (supported by P50 MH119029; PIs Mohr & Reddy)