

# Provocation – What Makes a Good Interactive Health Contribution?

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The purpose of this short provocation is to explore the opportunity to draw on a user-centred design framework ([1]) to help ground discussions about the types of contributions the community would like to encourage. This is not to indicate that we'd strongly believe our framework is providing a good answer to these questions, but rather that using the framework as an initial example can stimulate discussion about what we, as a community, might actually like to see. In what follows, we propose a series of assertions—building on the terminology developed from the CHI'24 paper—about the characteristics of contributions that could fit well within the Interactive Health space, as implications of the approach proposed by the framework. Given space constraints, we will not fully reiterate the underlying arguments from the CHI paper but refer to the relevant sections from the underlying paper for more detail.

*Scoping considerations.* A particularly important consideration is that the underlying framework was developed to consider *mental health* interventions, which is unlikely to be a full scope of the conference. To start, let's assume that we're focusing *only* on the subsection of the Interactive Health community research that is sufficiently similar – i.e., deals with questions that are related to (scaffolding / changing / understanding) users' experiences with the eventual aim of altering their cognition or behaviour. In other words, we are assuming that (i) there is some 'theory-of-change' process (whether technical or socio-technical) that the design aims to support in some way; (ii) this theory of change is at least partially related to psycho-social interactions rather than purely biological solutions (e.g., surgery, medication).

## Assertion 1:

**HCI Health contributions need to explicitly connect the presumed theory-of-change (i.e., what *should* make the intervention 'work') and the associated design challenges (i.e., what are the user-facing challenges we're trying to fix).**

One of the key difficulties within the health / HCI space is the tension between *digital innovation* (which often challenges the status quo within intervention design); and *psychological efficacy* (which needs to be retained even if the 'form' of the intervention is entirely re-designed). The framework suggests that one way of enabling such translation is by seeing both design constraints and theories-of-change as essentially descriptions of 'particular set of

experience trajectories' that users need to be guided through for the intervention to be successful. Such re-framing of *intervention design* into *experience design* enables us to bridge the tension between psychological efficacy and design innovation – both now are positioned as complementary requirements / boundaries on the experience to be supported. In our experience, such framing is then understandable for clinicians and HCI researchers alike.

If we were to follow the ideas within the framework, each Interactive Health contribution should be able to clearly articulate the problem they are solving in these terms, as well as be able to delineate the type of contribution that is proposed. In other words, 'only' showing that a given system 'works' (e.g., leads to a statistically significant changes in an RCT on a psychologically important variable) would not be a good Interactive Health contribution, *unless* it also articulated how this system / study helps address a design issue (e.g., by showing how the data represents a successful design solution of a previously unsolved design challenge). Similarly, 'only' showing that a new interaction technique leads to exciting interactions (e.g., those that were just not possible before) would not be a good Interactive Health contribution unless it also can articulate a specific class of theories-of-change within the health space for which this particular set of new interactions solves a user-problem.

## Assertion 2:

**HCI Health contributions can be delivered—and are equally valuable—at multiple of levels: labelled *capability*, *component*, *intervention system* or *intervention implementation* within the framework – see Figure 1 and Figure 2.**

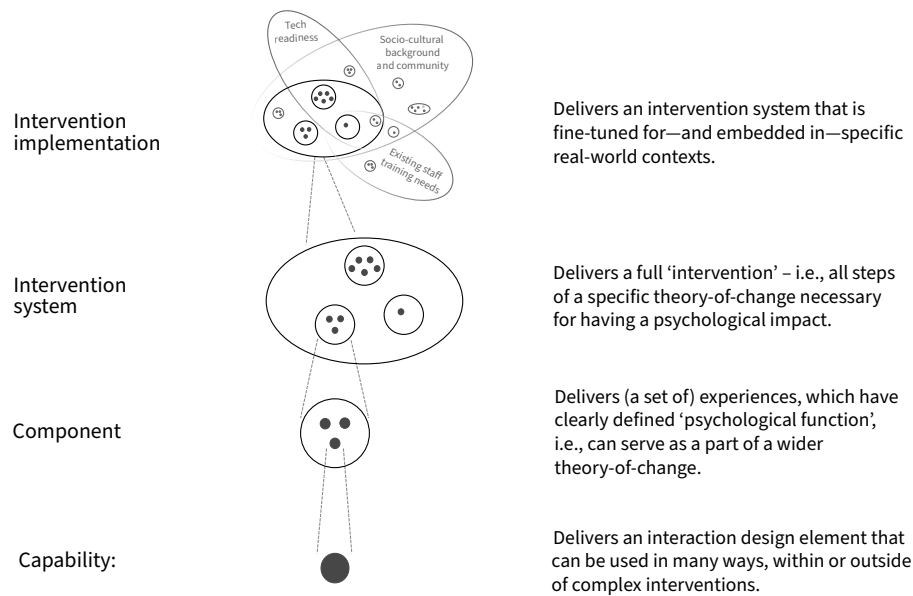
The second key argument in the original framework paper is that once we start seeing interventions as ensembles of experiences defined by theories-of-change, this enables us to think modularly about where, how, and when design innovation can emerge. This then also enables a clear scoping of (i) how such contribution fits into the broader application areas / theories of change; and (ii) can help ground the appropriate methodologies used – cf., section 3 in the paper [1].

As a result, a good Interactive Health contribution should be clear on which of these levels the authors aim to contribute to, how the authors envision it could fit into the 'higher' levels (e.g., how does a newly developed and tested component fit into broader intervention systems), and what assumptions their contribution relies on (e.g., which capabilities or other components would need to be available for it to work well).

While all four levels of the framework could be excellent Interactive Health contributions, our conjecture is that the 'component' level could be a possible initial sweet spot – mostly as it appears that 'component' level contributions (especially those based on

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**Figure 1: Our framework argues that psycho-social interventions can be seen prescribing ‘sets of experiences’ that are expected to lead to psychological effects for the participants ...and thus can be translated into design briefs. This figure provides an overview of the four key types of design briefs—at the capability, component, intervention system, and intervention implementation level—that correspond to different functions within an intervention.**

innovative design / development) are difficult to publish within psychology (where a full intervention systems evaluation is the expected model); and might be seen as ‘technically not innovative enough’ within HCI (where it might be mistaken for an attempt at a capability contribution). Another likely sweet spot is developing a user-centred understanding of existing challenges / barriers within implementations settings – e.g., a study that uses qualitative or mixed methods to identify challenges with an existing component of specific implementation; or identifies the need for a new component that would address a so far unsupported user difficulties.

### Assertion 3:

**Interactive Health should value two broad kinds of contributions – design brief ‘solutions’ as well as design brief ‘generation’.**

The focus on design briefs—as descriptions of experiences necessary for a complex psychosocial intervention ‘to work’—provide a bridge between interaction design choices and intervention requirements. As an implication, this enables a clear differentiation of two broad kinds of contributions: one focused on identifying new design briefs as design challenges that should be addressed; and the other on developing new systems (in response to a well known brief) – cf., section 4 in the paper [1].

*Responding to a design brief.* The contribution involves *developing (socio-)technical elements or systems* and requires the designer to be able to provide some argumentation as to *how these newly developed elements correspond to the functionality outlined in the brief*. In each of these cases, the contribution is about developing, adapting or

testing (a set of) digital elements, and understanding the extent to which these can deliver on the presumed theory of change (as embedded in the level-specific design briefs) *as well as* the design approaches to accomplish this.

*Creating a new design brief.* The contribution involves *articulation of a new design brief* (such as through a careful analysis of in-situ appropriation of an existing mental health intervention system), and *providing some evidence as to why the new functionality—as identified by the design brief—is needed or beneficial for a mental health intervention*. This type of contribution outlines how new design problems can be put forward—often by identifying challenges or opportunities in existing intervention elements. The aim is to provide a clearly-enough defined design brief (i.e., description of the necessary psychological function that the element is supposed to play), which is also well enough motivated so that others can take it up as a design challenge to provide a solution to the newly identified problem.

*How are these approaches in current domains?* As an oversimplification, one could argue that traditional health domains over-emphasise the ‘responding to design brief’ type of contribution – often without a strong mechanistic focus on the design choices that delivered it. Similarly, HCI might often over-emphasise the ‘creating a design brief’ type of contribution – often without the strong focus the underlying theory of change.

Similarly to the Assertion #1, part of the unique pull of the Interactive Health research community could be the specific focus and emphasis on the balance between both the psychological theory, and the underlying design choices to deliver it.

#### Assertion 4:

**For many Interactive Health contributions, articulating contributions of these types ('solutions' and 'generation') and scopes (*capability*, *component*, *intervention system*, and *intervention implementation*) can serve a coordinating function on our field.**

As research at the intersection of HCI and health grows (a good thing!), researchers and practitioners increasingly have challenges identifying transferable capabilities and components that have been developed and evaluated in other health conditions. Clear, crisp articulation of these *capabilities* and *components*, the motivations, the results of their evaluation, and limits to that evaluation can better support researchers in learning about, transferring, applying, and evaluating innovative capabilities and components to other health concerns. Similar challenges occur at the *intervention system* and *intervention implementation* scale, where an intervention may have been evaluated for population or one setting, but offer transferable lessons learned for other populations and settings. Here again, clear articulation of the design brief, what was designed, and for whom and in what context it was evaluated can support readers in reasoning through what might transfer and what adaptations may be required for a new setting.

Facilitating this sort of transdiagnostic discovery of innovative capabilities, components, and interventions is one of the greatest potentials the Interactive Health conference, and we hope that frames such as we outline can help that potential be realized.

#### Summary

The assertions above—even if read with the full understanding of the underlying framework—likely feel too restrictive to encompass the whole Interactive Health community; and perhaps will also feel restrictive to the mental health / psychosocial interventions sub communities. Our hope for this provocation is that this set of assertions serves as a probe – i.e., something that elicits reaction and helps discuss & better understand what would make our community unique, and a helpful addition to what is already out there (from CHI to JMIR journals family to more traditional health venues).

From our perspective, the core tensions described in the framework—the pull / push of established psychological theories of change vs design innovation—could perhaps be one aspect enabling such unique positioning; and frames such as the one described above will be needed to coordinate and facilitate the transdisciplinary work. It is our understanding that there are few venues that would enable such bridges to be deliberately built and emphasised ... and that would celebrate researchers' ability to combine and cross-over these considerations with care.

#### References

- [1] Petr Slovak and Sean A. Munson. 2024. HCI Contributions in Mental Health: A Modular Framework to Guide Psychosocial Intervention Design. In *Proceedings of the CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) (CHI '24). Association for Computing Machinery, New York, NY, USA, Article 692, 21 pages. doi:10.1145/3613904.3642624

Level	Definition	Evaluation focus	Example instances
Capability	Building blocks for <i>interaction design</i> that can be used in many ways, within or outside of complex interventions. <ul style="list-style-type: none"> <li>Capabilities can be developed both in digital artefacts and in people (e.g., clinicians) – a ‘technology piece doing X’ or a ‘human providing Y’.</li> <li>Design brief focused on describing the required properties of the interaction between the user and the system, but not necessarily the impacts that such interaction will have on user’s mental state.</li> </ul>	As design briefs for capabilities focus on <i>immediate interaction outcomes</i> , well-known usability & interaction design methods are likely sufficient. <p><b>Goal:</b> designers need to show that the capability is able to support a pre-specified set of behaviours / interactions as per the design brief.</p> <p><b>Methods:</b> Number of methods used across CHI communities (lab studies, proof-of-concept examples, technical benchmarking etc) might be suitable, depending on the design brief focus.</p>	<ul style="list-style-type: none"> <li>Design feature to record mood quickly on a mobile phone</li> <li>Visualisation presenting data in an engaging way.</li> <li>Algorithm to infer someone’s mental health from social media</li> <li>Clinician who has been trained to &lt;administer procedure X&gt;.</li> </ul>
Intervention component	Building block for <i>mental health interventions</i> , which has a clearly defined ‘psychological function’ – i.e., can serve as a part of theory-of-change. <ul style="list-style-type: none"> <li>Components include one or more capabilities that—when put together in that way—are supposed to have a psychological impact.</li> <li>Design brief focus on describing the experience trajectories that will lead to psychological effects, and specify what are the proximal outcomes we expect to change as a result.</li> </ul>	The evaluation of components should be focused on the <i>localised psychological change</i> that these are supposed to enact. <p><b>Goal:</b> the scope of the design brief should allow designers to focus on ‘easy-and-quick-to-shift’ proximal outcomes ... as long as one can argue how the psychological function described in the design brief (and tested through proximal outcomes) fits a future theory-of-change.</p> <p><b>Methods:</b> For example, a team might test whether a component provides a (temporary!) boost in mood, or enables the user to identify ‘well-crafted goal’ within a short in-lab / remote user study.</p>	<ul style="list-style-type: none"> <li>An app feature that supports a moment of self-awareness of own emotion</li> <li>A digitally mediated process that scaffolds planning of activity-for-the-day following a set of requirements from BA-based CBT through phone messaging.</li> </ul>
Intervention system	A well-defined <i>ensemble of intervention components</i> which, together, should lead to psychological change on core mental health outcome (e.g., anxiety / depression / self-harm). <ul style="list-style-type: none"> <li>Intervention systems describe a full theory of change that should – i.e., a description of the full set of experience trajectories that a person should go through to achieve a measurable change in key mental health outcomes.</li> <li>The design brief should outline the necessary components and how these are expected to connect to each other (sequentially or in parallel).</li> </ul>	The evaluation of systems is now on ‘ <i>full</i> ’ <i>function</i> of the proposed intervention, <i>at least within well-specified text deployment contexts</i> . <p><b>Goal:</b> targets should include the main health outcomes, together with areas such as feasibility, acceptability, engagement, and appropriation.</p> <p><b>Methods:</b> clinical methodologies to track how the system measurably impacts users’ mental health indicators over time are needed for efficacy questions, such as randomised controlled trials or emerging methods such as optimisation studies or microRCTs.</p>	<ul style="list-style-type: none"> <li>Behavioural activation group therapy for teens, complemented by a mobile application that provides access to peer support and digital versions of between-session homework.</li> <li>A social robot + a companion app for parents to provide an in-situ emotion regulation support</li> </ul>
Intervention implementation	A <i>fully fledged ‘intervention system’</i> that has been fine-tuned to a particular context and ideally includes a set of socio technical components that address barriers to implementation in that context. <ul style="list-style-type: none"> <li>The questions are no longer about whether the system ‘could’ work, but rather whether it ‘does’ work in this context, and how can it be improved?</li> <li>The design briefs will take into account factors that affect adoption and sustainment in particular settings – key focus is on how a given intervention system fails or could be amplified in a given real-world deployment scenario.</li> </ul>	Focus on health outcomes in a <i>real-world context</i> , as well as lived experiences with the intervention that affect its uptake and sustainment. <p><b>Goal:</b> if the aim is to determine the psychological effectiveness of the newly improved intervention, the methodological concerns from the previous level remain, and might be further amplified – for example by the need to employ factorial design or cluster-randomised experimentation</p> <p><b>Methods:</b> The research team will likely work with implementation science researchers, and be embedded in a particular deployment context; likely relying on a range of in-situ research methods (e.g., those drawing from CSCW traditions).</p>	The behavioural activation group therapy and mobile app from above, complemented by: <ul style="list-style-type: none"> <li>formal training for clinicians;</li> <li>a process for assigning peer groups to match for need; and</li> <li>peer support moderators.</li> </ul> ... with the aim to deploy to all youth seeking mental health services in <county X>.

**Figure 2: An overview of the key properties of the four types of design briefs, with focus on describing the role they play in the intervention development, and the key evaluation criteria associated with each type.**