How usable is that implementation strategy?

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Land Acknowledgement

We at the University of Washington's SMART Center and ALACRITY Center acknowledge that we learn, live, and work on the ancestral lands of the Coast Salish people who walked here before us, and those who still walk here. We are grateful to respectfully live and work on these lands with the Coast Salish and Native people who call this home.

Other Acknowledgements

MAIN POINTS (LAST THINGS FIRST!)

1. The world is designed (and can be better designed)

2. Human-centered design (HCD) and implementation science (IS) have overlapping objectives, but different foci

3. There are opportunities to better integrate HCD and IS methods surrounding the incorporation of **stakeholder perspectives** and **collaborative (re)design** of implementation strategies

   • Example: *Cognitive Walkthrough for Implementation Strategies (CWIS)*

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DESIGN PROBLEMS ARE EVERYWHERE

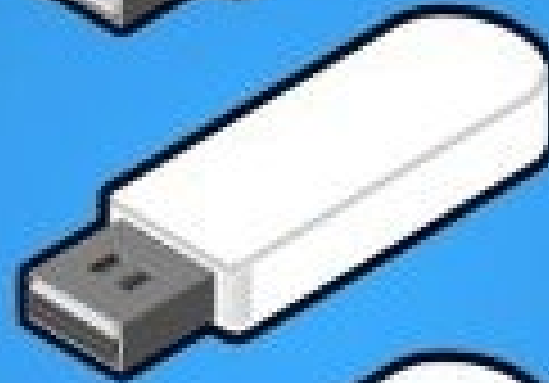# DESIGN PROBLEMS ARE EVERYWHERE

DESIGN PROBLEMS ARE EVERYWHERE

It is a well-known fact that you must spin a USB <u>three times</u>…

Co-Design
User Interface
Human-Computer Interaction
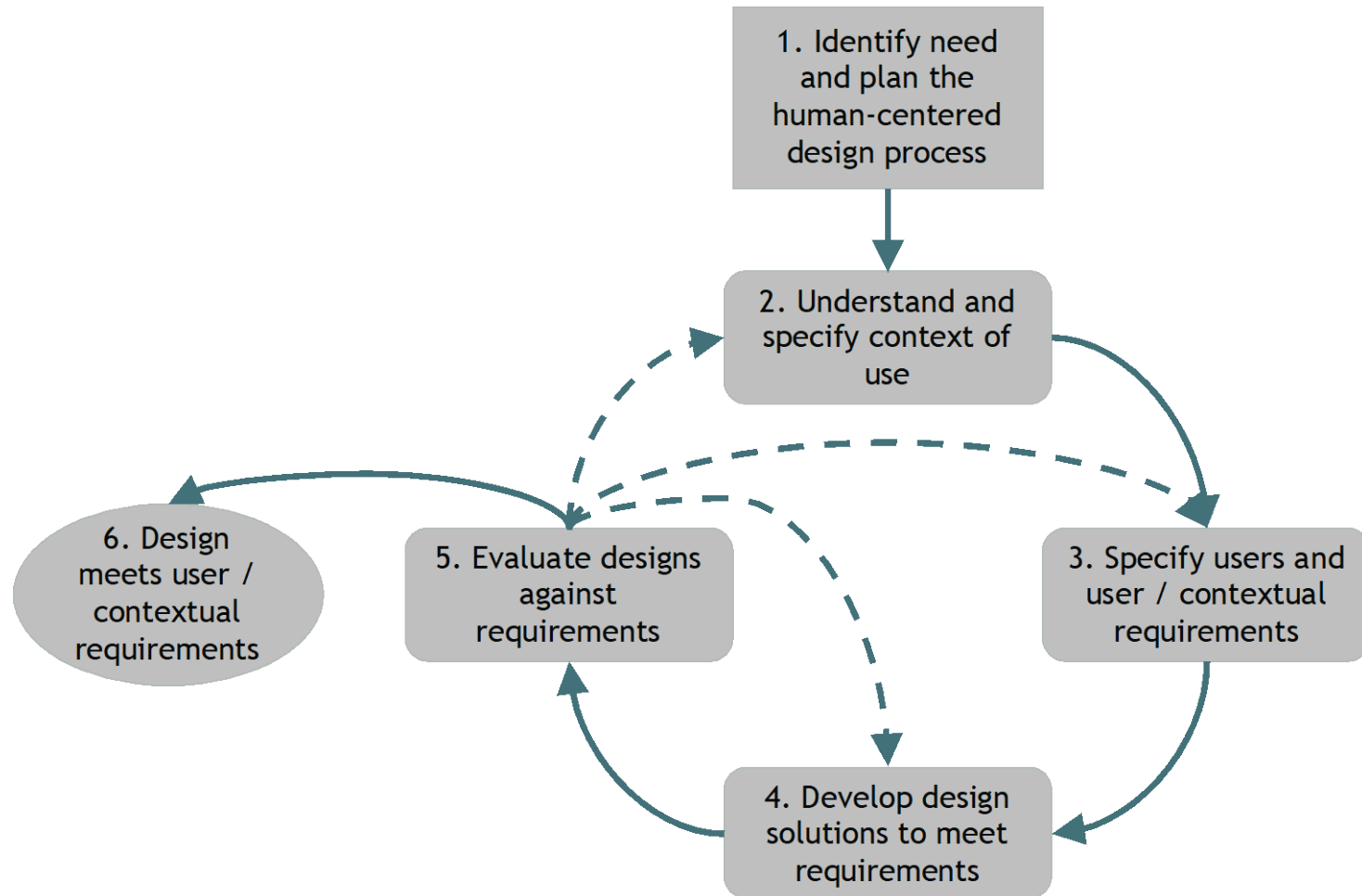User Experience
Human-Centered Design
Design Thinking
User-Centered Design
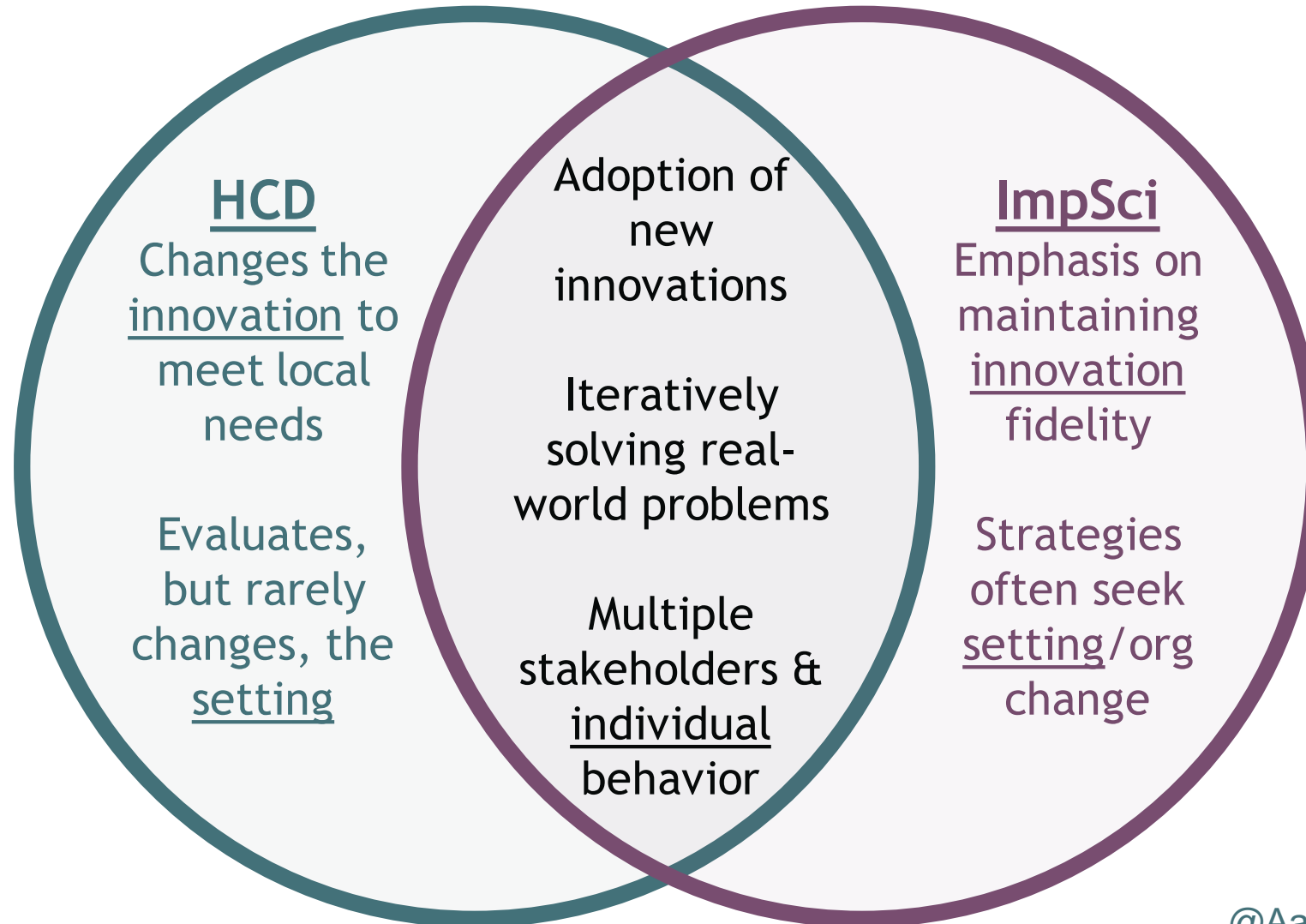Human Factors Engineering

HUMAN-CENTERED DESIGN (HCD)

1. Identify need and plan the human-centered design process

2. Understand and specify context of use

3. Specify users and user / contextual requirements

4. Develop design solutions to meet requirements

5. Evaluate designs against requirements

6. Design meets user / contextual requirements

Human-centered design is an approach that grounds the product development process in information about the **people** and **settings** that will use the product (ISO, 1999)

Lyon, A. R., Dopp, A. R., Brewer, S. K., Kientz, J. A., & Munson, S. A. (2020). Designing the future of children's mental health services. *Admin & Policy in Mental Health & Mental Health Serv Res, 47,* 735-751.

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Human Centered Design

Implementation Science

Offers methods to engage stakeholders

Offers frameworks and methods to examine multilevel determinants and to evaluate prototypes and experiments

Understand end user experiences to inform health intervention design and user behavior

Client-centered approaches to intervention development and implementation

Leverages strategies to optimize delivery of an intervention, practice, or policy

Population Health Impact

Chen, E., Neta, G., & Roberts, M. C. (2020). Complementary approaches to problem solving in healthcare and public health: implementation science and human-centered design. *Translational Behavioral Medicine.*

TBM

A glossary of user-centered design strategies for implementation experts

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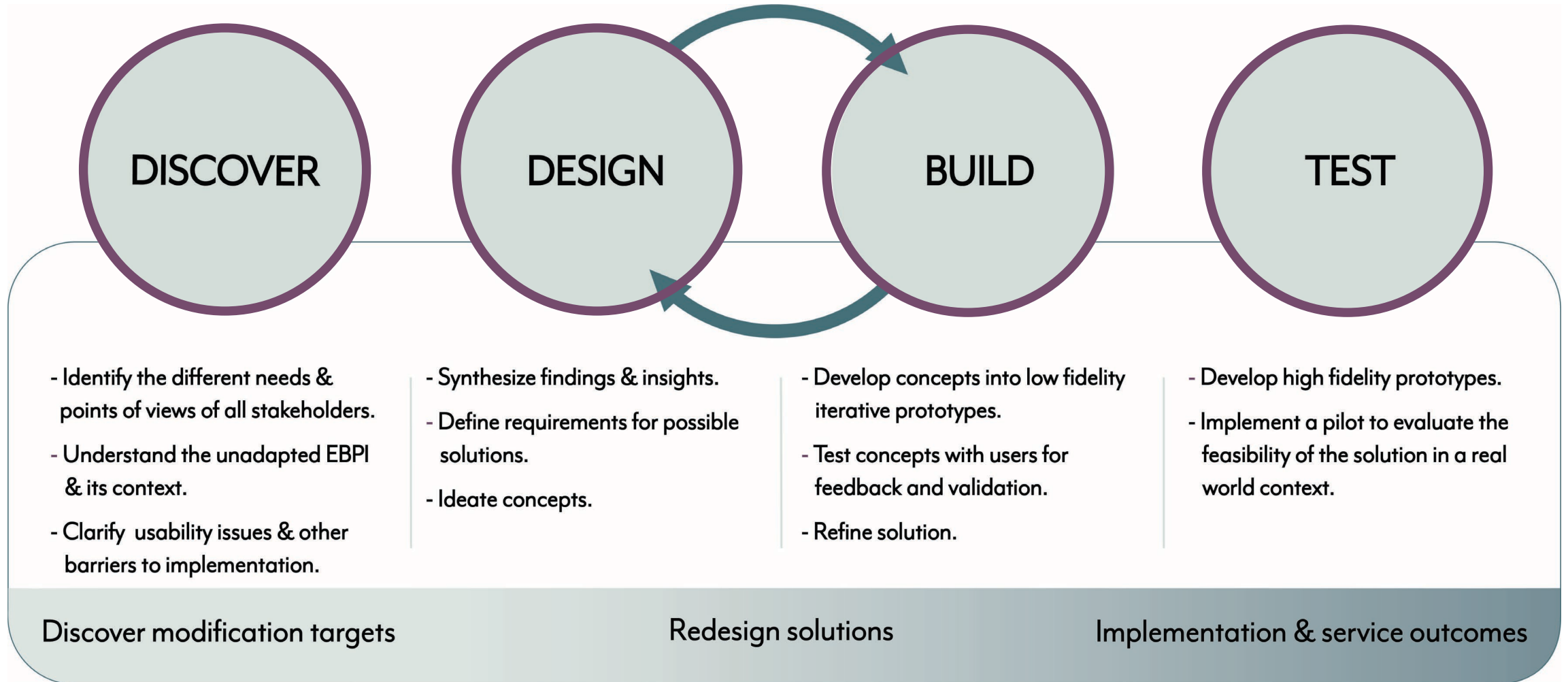
Abstract

User-centered design (UCD), a discipline that seeks to ground the design of an innovation in information about the people who will ultimately use that innovation, has great potential to improve the translation of evidence-based practices from behavioral medicine research for implementation in health care settings. UCD is a diverse, innovative field that remains highly variable in terms of language and approaches. Ultimately, we produced a glossary of UCD-related strategies specifically for experts in implementation research and practice, with the goal of promoting interdisciplinary collaboration in implementation efforts. We conducted a focused literature review to identify key concepts and specific strategies of UCD to translate into the implementation field. We also categorized the strategies as primarily targeting one or more levels of the implementation process (i.e., interventions, individuals, inner context, and outer context). Ultimately, we produced a glossary of 30 UCD strategies

Implications

Practice: Use of shared language around user-centered design (as presented in this glossary) can maximize the usefulness of interdisciplinary efforts to promote the implementation of evidence-based practices through improved design.

Policy: Policymakers who wish to promote a user-centered culture in health services should consider the value of tools like this glossary in developing shared language and interdisciplinary partnerships between implementation experts and user-centered design experts.

Correspondence to: A R Dopp

HCD + IMPSCI = DDBT FRAMEWORK

DISCOVER

DESIGN

BUILD

TEST

- Identify the different needs & points of views of all stakeholders.
- Understand the unadapted EBPI & its context.
- Clarify usability issues & other barriers to implementation.

- Synthesize findings & insights.
- Define requirements for possible solutions.
- Ideate concepts.

- Develop concepts into low fidelity iterative prototypes.
- Test concepts with users for feedback and validation.
- Refine solution.

- Develop high fidelity prototypes.
- Implement a pilot to evaluate the feasibility of the solution in a real world context.

Discover modification targets

Redesign solutions

Implementation & service outcomes

Lyon, A. R., Munson, S. A., Renn, B. N., Atkins, D. A., Pullmann, M. D., Friedman, E., & Areán, P. A. (2019). Use of human-centered design to improve implementation of evidence-based psychotherapies in low-resource communities: Protocol for studies applying a framework to assess usability. *JMIR Research Protocols, 8,* 10.

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HCD TARGETS IN IMPLEMENTATION...

HCD methods can be applied to range of health services research products...

Health services research product (HSRP)	Definition	Examples
Evidence-based psychosocial intervention (EBPI)	Interpersonal or informational activities, techniques, or strategies that target biological, behavioral, cognitive, emotional, interpersonal, social, or environmental factors with the aim of reducing symptoms of these disorders and improving functioning or well-being (Institute of Medicine 2015)	Parent training protocols Cognitive behavioral therapy Applied behavior analysis
Digital technology	A broad range of technologies to support users (most typically clinicians or clients) in changing behaviors and cognitions related to mental health and wellness	Devices and wearables Clinical decision support tools Digital therapeutics Mobile health apps
Implementation strategy	Methods or techniques used to enhance the adoption, implementation, and sustainment of a clinical program or practice (Proctor et al. 2013)	Initial training meetings Post-training consultation Leadership training for implementation Clinician motivation enhancement

Lyon, A. R., Dopp, A. R., Brewer, S. K., Kientz, J. A., & Munson, S. A. (2020). Designing the future of children's mental health services. *Administration and Policy in Mental Health and Mental Health Services Research 47*, 735–751.

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IMPLEMENTATION STRATEGIES

Implementation strategies vary, but many are complex multifaceted psychosocial interventions

FEATURE CREEP
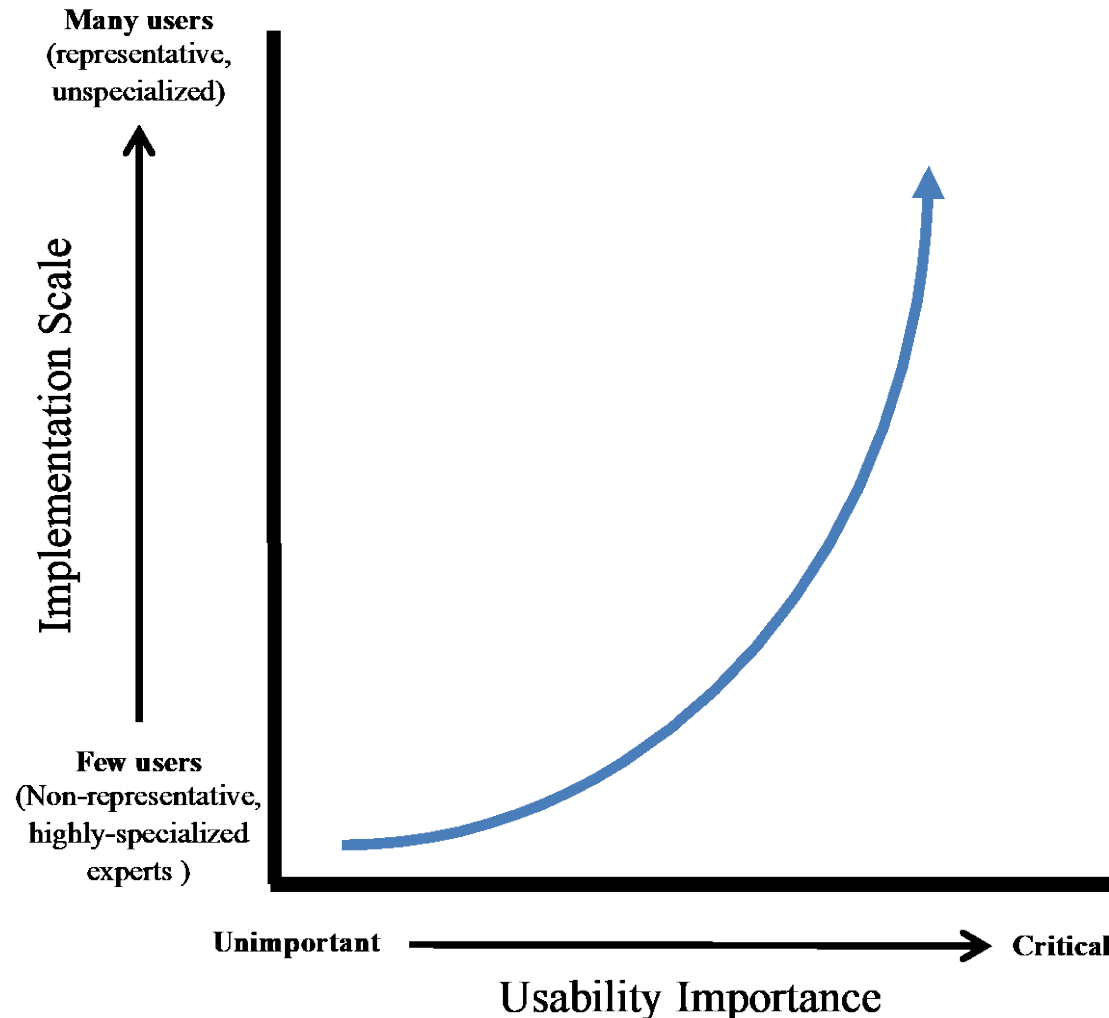The misguided notion that somehow more is always better.

- Many strategies are **bulky / expensive / not always usable** by implementation practitioners and other stakeholders

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Usability: the extent to which a product can be used by specified users to achieve specified goals in a specified context of use

International Organization for Standardization. (1998). Ergonomic requirements for office work with visual display terminals (VDTs)—Part 11: Guidance on usability.

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USABILITY'S IMPORTANCE INCREASES WITH SCALE

Many users
(representative,
unspecialized)

Implementation Scale

Few users
(Non-representative,
highly-specialized
experts)

Unimportant → Critical

Usability Importance

Lyon, A. R., Brewer, S. K., & Areán, P. A. (2020). Leveraging human-centered design to implement modern psychological science: Return on an early investment. *American Psychologist*, *75(8)*, 1067-1079. @Aaron_Lyon |

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BEST PRACTICES FOR USABILITY TESTING

- ❑ Identify end users (primary, secondary, negative)
- ❑ Prioritize components for testing
- ❑ Test authentic (vs. ideal) circumstances
- ❑ Create opportunities for users to **interact** with components
- ❑ Track user success/failure/efficiency in completing tasks
- ❑ Qualitatively describe issues that users encounter

- ❖ *Focus groups are <u>not</u> usability testing!*

USABILITY EVALUATION METHODS ARE DIVERSE

Example testing techniques	Example questions they can answer
Quantitative instruments	How significant overall are an innovation's usability issues?
Heuristic evaluation	How well does an innovation align with established usability principles?
Cognitive walk-throughs	How well does the basic structure and process of an innovation align with users' goals, expectations, and internal mental models?
Lab-based testing	What specific usability issues do users (new or experienced) encounter when completing targeted innovation activities?
In-vivo testing	What aspects of an innovation are most related to its adoption or discontinuation in a real-world context?

Lyon, A. R., Koerner, K., & Chung, J. (2020). Usability Evaluation for Evidence-Based Psychosocial Interventions (USE-EBPI): A methodology for assessing complex intervention implementability. *Implementation Research and Practice, 1.*

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EXAMPLE METHOD: CWIS

1. Determine necessary strategy pre-conditions

2. Hierarchical task analysis

3. Task prioritization ratings

4. Top tasks -> testing scenarios

5. Group testing w/ representative users

6. Problem classification / prioritization

Lyon, A. R., Coifman, J., Cook, H., McRee, E., M. S., Liu, F. F., Ludwig, K., Dorsey, S., Koerner, K., Munson, S. A., & McCauley, E. (2021) The Cognitive Walkthough for Implementation Strategies (CWIS): A pragmatic method for assessing implementation strategy usability. *Implementation Science Communications, 2, 78*

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RECENT CWIS APPLICATIONS

1. Evaluation of a **post-training consultation strategy** for measurement-based care (MBC) (*Brief Online Training [BOLT] for school clinicians; R34MH109605*)

2. Evaluation of a **leadership-focused strategy** to improve implementation climate (*Helping Educational Leaders Mobilize Evidence [HELM]; R305A200023*)

   • HELM is a redesign of Leadership for Organizational Change and Implementation (LOCI) (Aarons, Ehrhart et al., 2015)

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- Post-training consultation is a cornerstone implementation strategy (Herschell et al., 2010; Lyon et al., 2017)

- <u>Study Procedures</u>
  - Applied to **refine remote post-training consultation protocol** (live calls & msg. board)
  - *n* = **10** school-based clinicians (90% female, 70% Caucasian, 2-18 yrs in role)
  - Group CWIS walk-through procedure

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DETERMINE PRECONDITIONS

"The user is not like me"

- Identification of end users is a key aspect of precondition articulation
- Product developers tend to **underestimate user diversity** in their design processes
    - Base designs on people similar to themselves (Cooper, 1999; Kujala & Matyla, 2000)
    - Identification of representative users / user needs can correct this bias (Kujala & Kauppinen, 2004)

USER IDENTIFICATION IN HCD

DETERMINE PRECONDITIONS

- STEP 1: Application to post-training consultation

- Critical preconditions identified for <u>clinician users</u>:
    1. Clinicians working in the education sector
    2. Clinicians are interested in adopting MBC
    3. Have been exposed to initial online training in MBC

- Also developed personas-- design tools for communicating about different types of users and their needs (Cooper, 2007)

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SARAH

AGE 30
GENDER Female
EBP ATTITUDE Familiar & accepting
CASELOAD
TECH. SKILLS High, adaptable
EDUCATION

" I love learning new ways to work with my kids "

MOTIVATIONS

Like many of her colleagues, Sarah needs Continuing Education Units (CEUs) to keep her certifications. Sarah is also genuinely interested in keeping up with best practices, and seeks out opportunities to stay current.

NEEDS & WANTS

- Quick training opportunities that she can fit into her busy day
- Engaging training that she can easily implement
- See the payoff of the training
- A variety of resources from OLT

FRUSTRATIONS

- Wasting time
- Boring things ruin my day
- Learnings that I can't implement

REQUIREMENTS

- Incentives to complete the course
- Indication of the time required for a given module
- Short modules with incorporated assessments
- Variety of interactions & engagement
- Assessments to demonstrate learning
- Easily accessible resources

BIO/DAY IN THE LIFE

Sarah loves working in schools and wishes her job allowed her to do more of it. Right now, she sees about half of her caseload in middle and high schools and the other half at her employer's offices a few miles away. She moves around to a few different schools, but has a dedicated office in one of them for one day a week. One of the hardest decisions of her life was deciding whether to be a therapist or a teacher. She decided on a career in mental health based on her experience helping a family member who developed significant mental health problems. She loves talking with young people and tries to make room for as many as possible within her busy schedule. When she's not at work, she is often out running.

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TASK ANALYSIS

- Hierarchical task analysis includes identifying **all tasks and subtasks that have independent meaning** and collectively compose the strategy (Shepherd, 1989)

    - Tasks may be physical (e.g., taking notes) or cognitive (e.g., prioritizing cases) (Jonassen et al.; Wei & Salvendy, 2004)

- **STEP 2: Application to pertaining consultation strategy**

    - Original consultation protocol developed to target mechanisms of collaboration, responsiveness, and accountability
    - Protocol review yielded **24 unique tasks** For example…
        - Present first MBC case during consultation call
        - Login to message board
        - Schedule make-up consultation calls

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TASK PRIORITIZATION

- For most implementation strategies, individual testing of all tasks is *unlikely to be feasible*

- **STEP 3: Application to posttraining consultation**

  - Team members (*n* = 4) w expertise in consultation and school MH rated each task on 1 to 5 scales of…
    1. Likelihood that users might encounter issues or errors
    2. Criticality of completing the task correctly (i.e., importance)

  - <u>Top rated tasks</u>:

Task	Avg. Likelihood	Avg. Importance
Access digital materials during call	5	4
Present 1st MBC case	5	4
Articulate barriers to MBC for identified cases	4.75	3.5
Plan for maintenance of behavior change	4.5	4

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SCENARIOS

- Top tasks need to be represented in an accessible format for presentation and testing. Scenarios provide context for common use cases for the implementation strategies.

- Within each scenario, articulate/create…

  1. A brief description of the task
  2. A script for the facilitator to use when introducing the task
  3. An image or visual cue that represents the task

- STEP 4: Application to post-training consultation

  - Six scenarios generated from prioritized tasks
  - 1-3 tasks included per scenario

SCENARIOS

Scenario 2

It is your second consultation call, four weeks after the initial online training, and you have been applying MBC with multiple students on your caseload. Prior to the call, you are informed that all trainees will need to give an additional case presentation, again focused on the use of MBC practices with one of your students.

Task 2-1

Select a case with which you have used MBC over multiple sessions and describe the results of initial administration of the standardized instruments you selected, including: the student's scores, how the scores relate to established norms, what the student's response was to the results, and the intervention goals you and the student identified.

Task 2-2

Based on the student's intervention goals, briefly describe (a) the rationale for ongoing assessments for this case, (b) how you have defined/operationalized what a positive intervention response would look like, and (c) your next steps for using MBC with the student.

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TESTING

- Materials developed in Step 4 are presented to groups of **4-6 representative users**

- For each task, participants rate 3 items (1-4 scale) about their anticipated success and then provide their rationales
  - …discovering that the correction action is an option
  - …performing the correct action or response
  - …receiving sufficient feedback to understand that the task was successfully completed

1	2	3	4
No	No, probably not	Yes, probably	Yes
(a very small chance of success)	*(small chance of success)*	*(probable chance of success)*	*(a very good chance of success)*

- At the end, administer the 10-item **Implementation Strategy Usability Scale (ISUS)** adapted from the System Usability Scale (Brooke, 1996)

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Scenario	Task		Participant Ratings of Anticipated Task Success										Very confident in success
			1	2	3	4	5	6	7	8	9	10	
1	1-1	knowing what to do											50%
		doing it											30%
		learning you did it successfully											30%
2	2-1	knowing what to do											40%
		doing it											20%
		learning you did it successfully											40%
	2-2	knowing what to do											30%
		doing it											10%
		learning you did it successfully											50%
3	3-1	knowing what to do											90%
		doing it											50%
		learning you did it successfully											70%
	3-2	knowing what to do											70%
		doing it											60%
		learning you did it successfully											70%
	3-3	knowing what to do											50%
		doing it											30%
		learning you did it successfully											40%
4	4-1	knowing what to do											40%
		doing it											10%
		learning you did it successfully											70%
5	5-1	knowing what to do											60%
		doing it											30%
		learning you did it successfully											60%
	5-2	knowing what to do											70%
		doing it											30%
		learning you did it successfully											30%
6	6-1	knowing what to do											80%
		doing it											60%
		learning you did it successfully											50%
	6-2	knowing what to do											80%
		doing it											60%
		learning you did it successfully											80%

Legend:

- Very small chance of success
- Small chance of success
- Probable chance of success
- Very good chance of success

Mean ISUS score: **71.3**

EXAMPLE METHOD: CWIS

1. Determine necessary strategy pre-conditions

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WHAT IS A USABILITY ISSUE?

"Aspects of the innovation and/or a demand on the user which make it unpleasant, inefficient, onerous, or impossible for the user to achieve their goals."

Lavery et al. (1997)

COMPONENTS OF A USABILITY ISSUE

1. **Description / Problem Statement:** What is the issue?

2. **Severity:** How bad are the consequences? (catastrophic [0] –subtle problem [4])

3. **Scope:** How often does it happen?

4. **Complexity:** Do we understand the cause or fix?

5. **Evidence:** What evidence supports the above components?

CLASSIFICATION AND PRIORITIZATION

1. <u>Identification process</u>:

   - Directed content analysis (Heish & Shannon, 2005) with consensus coding (Hill et al., 2005) of CWIS group notes

2. <u>Classification categories</u>:

   - User (U); "Hidden" (H); Sequence or timing (ST); Feedback (F); Cognitive or social demands (CS)

3. <u>Prioritization</u>:

   - Independent ratings (1-3) by research team members (n = 3) on criticality of usability issue

CLASSIFICATION AND PRIORITIZATION

Table 3 Prioritization and categorization of usability problems

Severity rating	Complexity	Scope	Abbreviated UP	Usability problem	Problem types				
1.33	High	2	Focus on barriers detracts from case presentation	During initial case presentations, clinicians tend to focus on barriers to actually applying MBC, potentially detracting from other important topics of discussion and decreasing motivation to implement MBC (inferred).	**U**	H	ST	**F**	CS
1.67	Medium	5	Unprepared to identify solutions to barriers	When generating solutions to perceived barriers to using MBC during late-stage consultation calls, clinicians don't feel prepared to identify appropriate/insightful solutions in the moment, leaving them unsure how to proceed (stated), and discouraged or unmotivated to use MBC (inferred).	**U**	H	ST	F	CS
1.67	Medium	7	Inadequate on-site technology	Consultation calls employ videoconference technologies and equipment, but some clinicians do not have necessary hardware or technological supports, which might detract from the level of engagement or ability to participate during the calls (inferred).	U	H	ST	F	**CS**
2.00	Medium	5	Rapid assessment misaligned with available time	The consultation protocol assumes a rapid assessment and feedback process between meetings to identify treatment goals (4 weeks), which clinicians experienced as shorter than amount of time often allotted, creating a barrier to implementing MBC (stated) and/or decreased engagement with consultation (inferred).	U	H	**ST**	F	**CS**
2.00	High	5	Digressions derail barrier problem solving and engagement	When clinicians are asked to articulate and prioritize perceived barriers to applying MBC, they frequently digress, resulting in other clinicians disengaging from the call (stated), worries about describing contextual constraints of their roles (stated), and uncertainty about quality of feedback that is contingent on their	U	H	ST	**F**	CS

IMPLICATIONS FOR REDESIGN

- **Digressions/excessive barrier discussion** → Clearer directions; targeted praise for consultee brevity; troubleshooting tips for consultants

- **Multitasking with tech** → Brief clinician orientation to training platform; Consultant prepared materials to share via Zoom

- **Unfamiliar with/unprepared for case presentation structure** → written/verbal case presentation examples; set clear expectations; Created collaborative, safe atmosphere via video calls, etc.

- **Time + context constraints** → rank-ordered time slot selection; group calls < 1hr; brief make-up sessions

MAIN POINTS (REVISITED)

1. The world is designed (and can be better designed)

2. Human-centered design (HCD) and implementation science (IS) have overlapping objectives, but different foci

3. There are opportunities to better integrate HCD and IS methods surrounding the incorporation of **stakeholder perspectives** and **collaborative (re)design** of implementation strategies

   - Example: *Cognitive Walkthrough for Implementation Strategies (CWIS)*

THANK YOU

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