Aug 11th, 12:00 AM

To empathize or perceive? Towards a 'perceptive design' approach.

Prithi Yadav

QUT Design Lab, Queensland University of Technology (QUT), Australia

Follow this and additional works at: <https://dl.designresearchsociety.org/drs-conference-papers>

Citation

Yadav, P. (2020) To empathize or perceive? Towards a 'perceptive design' approach., in Boess, S., Cheung, M. and Cain, R. (eds.), *Synergy - DRS International Conference 2020*, 11-14 August, Held online.
<https://doi.org/10.21606/drs.2020.340>

This Research Paper is brought to you for free and open access by the Conference Proceedings at DRS Digital Library. It has been accepted for inclusion in DRS Biennial Conference Series by an authorized administrator of DRS Digital Library. For more information, please contact DL@designresearchsociety.org.

To empathize or perceive? Towards a ‘perceptive design’ approach.

Prithi YADAV

QUT Design Lab, Queensland University of Technology (QUT), Australia

prithi.yadav@hdr.qut.edu.au

doi: <https://doi.org/10.21606/drs.2020.340>

Abstract: Empathy is key in human-centred design but has become more of an ideology than a principle (Heylighen and Dong, 2019). This study proposes perception as an alternative to understanding users that holistically considers their contextual, cognitive, affective and environmental states. To apply perception for understanding users, this research integrates three predominant approaches of mindreading, social cognition - Theory Theory, Simulation Theory and Interaction Theory. A methodology centred on a conceptual ‘perceptive design’ scale and taxonomy of the four levels – ‘recognize, resonate, relate and realize’ - is developed. The ‘perceptive design’ scale’s applicability as a framework for two different human-centred design contexts and as an analytical tool are demonstrated. The contribution is threefold. It can contribute to design practice, research and education by providing structure in the phase of understanding users; enhancing existing and supporting the development of new design tools; and offering opportunities to practice perception in understanding users.

Keywords: empathy in design; perception in experience design; social cognition in design; perceptive design scale taxonomy

1. Introduction

Imagine a team of designers trying to reduce homelessness in a city. How do these designers, who have no lived experience of homelessness, attempt to understand those experiencing homelessness? Should the designers empathize with them or perceive them?

Every day, designers around the world attempt to understand users to design better products and experiences. Over the last three decades, the contextual and affective factors of design have gained prominence in design literature (Kouprie and Visser, 2009). In human-centred design (HCD), understanding the user has come to be synonymous with the construct of empathy (ideo.org, 2009; Battarbee et. al 2014; Mattelmäki et al., 2014). Empathy allows the designer to stand in the user’s shoes (ideo.org, 2009; Battarbee et. al 2014). However,

This work is licensed under a
Creative Commons Attribution-NonCommercial 4.0 International License.

recent studies have shown that empathy, in general (Bloom, 2016) and empathy in design (Heylighen and Dong, 2019; Lloyd, 2009) has its limitations.

This research builds on these studies and insights from the field of mindreading (social cognition), its three predominant approaches of Theory Theory (TT), Simulation Theory (ST) and Interaction Theory (IT). This study proposes that in the process of understanding users, users should be *perceived* (a more holistic way of understanding), rather than *empathized with* (understanding of predominantly affective states). While empathy asserts the value of becoming the user, this study proposes that perception allows the designer to retain their own consciousness and objectively draw from it to better inform the design process. As such, perception becomes key to designers' understanding of users.

To support the application of perception in the design process, this study develops a methodology for 'perceptive design', centred on a conceptual scale and taxonomy. Perceptive design holistically considers contextual, cognitive, affective and environmental factors in the understanding of users. Being aware that there are multiple ways of understanding users can allow designers to engage in the type or level of perception relevant to the design context. This study further illustrates the application of the scale as (1) a framework in two different design scenarios of (a) social change design and (b) user-centred design and (2) an analytical tool to evaluate several common user-centred tools.

The 'perceptive design' methodology can contribute to - design practice by providing guidance and structure in understanding users; design research by enhancing current HCD applications and supporting the development of new HCD tools; design education to help teach and practice perception in user research and engagement. This study can also inform and contribute to larger discussions about the roles of empathy and perception in HCD.

The following sections discuss empathic design, the proposed perceptive design; the development of the perceptive design scale and taxonomy; and their applications.

2. Empathic design and the case for Perceptive design

2.1 Empathic design

Empathy originated from art history in 1873 as *Einfühlung*, German for "feeling into", "to describe an embodied response to an image, object, or spatial environment" (Koss, 2006). In the field of design, Dandavate et al. (1996) were one of the first to note that product development overly relied on cognitive models in the consideration of human thought and behaviour. These authors called for a shift from the rational to the emotional in the early stages of product development to build more successful products that users could connect with. Segal and Suri (1997) went on to harness the inferential capacity of empathy through analysis and advanced its standing as a design approach. Empathy has since become an integral principle in universal design (Krzmaric, 2014) and human-centred design (ideo.org, 2009). The latter encompasses user-centred design, goal-directed design and experience-centred design, all of which leverage empathy (Cooper, Reimann, Cronin & Noessel, 2014).

Recently, Heylighen and Dong (2019 p.107) highlighted the limitations of empathy in design and state “... empathy has become a design ideology rather than a principle...” and is selectively appropriate. Heylighen and Dong (2019) cite Lloyd (2009) and Le Dantec & Do (2009) to assert the ethical implications of applying empathy to design. These ethical implications include the design impact and solution-generating process being driven by the ability of the designer to gain empathy (which sometimes cannot be achieved).

Although, as de Vignemont and Singer note, “there are probably nearly as many definitions of empathy as people working in this topic” (2006, p. 435), empathy in design has, in recent times, become synonymous with understanding the user. This study asserts that, although empathy in design started out to balance the over-reliance on the rational, design has since become focused on the user’s emotional states (Battarbee, Suri, & Howard, 2014; Mattelmäki et al., 2014).

2.2 Kouprie & Visser’s (2009) framework for empathy in design

An influential work on the role of empathy in design, Kouprie & Visser’s (2009) work drew on psychology studies to create a framework to apply empathy in design. The developed framework clearly defines a four-stage process for the designer to follow in creating empathy for the user to support the design process. Their framework entails four phases - Discovery, Immersion, Connection and Detachment and is intended to provide ‘a fundamental understanding of the mental process of achieving empathy and using that understanding in designing’ (Kouprie & Visser, 2009 p.446).

However, the ‘stepping-in’ stage (comprising of the second and third phases of Immersion and Connection) allude to a range of levels of empathy but seems to make a leap from Immersion to Connection. The authors equate resonance (phase three Connection) with sharing the user’s experience in the same phase. This study proposes that resonance and experience-sharing are two different degrees and that sharing mental experiences can be a different level from sharing experiences that take into consideration physical, environmental context as well.

Kouprie & Visser’s (2009) framework establishes that a process to understand users is very relevant to designers. However, this study questions centring the process of understanding users around empathy. Although empathy considers both cognition and affectivity, it is predominantly associated with the designer’s cognitive reasoning and affective resonance of the user’s affective or “emotional state” (Kouprie & Visser, 2009 p. 442).

Based on the limitations of empathy in providing a holistic understanding of the user and Kouprie and Visser’s (2009) framework for empathy in design, this study proposes perception as an alternative construct for understanding users in human-centred design.

2.3 The case for ‘perceptive design’

Perception is defined as both - ‘awareness of something through the senses’ and ‘the way in which something is regarded, understood or interpreted’ (“Perception”, 2020). Although

the first definition seems to indicate perception is just information received through our senses, such as what we see; the second definition clarifies that perception is more than mere information from our senses. Perception is our inference and even interpretation of the information from our senses. This study builds on the dictionary definition to propose that one's perception of another is shaped by the perspectives, experiences and consciousness of the perceiver. Einstein said, "Creativity is seeing what everyone else has seen, and thinking what no one else has thought." As such, perception is key to design as it presents the opportunity to look at design problems in different ways. Perception allows the designer to retain their consciousness, while considering the user's consciousness, allowing for a plurality of consciousness to better inform design processes. As noted by Taboada et al. (2020) citing Freire (1970) and Foucault (1997, 1982) "a plurality of consciousness" in the design process would allow for "mutual creative understanding" and balance in power.

For the team of designers trying to reduce homelessness in a city, as Parcell (2020) notes, by citing Bloom (2016), empathising with those experiencing homelessness results in responses that are counterproductive to achieving housing stability in the long run. Empathy is mainly limited to the affective states. Perception in understanding users, however, can consider the user's contextual, cognitive, affective, physical, and environmental factors. Perceptive design allows user research to be holistic and includes all aspects pertinent to the design issue such as context from the existing service design of the housing system. The scenario of homelessness is used to illustrate the potential of perception for HCD. HCD in general, can benefit from the designer objectively drawing from their own consciousness, experiences to infer and interpret user research towards problem-definition, ideation and iteration.

Phenomenologists such as Scheler, Stein and Husserl equate perceiving with direct experience and consider empathy as a more indirect experience of the other's original experience (Zahavi, 2014). This study proposes that perception always undergoes a process of inference or interpretation and builds on social cognition studies to draw on both kinds of perception in social cognition – direct perception and inferential perception (where inference is from intuition and/or simulation (Gallagher and Varga, 2014)) and applies them in the development of the perceptive design scale in sections 3.2 and 3.3 below.

3. Developing the 'perceptive design' approach

In developing the 'perceptive design' approach, this study acknowledges that there are degrees to understanding users and proposes a conceptual scale to define these degrees. For a conscious understanding of users, designers need to draw from their expertise as well as their everyday experiences as fellow human beings. Thus, literature in the fields of mindreading and social cognition is drawn on, to develop the perceptive design scale which considers the holistic understanding of users and their experiences.

The following sub-sections expand upon - the three predominant approaches of social cognition; how perception varies for each approach; and how their integration contributes to the development of the perceptive design scale.

3.1 Social Cognition, the three predominant approaches - TT, ST and IT

Social cognition is the branch of cognitive science that involves perceiving and inferring others, to understand, explain and predict their actions and behaviours (International Social Cognition Network). Social cognition predominantly comprises three approaches (Table 1) - Theory-theory (TT), Simulation Theory (ST) (which together encompass the Theory of Mind (ToM) approaches) and the newer Interaction Theory (IT)

Table 1 The three predominant approaches of social cognition

Theory-Theory (TT)	Simulation Theory (ST)	Interaction Theory (IT)
we infer other's mental states such as beliefs, desires, fears etc. through basic, intuitive, psychological theories based on common-sensical principles and generalizations (Fodor 1968; Lycan 1981, 1982; Ratcliffe 2006)	we use our own minds as models to mirror or understanding other minds. (Goldman 1989; Goldman 2000; Gordon 1986; Gordon 1995 a; Gordon 1995 b; Gordon 1996; Heal 1995; Heal 1998; Heal 2000)	we perceive through social interactions comprising embodied interactions, direct perception and narratives (Gallagher and Varga, 2014). Gallagher (2001) coined the term 'Interaction Theory' and equates social cognition with social interaction (Gallagher 2008a)
E.g. inferring X left the building because they heard the fire-alarm OR Inferring X is searching for their key or phone when they reach into their pocket upon approaching a locked door.	E.g. inferring X will like a movie that you liked because you have similar taste in movies OR Inferring X is distraught at his dog's passing away because you are as attached to your dog too.	E.g. direct perception, embodied interaction: perceiving someone's joy or anger from their tone of voice or expression E.g. narrative competency: assuming a parent will save their child from danger (ingrained from stories, movies from childhood)
Hybrid versions of theorizing and simulating that aim to address the limitations of each individually, have also been advocated for (e.g., Nichols and Stich, 2003; Goldman, 2006).		
This study draws from an integration of TT, ST and IT as supported by Zahavi (2011, p.556)		
"Our social understanding comes in many shapes and forms, and we need multiple complementary accounts in order to cover the variety of abilities, skills and strategies that we draw on and employ in order to understand and make sense of others."		

3.2 Perception in TT, ST and IT

The three approaches differ in their views on perception. ToM (both TT and ST) supports the core assumption that the mind of others is imperceptible, it requires "some extra-perceptual cognitive step (inference through theory or simulation) as necessary for "mindreading" the mental states of others" (Gallagher and Varga, 2014 p.185). IT's core concept, however, is perception, providing both function as well as content, and enables the understanding and interaction with others (Macgann and De Jaegher 2009; Gallagher 2008b). Several authors (Freedberg and Gallese 2007; Rizzolatti and Craighero 2005; Rizzolatti and Sinigaglia 2008; Goldman 2011) believe that ST is based on empathy, in which the empathizer undergoes

similar processes as the target's psychological or neurological states. Interaction Theorists however, counter that empathy is a form of perceptual experience of another's mental state (Gallagher & Varga 2014; Zahavi, 2008) and this is the view that this study takes.

All three approaches are important in the value they provide in the day-to-day context of perceiving others. One prominent version of IT is the direct perception thesis of social cognition. The direct perception model proposes that for everyday interactions, by directly perceiving other's expressions, bodily movement and actions, we can gain insights into their intentions, emotions and meanings behind their behaviour (Gallagher 2008b) such as perceiving X's disappointment from their body language. Gallagher and Varga (2014, p.192) assert that although perceiving other's mental states is complex and dynamic at "sub-personal, sensory-motor level", it does not occur from additional, extra-perceptual influences. However, Gallagher and Varga (2014 pp.191) also acknowledge that "on some versions of TT and ST, an extra-perceptual inference (or simulation) is added to the perception" because perception by itself is not enough.

The three approaches also differed on their views on perceiving context. ToM focuses on the cognitive processes of understanding others and does not consider environment, context and embodiment in social cognition (Bohl and Bos, 2012). This research considers environmental, social, cultural factors and prior experience also as stemming from theory-laden perception (TT) besides the narrative and perceptual processes of IT.

For this research, wherein the designer needs to also take on the role of an expert, the proposed scale goes beyond the value provided just by direct perception. It draws on (1) the larger IT that focuses on embodied interaction as well as narrative, besides direct perception in social cognition and (2) the extra-perceptual inferential capacities of TT & ST. Jacob (2011) argues against this model that he terms "the direct perception model of empathy" in which perception can be direct as well as inferential. Zahavi (2011), a proponent of Interaction Theory counters by asserting that given the variety of social contexts, diverse and complementary ways would be required to "understand and make sense of others." Zahavi (2011 p.556) thus makes the case for integrating TT, ST and IT, which this study draws on.

3.3 Integrating TT, ST and IT for the proposed perceptive design scale

This research merges elements of TT, ST and IT, as done by Gangopadhyay and Schilbach (2011), Michael (2011) and Bohl and Bos (2012) as all three TT, ST and IT offer specific value in understanding others, that can be relevant to application in design. This section delves into how relevant aspects of each approach is incorporated in the perceptive design scale.

TT plays a significant role in the process of designers understanding users. The very premise of any design is that it is based, explicitly or implicitly, on assumptions, or theories. An example of working from theory in the phase of understanding users or user-research is the identification of user-groups. Common-sensical principles or generalizations (theories from TT) are at play even when identifying users of a certain demographic. TT is thus woven throughout the phases in the 'perceptive design' scale.

The ways in which the different social cognition approaches lent themselves to the formulation of each stage of the proposed perception scale are outlined below:

The first stage builds preliminary context about the user. IT advocates for the importance of social, cultural understanding for a full social perceptive understanding (Gallagher and Varga, 2013). ST advocates for prior information about the target's mental states being key (Goldman 2013). TT as theory-laden perception (from sec 3.2). These are considered in the first stage where designers can '**recognize**' the context, not necessarily through interaction.

The second stage involves grasping the mental states of the user, through potential interaction. IT's embodied interaction, communicative, narrative competency, enactive, direct perception all play roles in this stage. ST - the designer can draw from their experiences to have the user's ideas resonate with them. TT - consciously or subconsciously, the designer is working from a theory about the potential user in relation to the product or experience or idea. This stage facilitates aspects of the user to '**resonate**' with the designer.

The third stage involves the process of reconstructing another's experience (with the product or service) to mentally experience it, while retaining one's own consciousness. Thus, ST, IT and TT can be drawn upon in this stage – ST, when we are using our minds as models to perceive by inference through simulation and TT, when we are working from a theory. IT, when the user is involved in the process, to perceive the user's embodied processes to inform the design process. This stage aids the designer to '**relate**' to the user.

The fourth stage weaves insights gained from the previous stages to create 'almost' experiential processes. This stage relies primarily on ST and IT when it potentially includes narrative, communicative practices and environmental context. One cannot experience someone else's experience (Pine & Gilmore 1998, Forlizzi & Ford 2000, Buchenau & Suri 2000). However, as Battarbee (2004) notes, in everyday life, we transfer experiences (about holidays, food, etc. by discussion), and such a "close enough" experience should work for design. This last stage aids the designer to (almost) '**realize**' the user's experience.

4. Proposed scale and descriptions of the levels of perception

This resulted in the development of a perceptive design scale as shown in Figure 1 (below), with a taxonomy relating to the four degrees of perception as - Recognize, Resonate, Relate and Realize.

Figure 1 The design perception scale as recognize, resonate, relate, realize

The proposed perceptive design scale is centred on there being various degrees and aspects of understanding the user. The scale is a guide to aid designers in the process of understanding users' lives. It aims to provide awareness of the range of conceptual depths the designers can go to, to achieve an understanding of the user. As designers step into territory that is unfamiliar to them, a scale can let them gauge how deep they want to go. It can allow the designers to navigate these conceptual depths, potentially allowing for (re) assessment and modulation to achieve the optimum level of perceptive design. In Table 2 (below), the taxonomy and the associated degrees are described:

Table 2 Taxonomy of the levels of perception on the 'perceptive design' scale.

Level of perception	Description
<p>Recognize</p>	<p>The lowest level of perception is where the designer gains understanding about the user by becoming aware of the user's context, requirements, without necessarily interacting with the user. The term adopted for this level is 'recognize', where the designer can 'recognize' aspects of the user. E.g. surveys, user-data.</p>
<p>Resonate</p>	<p>The lower level of perception is identified as the level in which the designer gains insight into the user's mental and emotional states, such as their beliefs, hopes, desires, etc. This level involves the designer engaging with potential users to build more context. The term adopted for this level is 'resonate' where aspects of the user can resonate with the designer. E.g. interviews and stories</p>
<p>Relate</p>	<p>The higher level of perception is identified as the level in which the designer relates to the user either by</p> <ol style="list-style-type: none"> 1. consciously, actively placing themselves (mentally) into the user's context - (social change design) <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. gaining insights into the user's behavioural responses to a stimulus - (user-centred design). <p>The term adopted for this level is thus, 'relate' where the designer and the user can be at the same level. E.g. journey-map, role-play</p>
<p>Realize</p>	<p>The highest level of perception is identified as where the designer shares experiences with the user as part of the process of understanding the user. The term adopted to depict this level is 'realize', where the designer can 'almost' realize the user's experience. E.g. Augmented reality exercises, immersion exercises.</p>

5. Application of the scale

The perception scale can potentially be applied as a framework as well as an analytical tool. The following sections 5.1 and 5.2 illustrate both applications. The application of the scale as a framework is depicted in 5.1 as two HCD scenarios, one with a user-centred design context and one with a social change design context. In 5.2, the scale's application as an analytical tool is illustrated by evaluating ten common user-centred tools on the conceptual scale. Given that perception is difficult to quantify, the levels within the proposed design perception scale are to be considered as conceptual and boundaries between levels are to be considered fluid. They are subject to the specific design processes, requirements and outcomes that they are applied to.

5.1 Illustration of the application of the scale as a framework

The perceptive design scale can potentially serve as a framework for structuring and guiding the designer through a process of sequentially progressing through the levels on the perceptive design scale. The application as a framework is depicted below, in two different design scenarios of designing for social change and designing for user-centred design. Please note that further research is awaited as the proposed framework is applied as part of the author's research. The below scenarios are indicative of the potential of the scale.

To illustrate how user understanding differs, depending on the design context: Janzer & Weinstein (2014) note that the differences in design contexts such as user-centred design and development challenges is a case of object-centric versus situation-centric processes. While user-centred design focuses on creating products, development challenges need interventions as responses to situations and thus require a service design or situation-centric process. Lee (2015) cites the difference between the two as designing a computer mouse for a user versus designing better health service systems for poor villagers, a situation in which diverse stakeholders are involved. For the design of a computer mouse - the user's cognitive, emotional, physical states would need to be considered. For the design of better public health services in a village, the user's cognitive, emotional, physical and contextual (environmental, spatial contexts) states would need to be considered.

(User-centred design context) For a group of diverse stakeholders designing a transit app for residents of a location, the levels of perception to be engaged in could range over several levels. It could start from the level of '**recognize**' (demographic data, transit surveys), before moving on to the '**resonate**' level (user circumstances relating to their transit requirements from user interviews). These levels of perception can be enough for the initial design. Based on these, a shared representation of the user could be created to align stakeholders' understanding and objectives to design key features of the app. The initial design could then progress to the '**relate**' level (behavioural insights from users trying the app) and '**realize**' level (where user experience with the app is simulated) to further the design of the app.

(Social Change design context) For the scenario in the introduction - service (re-)design of the homelessness system - a basic overview of how the scale can act as a framework follows: The

first level '**recognize**' would act as the first phase, in which cognitive understanding of the homeless person's context is established from sources such as surveys, demographic data, reports, spatial data and journeys through the existing service of the homelessness system. The second level '**resonate**' would act as the second phase, in which the demographic data is supplemented with interview information about the user's journey through the existing homelessness service system, their mental and emotional states such as their beliefs, hopes, desires projected to a time where they did/will have a home and regular lives. This is the level that is expected to resonate with aspects of the designer's life. The third level '**relate**' would act as the third phase, in which the designer consciously adopts the (mental) perspective of the experience of homelessness in relation to their own lives. In this phase, the designer, potentially through exercises, draws from their own potential experiences with uncertainty, instability in their lives to reconstruct the mental and emotional states that the homeless person feels. The fourth level '**realize**' would act as the fourth phase, in which the designer, through a process of immersion attempts to understand the user's experience through simulation etc. This phase could build on the insights gained from the previous stages and potentially incorporate physical or environmental aspects such as applying augmented reality to 'almost' experience homelessness at specified locations.

5.2 Illustration of the application of the scale as an analytical tool

A study of several commonly used user-centred tools (Figure 2) demonstrated that they offered various degrees in understanding users. The study also showed that the kind of understanding offered by the tools varied, and the outcome of the tool employed, depended on the specific design context.

Figure 2 Commonly used user-centred design tools

In this section, the application of the perceptive design scale as an analytical tool is demonstrated by evaluating ten commonly used user-centred design tools as shown below, in Table 3. These user-centred design tools are typically applied to gain a deeper understanding of the user in the early stages of design. Please note that the categorization and justification provided is indicative of how the scale can be applied. Every design problem is unique, and every tool can be customized to gain the kind of insights required.

Table 3 Categorization of common user-centred tools on the perceptive design scale.

Tool	Function	Level	Justification
Stakeholder Mapping Nesta (2014)	provides a clearer picture of how all the different people and organisations involved, relate both to the work and each other	recognize	basic insights into design contexts involved, lets the designer ' recognize ' user aspects
Surveys	provide preliminary design context through insights from user needs, wants, demographics, etc.	recognize	provide key context for the designer to ' recognize ' aspects of the user
Personas Nesta (2014)	provides a fictional character as a user type to represent a group with similar characteristics such as user needs relevant to the design problem	recognize, resonate	ranges from providing basic context about user needs (recognize), to insights into user's emotional, mental states (resonate), if used with narratives or scenarios
Storyworld Kimbell L., Julier J. (2012 p.24)	provides ways to harness and transmit most relevant insights about people into stories that make users easier to relate to	resonate	the user's contexts, mental, emotional states serve to ' resonate ' with the designer
Question Ladder Nesta (2014)	provides various ways to start asking probing questions, and to configure combinations of questions to the best route to arriving at the core issue(s)	resonate, relate	insights into user's mental and emotional states (resonate) allows the designers to shift their mental state (relate)
Interviews	provide insight into a person's opinions, desires and fears on a given subject, range widely depending on modes, outcomes	resonate, relate	designer resonates with and relates to contextual, mental, emotional insights
Empathy Map Gray, Brown & Macanuso (2010 p. 65-66)	provide insight into what the user says, thinks, does, feels, sees and hears in response to a product or a service	relate	the designer can ' relate ' to these insights by drawing from their own experiences
Journey maps Stickdorn M., Schneider J. (2010)	provides insight into various routes, points at which users become aware of, connect with (potential) products or services.	relate	the designer can ' relate ' to insights from the user's journey by drawing on their own experiences
Roleplaying Boess, S. U. (2006)	provides insights into users' contexts or experiences of a product, service by acting it out	relate	the designer can relate to insights about the user's experience through roleplay
People-shadowing Nesta (2014)	provides insights into user's environment, providing contextual details into a person's motivations and behavioral responses	realize	provides experiential insights at the simulation level, allowing for the designer to realize the user's life.

Figure 3 *Demonstration of the perception scale as an analytical tool to assess ten commonly used user-centred design tools*

Figure 3 depicts how the conceptual perceptive design scale can assess design tools. The scale can also be used as an analytical tool to assess design processes to guide the designer. The levels can be stand-alone levels to evaluate where a design process is on the perception scale and gauge if that is the appropriate level for it or whether it needs to be at higher or lower levels. It can indicate how deep the designer is going or the type of understanding required (contextual, mental or experiential), to understand the user. It also provides opportunities for the user to (re)assess and modulate that level on the conceptual scale.

6. Discussion

This study proposes that perception allows for a holistic understanding of users by considering their contextual, situational, cognitive, affective and environmental states. Each of the three key approaches of social cognition offers a different kind of perception. Theory Theory (TT) offers a theory-laden intuitive perception, Simulation Theory (ST) a simulative perception and Interaction Theory (IT) offers direct, enactive perception. This study draws on and integrates all these perceptions to harness the value provided by “multiple complementary accounts” in applying a “variety of abilities, skills and strategies” to comprehend others (Zahavi, 2011 p.556). This study acknowledges that certain levels on the scale could be considered empathy, but for such instances takes the view of Interaction Theorists, who argue that empathy is a form of perceptual experience of another’s mental state.

The perception scale for user-centred design presented in this study serves three key functions in Human-Centred Design (HCD). It can (1) create awareness that the design process involves a range of types and/or levels of understanding the user. Some design processes may require functioning from a certain level or a certain type of perception such

as contextual or mental states; (2) act as a roadmap for the designer to navigate the fluid concept of understanding the user in HCD by providing structure; (3) align understanding about the user, as user insights gained can lead to development of shared representations of the user. When a diverse design team with members from several disciplines agree on user insights, it can lead to alignment in identifying user needs and design outcomes.

This study demonstrates through two scenarios (1) social change design and (2) user-centred design, the applicability and customizability of the proposed scale in different HCD contexts.

One cannot experience someone else's experience (Pine & Gilmore 1998, Forlizzi & Ford 2000, Buchenau & Suri 2000). The proposed 'perceptive design' scale supports 'almost experiential' experiences. For design problems that require an understanding of the physical experiences of the user, such as wearables, participatory exercises with the user, would aid stages 3 (relate) and 4 (realize). From these exercises, the designer can perceive the user's experiences through direct, enactive perception and embodied interaction (IT).

Other frameworks for understanding users, such as Stein (1917), Reik (1949), Kouprie and Visser (2009) which rely on empathy, require that the empathizer detaches after immersion "for competent action" based on insights gained (Kouprie and Visser, 2009 p.444). This study considers and acknowledges that designers will often retain their physiological, cultural and psychological consciousness while trying to understand the user. In retaining their consciousness, the designer needs to exercise caution and be mindful of potential egocentric views and biases seeping into the processes. However, applying the proposed construct of perception can potentially allow the designer to perceive and include their own experiences and perspectives in the design process objectively, rather than denying them. Further research is awaited as the proposed framework is applied in the author's research.

7. Conclusion

The study shows that empathy, although valuable in design has its limitations and proposes perception as a potential construct for holistically understanding users in human-centred design (HCD). The methodology for 'perceptive design' is centred on a conceptual scale and taxonomy of the levels - recognize, resonate, relate and realize. The methodology is developed by integrating the three predominant approaches of social cognition - Theory Theory, Simulation Theory and Interaction Theory. The 'perceptive design' scale is applied as a framework as well as an analytical tool to demonstrate its applicability. This study's theoretical contribution is the proposed concept of 'perceptive design' and the application of mindreading and social cognition approaches to design. This study's methodological and empirical contributions are the applicability of the perceptive design scale as a design process (method) and as an analytical tool (empirical) respectively.

Acknowledgments: Many thanks to Associate Professor Dr Markus Rittenbruch and Senior Lecturer Dr Glenda Amayo Caldwell (QUT, Brisbane) for encouraging the conception of this work; Sarah Johnstone and Dr Irina Anastasiu (QUT, Brisbane) for their support in the development of this work; and both the reviewers for their valued input.

8. References

- Battarbee, K., (2004). *Co-experience: understanding user experience in social interaction* (Doctoral Dissertation). University of Art and Design, Helsinki.
- Battarbee, K., Suri, J. F., & Howard, S. G. (2014). *EMPATHY ON THE EDGE*. Retrieved February 12, 2020, from <https://tinyurl.com/yc7cyvm8>
- Bloom, P. (2018). *Against empathy: the case for rational compassion*. London: Vintage.
- Boess, S. U. (2006). Rationales for Role playing in design. In *Proceedings of Wonderground, the Design Research Society Conference* (pp. 1-4). Lisbon: Lisbon.
- Cooper, A., Reimann, R., Cronin, D., Noessel, C., Csizmadi, J., LeMoine, D., & Cooper, A. (2014). *About face : the essentials of interaction design* (Fourth edition.). John Wiley and Sons.
- Bohl, V., & Bos, W. V. D. (2012). Toward an integrative account of social cognition: marrying theory of mind and interactionism to study the interplay of Type 1 and Type 2 processes. *Frontiers in Human Neuroscience*, 6. doi: 10.3389/fnhum.2012.00274
- Buchenau, M., & Suri, J. (2000). Experience prototyping. *Proceedings of the 3rd Conference on Designing Interactive Systems*, 424–433. <https://tinyurl.com/ydehfybm>
- Dandavate, U., Sanders, E. B. N., & Stuart, S. (1996). Emotions Matter: User Empathy in the Product Development Process. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 40(7), 415–418. <https://tinyurl.com/ybloz496>
- de Vignemont, F., & Singer, T. (2006). The empathic brain: how, when and why? *Trends in Cognitive Sciences*, 10(10), 435–441. <https://tinyurl.com/yddaeoyz>
- Fodor, J. (1968). The Appeal to Tacit Knowledge in Psychological Explanation. *The Journal of Philosophy*, 65(20), 627–640. <https://tinyurl.com/yas638pd>
- Forlizzi, J., & Ford, S. (2000). The building blocks of experience: an early framework for interaction designers. *Proceedings of the 3rd Conference on Designing Interactive Systems*, 419–423. <https://tinyurl.com/ybuz7ewd>
- Foucault, M. (1997). Sex, Power and the Politics of Identity. *Ethics: Subjectivity and Truth. The Essential Works of Michel Foucault 1954-1984*, edited by Paul Rabinow, 163–173. New York: The New Press.
- Foucault, M. (1982). The Subject and Power. *Critical Inquiry* 8 (4): 777–795. doi:10.1086/448181.
- Freedberg, D., and V. Gallese. (2007) Motion, emotion and empathy in esthetic experience. *Trends in Cognitive Sciences* 11: 197–203.
- Freire, P. (1993). *Pedagogy of the oppressed* (New rev. 20th-Anniversary ed.). New York: Continuum
- Gallagher, S. (2001). The practice of mind: Theory, simulation, or primary interaction? *Journal of Consciousness Studies*, 8 (5–7): 83–107
- Gallagher, S. (2008a). Understanding others: embodied social cognition. *Handbook of Cognitive Science: an Embodied Approach* 439–452, Calvo, P and Gomila A. (eds) Amsterdam: Elsevier
- Gallagher, S. (2008). Direct perception in the intersubjective context. *Consciousness and Cognition*, 17(2), 535–543. <https://tinyurl.com/ybtvphko>
- Gallagher, S., Varga, S. (2014) Social Constraints on the Direct Perception of Emotions and Intentions. *Topoi* 33, 185–199 . <https://tinyurl.com/y8tqd3rj>
- Gangopadhyay, N., & Schilbach, L. (2012). Seeing minds: A neurophilosophical investigation of the role of perception-action coupling in social perception. *Social Neuroscience*, 7(4), 410–423. doi: 10.1080/17470919.2011.633754
- Goldman, A. (1989). Interpretation Psychologized, *Mind and Language*, 4(3): 161–185; reprinted in Davies and Stone 1995a, pp. 74–99.

- Goldman, A. (2000) The mentalizing folk. In D. Sperber (ed.), *Metarepresentations*. Oxford:Oxford University Press.
- Goldman, A. (2006). *Simulating Minds: the Philosophy, Psychology, and Neuroscience of Mindreading*. Oxford, New York, NY: Oxford University Press.
- Goldman, A. (2011) Two routes to empathy, insights from cognitive neuroscience. In *Empathy: Philosophical and psychological perspectives*, ed. A. Coplan and P. Goldie. Oxford: Oxford University Press.
- Gordon, R.M. (1986). Folk Psychology as Simulation. *Mind and Language*, 1: 158– 171.
- Gordon, R. M. (1995a) Simulation Without Introspection or Inference From Me to You. *Davies and Stone* (eds) 1995, 53-67.
- Gordon, R. M. (1995b) Sympathy, Simulation, and the Impartial Spectator. *Ethics*, 105, 727-742.
- Gordon, R.M. (1996) 'Radical' simulationism, in Carruthers, P., & Smith, P.K., (Eds), *Theories of Theories of Mind*, pp 11-21. Cambridge: Cambridge University Press.
- Gray, D., Brown, S., & Macanufo, J. (2010). *Gamestorming* (1st edition). O'Reilly Media, Inc.
- Heal, J. (1995) How to think about thinking, in Davies, M. & Stone, T., (dirs.), *Mental Simulation*, Oxford, Blackwell, 33-52.
- Heal, J. B. (1998) Co-cognition and Off-line Simulation: Two Ways of Understanding the Simulation Approach. *Mind & Language*, 13, 477-498.
- Heal, J. B. (2000) Other Minds, Rationality and Analogy. *Aristotelian Society Supplement*, 74, 1-19.
- Heylighen, A., & Dong, A. (2019). To empathise or not to empathise? Empathy and its limits in design. *Design Studies*, 65, 107–124. <https://tinyurl.com/y93ujgrl>
- IDEO (Firm), (2009). *The field guide to human-centered design: Design kit*.
- International Social Cognition Network. (n.d.). ISCON. Retrieved September 30, 2019, from <http://www.socialcognition.info/>
- Jacob, P. (2011). The Direct-Perception Model of Empathy: a Critique. *Review of Philosophy and Psychology*, 2(3), 519–540. <https://tinyurl.com/ybnphcdo>
- Janzer L. & Weinstein L. S. (2014) Social Design and Neocolonialism, *Design and Culture*, 6:3, 327-343, DOI: 10.2752/175613114X14105155617429
- Kimbell L, Julier J (2012) The Social Design Methods Menu (Fieldstudio, London). http://www.lucykimbell.com/stuff/Fieldstudio_SocialDesignMethodsMenu.pdf
- Koss, J. (2006). On the Limits of Empathy. *The Art Bulletin*, 88(1), 139–157. <https://tinyurl.com/y6vllzry>
- Kouprie, M., & Visser, F. S. (2009). A framework for empathy in design: stepping into and out of the user's life. *Journal of Engineering Design*, 20(5), 437-448. <https://tinyurl.com/y94pekz3>
- Krznaric, R. (2015). *Empathy: why it matters, and how to get it*. London: Rider Books
- Le Dantec, C., & Do, E. (2009). The mechanisms of value transfer in design meetings. *Design Studies*, 30(2), 119–137. <https://tinyurl.com/yd4jl7n6>
- Lee, P. (2015). Before the Backlash, Let's Redefine User-Centered Design. *Stanford Social Innovation Review* Retrieved from <https://tinyurl.com/ya3cpsjs>
- Lloyd, P. (2009). Ethical imagination and design. *Design Studies*, 30(2), 154–168. <https://tinyurl.com/y8x7nx2l>
- Lycan, W. (1981). Form, Function and Feel. *The Journal of Philosophy*, 78, 24-50.
- Lycan, W. (1982) Toward a Homuncular Theory of Believing. *Cognition and Brain Theory* 4:139-59
- Mattelmäki, T., Vaajakallio, K., & Koskinen, I. (2014). What Happened to Empathic Design? *Design Issues*, 30(1), 67–77. <https://tinyurl.com/ybpsusfk>

- McGann, M., & de Jaegher, H. (2009). Self-other contingencies: Enacting social perception. *Phenomenology and the Cognitive Sciences*, 8(4), 417–437. <https://tinyurl.com/y8hldqtb>
- NESTA (2014) *DIY: Development and impact you : practical tools to trigger and support social innovation*, London, National Endowment for Science, Technology and the Arts (NESTA).
- Nichols, S., and Stich, S. (2003). *Mindreading: An Integrated Account of Pretence, Self-Awareness, and Understanding Other Minds*. Oxford: Oxford University Press
- Parsell, C. (2020). Growing Wealth, Increasing Homelessness, and More Opportunities to Exercise Our Care to the Homeless. *European Journal of Homelessness* 13 (2) 13-26.
- Perception. (2020). In *Oxford Online Dictionary*. Retrieved from <https://tinyurl.com/yaochzrk>
- Pine, B., & Gilmore, J. (1998). Welcome to the Experience Economy. *Harvard Business Review*, 76(4), 97–105.
- Ratcliffe, M. (2006). "Folk Psychology is not folk psychology". *Phenomenology and the Cognitive Sciences*. 5 (1): 31–52. doi:10.1007/s11097-005-9010-y.
- Reik, T. (1949) *Listening with the third ear: The inner experience of the psychoanalyst*. New York: Grove.
- Rizzolatti, G., and L. Craighero. (2005) Mirror neuron: a neurological approach to empathy. In *Neurobiology of human value*, ed. J.-P. Changeux et al. Berlin: Springer-Verlag.
- Rizzolatti, G., and C. Sinigaglia. (2008) *Mirrors in the brain: How our minds share actions and emotions*. Oxford: Oxford University Press
- Segal, L. (1997). The empathic practitioner: Measurement and interpretation of user experience. *Proceedings of the Human Factors and Ergonomics Society ... Annual Meeting*, 1, 451. Retrieved from <https://tinyurl.com/ydbny634>
- Stein, E., (1917) *Zum Problem der Einfühlung*. Halle: Waisenhaus
- Stickdorn, M., & Schneider, J. (2010). *This is service design thinking : basics--tools--cases*. Amsterdam: BIS Publishers.
- Taboada M.B., Rojas-Lizana S., Dutra L. X. C. and Levu A. V. M., (2020) Decolonial Design in Practice: Designing Meaningful and Transformative Science Communications for Navakavu, Fiji, *Design and Culture*, DOI: 10.1080/17547075.2020.1724479
- Zahavi, D. (2008). Simulation, projection and empathy. *Consciousness and Cognition*, 17(2), 514–522. <https://doi.org/10.1016/j.concog.2008.03.010>
- Zahavi, D. (2011). Empathy and Direct Social Perception: A Phenomenological Proposal. *Review of Philosophy and Psychology*, 2(3), 541–558. <https://tinyurl.com/yboukpgv>
- Zahavi, D. (2014) Empathy and Other-Directed Intentionality. *Topoi* 33, 129–142. <https://tinyurl.com/ybjxlwhp>

About the Author:

Prithi Yadav is a PhD student, designing for social change at the QUT Design Lab, Brisbane, Australia. An architect, urbanist and design strategist, she finds her balance in design - the space between artistry and analytics, stories and statistics, chaos and control.