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DESIGN 3.0 FORUM

NOV 03-04 .2016 Ullim-hall and ID KAIST (N13-1)

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Introduction

Design 3.0 Forum aims to raise and discuss the challenging issues in design research, education and practice in this newly emerging paradigm we now face with new forms of end-user products such as intelligent products and services, DIY/fabrication tools, and IoTs. These new forms of products and services change the ways people interact with them and shape their everyday lives.

We would like to re-think about our traditional user-centered and human-centered approaches and what are new agenda to be raised and considered for future designers and design researchers to be prepared for. This is what Design 3.0 Forum is targeting for, and we hope that this can be the start of continued conversations around these issues even after this forum.

Through this forum, we will synthesize our discussions with renowned panelists in design research and education for proposing what to do for the next generation of design research, education and practice for Design 3.0.

THREE PANELS OF DESIGN3.0 FORUM

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The rise in importance of user creativity, social innovation, and personal production

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The roles of theory, methods, and assumptions of interaction design/HCI

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Post-education and practice :

Rethinking the elements, limits, and potentials of education and practice in design

Chairs

Youn-kyung Lim | KAIST

Dr. Youn-kyung Lim is an associate professor at the Department of Industrial Design at KAIST in South Korea. Her research directions include experience-centered design and aesthetics of interaction as well as prototyping in interaction design especially for creative interaction design in the domains of CHI, DIS, UbiComp and CSCW. She is a recipient of the 2009 Microsoft Research New Faculty Award by Microsoft Research Asia (MSRA). She has been participating in service activities as PC or TPC members for major top international conferences in the areas of HCI and Design such as CHI, UbiComp, DIS, DRS, and IASDR.

Ron Wakkary | Simon Fraser University

Ron Wakkary is a Professor in the School of Interactive Arts and Technology (SIAT) at Simon Fraser University (SFU) where he established the Everyday Design Studio, a design research studio that explores interaction design. He is also Visiting Professor and Chair of the Impact of Interaction Design on Everyday Life in Industrial Design at Eindhoven University of Technology (TU/e). Wakkary's research investigates the changing nature of interaction design in response to everyday design practices like home life, DIY, amateur experts, hobbyists, and sustainability. Wakkary publishes regularly in design and human-computer-interaction journals and conferences. He is an Editor-in-Chief of ACM interactions, Director of the Interaction Design Research Centre at SFU, member of the SIGCHI Executive Committee, and a member of the Steering Committee for Tangible Embedded/Embodied Interaction (TEI).

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Representatives

Kun-pyo Lee | KAIST

Kun-pyo Lee is Professor and Head of Department, Industrial Design, KAIST, S. Korea and Director of Human Centered Interaction Design Lab. He is also serving as President of International Association of Societies of Design Research. He was Executive Vice President and Head of Corporate Design Center of LG Electronics. His research interests include User Experience Design, User-Centered Design Methods, and Empowering Design. He is serving editors in major design related journals including Design Studies, International Journal of Design, and Journal of Design Business & Society. His contribution to design research and education was recognized by appointment of Honorary Fellow of DRS and local hearo of CHI.

Tek-jin Nam | KAIST

Tek-Jin Nam is a Professor in the Department of Industrial Design at KAIST, Korea. He leads Co.design:Inter.action Design Research Laboratory at KAIST. He teaches Interactive Product Design Studio, Interaction Prototyping, and Design Research Issue at KAIST. His research interests lie at the intersection of industrial design and design-oriented human–computer interaction. The focus is on creating people-centric values of future products and services (Augmented Design as noun) and structured approaches to creative design and innovation (Augmented Design as verb). He is also interested in harmoniously integrating design research with practice.

Daniel Saakes | KAIST

Daniel Saakes is trained as an industrial design engineer at Delft University of Technology and he likes making things and making things that make things. Before joining Industrial Design KAIST, he has been active at ID Studiolab, MIT Medialab, Keio University, Japan Science and Technology Agency, University of Tokyo and Umea Institute of Design.

Panel I

01 DESIGN ISSUES

Open Creativity and Design :

The rise in importance of user creativity, social innovation, and personal production

Panel I

Elizabeth Gerber | Northwestern University

Dr. Liz Gerber serves as Faculty Founder of Design for America, Director of the Design Research Cluster, Associate Professor of Design in the Schools of Engineering and Communication, with courtesy appointments in the School of Management and Education and Social Policy at the Northwestern University. Dr. Gerber researches collective innovation – a process that harnesses the diverse and untapped human, social, and economic capital from distributed networks to discover, evaluate, and implement new ideas. She received her PhD and MS in Management Science and Engineering and Product Design from Stanford University. Learn more about Dr. Gerber and her work at www.lizgerber.com and connect with her on Twitter at @elizgerber

POSITION STATEMENT | COLLECTIVE INNOVATION

In the face of looming challenges like childhood obesity, environmental collapse, and soaring health care costs, we need dramatic and sustained innovation. The driving question behind my research is how new technology can support an innovation process to tackle these societal challenges. In particular, I examine what I define as *collective innovation*, an innovation process that harnesses the diverse and untapped human, social, and economic capital from distributed networks to discover, evaluate, and implement new ideas. Open, ubiquitous social technical infrastructure supports collective innovation affording greater speed and deeper and broader participation than was imaginable even a decade ago. While collective innovation is a fast-evolving and scalable process that has the potential to influence the global economy by influencing how, why, and which ideas are introduced into the world, this process is poorly understood.

The first premise of collective innovation is that direct interaction between stakeholders can radically enhance rates of innovation. If stakeholders engage in authentic feedback exchange throughout an iterative design process, the idea is more likely to meet the needs of and be adopted by stakeholders. While online feedback exchange can be authentic, low cost, and accessible, designers struggle to manage the information overload and variable quality. A framework for online feedback exchange must consider the socio-psychological factors of online feedback exchange between designers and stakeholders from initial help-seeking stages to sense-making to action.

Elizabeth Gerber | COLLECTIVE INNOVATION

The second premise is that even across weakly connected, heterogeneous networks, changes in the design of our infrastructure can bring forth effort and resources that would otherwise lie fallow. Online requests for resources from a distributed audience and secure financial transaction services - provides a new way for individuals and teams to solicit financial support from a distributed audience across geographic boundaries. Social media afford the exchange of social capital from an on-demand audience. And crowdsourcing affords exchange of human capital from a global talent pool.

The third premise: Actively engaging a greater number and variety of people to participate in the innovation process expands the breadth of problems addressed and increases the quality of the solutions. While collective innovation offers greater distribution or roles, flexibility, and sense of agency, we need to address issues of skill variety, ownership and responsibility, fragmentation, poor communication, missing resources, planning failures, and burnout.   Many underestimate the skills, necessary preparation and complexity of participation in collective innovation. We need targeted support among the novice innovators who make up the vast majority of participants. Design for America, a national network of design innovators working to address social challenges and Digital Loft, an open, scalable, crowd based support system are two recent developments to help address this unmet need.
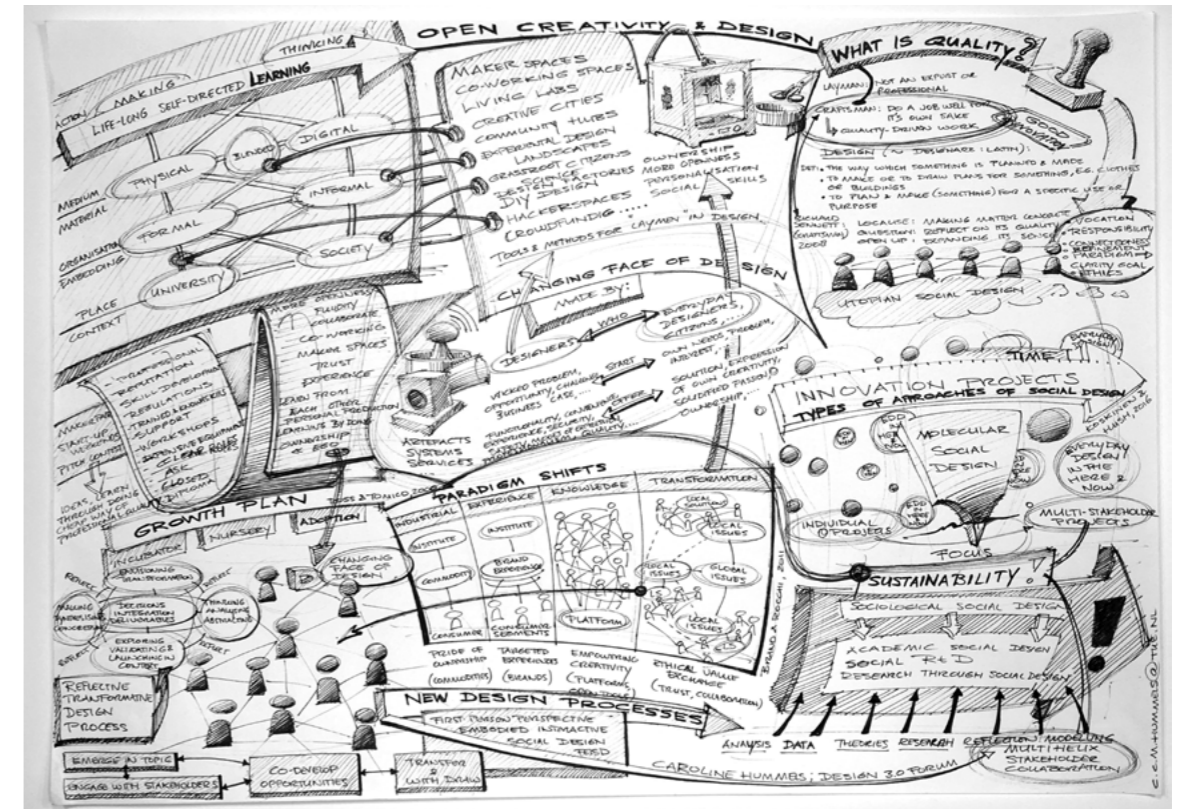
Panel I

Caroline Hummels | Eindhoven University of Technology

Caroline Hummels is professor Design and Theory for Transformative Qualities at the department of Industrial Design at the Eindhoven University of Technology (TU/e) in the Netherlands. She is heading the Designing Quality in Interaction group at ID and leading the interdepartmental area Participatory Health and Wellbeing at TU/e. Her activities concentrate on designing and researching transformative qualities in products and systems, including related frameworks, methods and tools, with a focus on embodied interaction, sensemaking, ethics, aesthetics, multi-stakeholder social design, and health and wellbeing. She is founder and member of the steering committee of the Tangible Embedded, and Embodied Interaction (TEI) Conference, editorial board member of the International Journal of Design, chairman of MU Artspace and member of the Provincial Council of Health.

POSITION STATEMENT | OPEN CREATIVITY & DESIGN

Panel I

Silvia Lindtner | University of Michigan

Silvia Lindtner is an assistant professor at the University of Michigan in the School of Information, with a courtesy appointment in the Penny W. Stamps School of Art and Design. Lindtner's research and teaching interests include transnational networks of innovation and entrepreneurship culture, DIY (do it yourself) making and hacking, science and technology studies in China, and Internet and digital cultures. She is currently writing a book on the culture and politics of "making" and transnational entrepreneurship in urban China. Her research has been awarded support from the US National Science Foundation, IMLS, Intel Labs, Google Anita Borg, and the Chinese National Natural Science Foundation. Her work has appeared at ACM SIGCHI, ACM CSCW, ST&HV, Games & Culture, China Information, and other venues.

POSITION STATEMENT | NATION HACKING: How ideas of making, participation and open design refigure governance, citizenship and livelihoods

Open design, user creativity, and social innovation all stipulate everyday citizens as active participants not only in matters of technology production, but matters of social, economic and political concern. Across regions, grassroots tinkerers, corporations, and governments alike have endorsed this idea that the future of their regions and nations rests on citizens taking matters into their hands, i.e. to intervene in existing social and economic structures by democratizing technology design and production. To take but two examples; since 2012, the Obama administration has officially endorsed open source hardware and making as a way to engage American citizens in designing solutions to solve larger societal problems. By encouraging Americans to become makers of technologies and by opening up existing design and production processes to lay audiences, so the vision goes, the nation itself can reinvent itself and bring back – as Obama described it – a more enhanced and globally impactful version of "made in America." Similarly, in China, government officials have begun endorse open hardware and maker production as a way to cultivate an entrepreneurial mindset and innovation thinking amongst "masses" of Chinese people and in so doing reposition China itself in the global imaginary from a place known as "made in" to "created in." Why has this idea that open design, making and hacking as the crux of reinventing whole regions and even nations, i.e. nation hacking, found support from regions as economically and politically diverse as China and the United States? What is the seductive draw of notions of open-ness, participation, innovation, problem solving and social change? Why do seemingly unlikely allies such as grassroots tinkerers and politicians come together around the

Silvia Lindtner | NATION HACKING:
How ideas of making, participation and open design
refigure governance, citizenship and livelihoods

idea that bottom-up citizen engagement is the crux for societal and regional futures?
The answer I argue lies in the promise of a better and more hopeful future that ideas of open-ness, participation, and hacking hold. From hardware tinkering and making to open innovation, methods of participation promise people a sense of control amidst increasing precarious times. Making, for instance, promises a hands-on engagement and in-depth understanding of the inner workings of technology, and by extension an ability to "hack," i.e. open up, previously closed systems from tech products to governance and social organization. What is overlooked and often even rendered invisible because of this exact focus on opportunity, a sense of control and possibility, is how the implementation of open design and innovation models has gone hand in hand with and was in part propelled forward by a proliferation of increasingly precarious work conditions. The language of open-ness and participation masks a broader shift towards a form neoliberal governance that demands of individuals to become self-inventing and self-actualizing entrepreneurial citizen-subjects, all the while stripping away infrastructures of security from retirement and health insurance to stable job environments. Indeed, long-term employment, state intervention, and larger organizational structures are rendered as holding both individuals and nations back from becoming truly innovative and capable to address the challenges of an increasingly insecure world. What is needed advocates of open production and government officials alike argue is a self-regulating system of individuals capable of designing their own immediate responses to challenges at hand. Protection by the state or academic research structures are portrayed as backwards and as too slow and as such incapable to respond to a world that demands quick, micro-entrepreneurial and agile interventions as its environment, climate, and political situation is experiencing increasing havoc. What is needed instead, so the story goes, is an opening up of old structures of governance, research and society towards entrepreneurial intervention and experimentation as the only possible pathway to live in an increasingly precarious world.

What do we as researchers and designers in academic and industry networks who have long argued for open-ness and participation in design make of this shift in governance that has turned participation itself into a site of neoliberal expansion? What is our role and responsibility as the values we advocate become taken up by powerful players to redesign work, social organization, and livelihoods?
In the panel, drawing from more than six years of ethnographic research and designerly engagements with the topics of making, open innovation, and entrepreneurship and innovation discourse in China and the United States, I will provide concrete examples to the issues and points I raised above.

Panel I
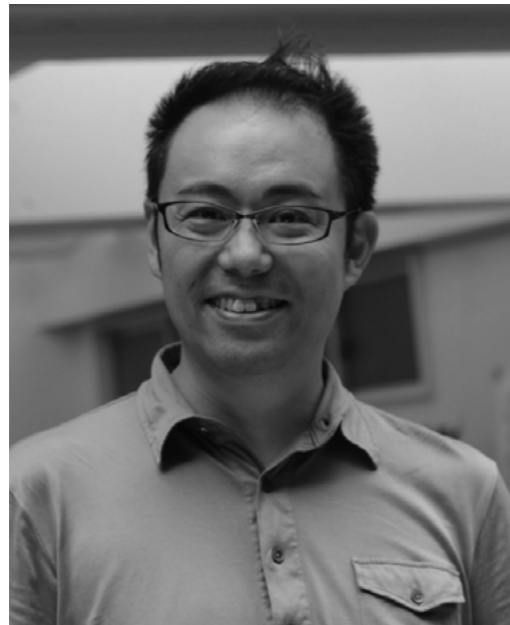
Hiroshi Tamura | Re:public Inc.

Hiroshi Tamura is Co-founder and Managing Director at Re:public Inc. Hiroshi also serves as Co-Founder and Executive Fellow at i.school of The University of Tokyo where he has taught innovation process by harnessing ethnographic investigation. Now Hiroshi engages in developing innovation ecosystem where citizen participation takes a key role for a better change. Hiroshi takes the directorship of "Citizen-led Innovation" platform in Fukuoka City, a million city located in the south-west Japan, where citizens exerts leadership to shape trans-boundary innovation teams by cutting across a variety fields from government to corporation, from tech savvy to social entrepreneurship.

POSITION STATEMENT | HOW DO WE NURTURE NEXT GENERATION DESIGNERS/ CREATORS? – A practitioner's point of view from Japan

Until spring of 2013, I worked for an ad agency Hakuhodo as the research director as well as the founding director of i.school, where 'i' stands for innovation, at the University of Tokyo that was reputed as one of nine emerging design education programs worldwide by Bloomberg in 2009. While I was the director at i.school for four years, some 40 students completed the course and roughly 20 percent of them have become successful entrepreneurs so far utilizing human centric approach to innovation. After 2013, I co-founded and have worked for Re;public an innovation think/do tank that is partnering with government, university, industry including large enterprises as well as SMEs, and creative citizens in order to co-create sustainable innovation ecosystems; E.g. we have established the citizen-led innovation lab named Innovation Studio Fukuoka that has been a driving power having Fukuoka City a very successful start up arena, and Innovators 100 Hiroshima that has helped SMEs in a variety industrial field in Hiroshima Pref. to nurture young innovators in and across the companies.

As a practitioner in the field of human-centric way to innovation and having roots in institutional design/creative industry, I have witnessed radical changes there. The institutional one is generally ailing with budget decline because of number of reasons including user-friendly yet affordable digital creative suites, inexpensive offshore services, and fierce competitions in the market. The industry has lowered the threshold of its entry that means designers/creators are no more a special tribe. In other words, design has been democratized. But imagine how do you paid under this circumstance?

Hiroshi Tamura | HOW DO WE NURTURE NEXT GENERATION DESIGNERS/
CREATORS? – A practitioner's point of view from Japan

A premium creative arena such as branding commercial film production gets smaller and smaller and the key players in Japan in the field like Dentsu and Hakuhodo walked out from the role of incubator of young creators, as they actually took the role and spawned famous creators like Masahiko Sato and Kashiwa Sato at least until a decade ago. Now we are missing the institutional gateway to successful creators in the Japanese creative industry at the very least. On the other hand, we are also witnessing arising entrepreneurial creators after the Great East Japan Earthquake like Eisuke Tachikawa and Yuma Harada, both of whom are ever independent and shot to fame through their self-financing projects directed to sort out social issues. Harada once described himself a 'progettista,' an Italian word meaning a project developer as well as a conductor in aesthetics, functions and businesses.

The tide has changed. Then may we have to think how we fix up the befitting way to nurture designers/creators in the next generation? Or any other way of thinking to deal with the matter? I look forward the discussion about this.

FYI. Following are the questions raised regarding my position statement above:

Q1. What are the promising creative business models in the era of open creativity? How do we expect our creativity can be paid?

Q2. Regarding Q1, what new capabilities are especially required when we are engaged with the new creative businesses? How are these capabilities nurtured? Are they able to be taught in the classroom?

Panel I
Question List

Elizabeth Gerber

Q1: What impact does open creativity and design have on design education? When design education ends and design practice begins? [the line is blurring]

Q2: How the infrastructure for open creativity compare to institutional creativity? What are the roles and responsibilities? Communication patterns? Reputation systems? And feedback mechanisms? How does the current infrastructure support (not support) diverse participation?

Caroline Hummels

Q1. What is influence of user creativity and open design on the time span and scope of projects? Are open design projects both addressing / suitable for long-term visionary (even utopian) projects as well as short term hands-on (molecular) projects?

Q2. How can the results of open design and social innovation projects become sustainable on a societal level?

Q3. What is the role of theory, reflective practice and research in open design / social innovation projects?

Q4: As an addition to Q2 which you set: How does this impact the role and activities of the designer as we currently understand them, and of the other stakeholders / users?

Silvia Lindtner

Q1: As Silicon Valley design and research methods from design thinking to start-up weekends and pitch contests have received increasing uptake around the globe, how is the profession of the designer itself changing?

Q2: Who gets to decide what counts as good innovation, authentic creativity, and proper design?

Q3: With the rise in grassroots community spaces from makerspaces to coworking spaces what counts as expertise in design?

Hiroshi Tamura

Q1. What are the promising creative business models in the era of open creativity? How do we expect our creativity can be paid?

Q2. Regarding Q1, what new capabilities are especially required when we are engaged with the new creative businesses? How are these capabilities nurtured? Are they able to be taught in the classroom?

Panel II

02 DESIGN RESEARCH

Speculation, research, and design inquiry:

The roles of theory, methods, and assumptions of interaction design/HCI

Panel II

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Bill Gaver | Goldsmiths, University of London

Bill Gaver is Professor of Design and co-leader of the Interaction Research Studio at Goldsmiths, University of London. He pursues research on design-led methodologies and innovative technologies for everyday life in a studio that brings the skills of designers together with expertise in ubiquitous computing and sociology. With the Studio, he has developed produced a series of highly-finished research products that have been deployed for long-term field trials and exhibited internationally.

POSITION STATEMENT | A WILFULLY OPTIMISTIC MANIFESTO FOR THE THINGS THAT SCARE ME

Now is the time! We live in an age when we have unprecedented opportunity to use technologies to make richer, more engaging, and more fulfilling worlds. All we need is craft, resourcefulness, courage, and a certain sense of humour.

Of course, these days it's easy to be a bit nervous. As computer systems increasingly coalesce with each other and the physical world, the advantages they offer seem to be balanced by their dystopian possibilities. But I'm not so worried about drones flying drugs to prisoners[1], robots raising children[2], driverless cars killing passengers[3], or even AI threatening mass unemployment[4] and outstripping human intelligence in a singularity[5] that could threaten humanity itself[6]. The sheer drama of these overt, headline-worthy dangers will rally the forces needed to address them[7]. No, what worries me are the more insidious threats that IoT, Big Data and the like present to our social, cultural and personal lives. Chief amongst these is the coercion through convenience that characterises so many current developments. This is the tendency for services and systems to seduce us into acting against our beliefs or interests by making life just a little bit easier, and, conversely, by being tiresome to avoid. For instance, who can resist Uber's convenience and low fares, despite knowing it lowers drivers' pay and conditions, undermines local businesses, and

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1 bbc.co.uk/news/uk-36302136
2 theguardian.com/technology/2016/sep/29/ipal-robot-childcare-robobusiness-san-jose
3 newscientist.com/article/2095740-tesla-driver-dies-in-first-fatal-autonomous-car-crash-in-us/
4 ft.com/content/063c1176-d29a-11e5-969e-9d801cf5e15b#axzz40LiuFHpZ
5 www.singularity.com/qanda.html
6 en.wikipedia.org/wiki/Open_Letter_on_Artificial_Intelligence
7 And if not, at least we can hope that our robot masters will treat us like pets, not livestock: www.augerloizeau.com/projects/robots

avoids paying taxes? Aren't ebooks great, once you get past the guilt of seeing bookshops close? Doesn't the seamless way your phone, tablet and laptop connect with one other and a plethora of online shops outweigh any concern for the way corporations have access to so many facets of your life?

Coercion through convenience not only leads us to give up our privacy or collude in societally harmful activities. It also leads to totalising world views as our perceptions are shaped by the tools we use. It separates us as we cluster to products, services and sites that cater to our interests and confirm our beliefs. It deskills us as we increasingly rely on our technologies to find our way, to bring us information, to suggest products and drive our cars. And it leads us to channel our money, micropayment by micropayment, to the Silicon Valley businesses who benefit from the economies of scale offered by the one-click economy.

But we're designers, and we don't despair!

We know that we fundamentally shape the world, by working between materiality and humanity – even, one is tempted to say, between the corporeal and spiritual. If we are sceptical of coercion through convenience, then we can work against it. Even better, we know some tactics to proceed:

- <u>Design for openness</u>. Many systems try to match people's desires closely but end up teaching them to want what they offer. Creating systems that maintain openness, or even ambiguity and ambivalence, allows people to engage with them as they want. The trick is to offer resources, not solutions. Ideally, this will offer almost as much convenience with far less coercion (e.g. Wakkary et al. 2015; Lim et al. 2013; Gaver et al., 2004).

- <u>Design for particularity</u>. One of the reasons systems shape us instead of fitting us is that they are designed for mass appeal. The advent of low cost batch production means products can be developed for niche markets, designed for alternative values and to capture odd perspectives. The new worlds they offer may enrich all our lives (e.g. Wallace et al., 2013; Gaver et al., 2010).

- <u>Design to reframe data</u>. The internet is awash with user-generated and so-called 'big' data. In many contexts, these lead to the sorts of siloed, totalising world views I decry earlier. But they also provide a rich and virtually unlimited resource for design, capable of offering surprising new perspectives and insights if they are framed in different ways than they were conceived (e.g. Gaver et al, 2016; Hansen & Rubin, 2002)

- <u>Design for (re)making</u>. As rapid prototyping and microprocessor platforms become widespread and affordable, opportunities grow for distributing designs rather than finished products. This is a new focus for our studio's work, as we work towards designs that suggest new perspectives through their idiosyncrasies while remaining open for adaptation and modification. In the long run, this may become the basis for new ways to distribute and acquire computational products that provide an alternative to the oddly homogenising effects of Silicon Valley's so-called disruptive technologies.

More fundamentally, we know that design, and design research, is emergent. Relevant questions, issues, and even areas of concern appear and change over the course of a project. As Schön [1983} and Rittel's [1974] accounts suggest, design must be situated, flexible, and a matter of designers' embodied knowledge to address the complex situations in which it operates. Scientistic approaches, involving a priori hypotheses and questions, formulaic methods, and 'generalised' theories will only recreate a mass-produced culture of coercive convenience. Instead, we need

Bill Gaver | A WILFULLY OPTIMISTIC MANIFESTO
FOR THE THINGS THAT SCARE ME

to reconceive design research to suit its emergent nature. This will require valuing particular narratives of design processes, and design outcomes that don't seek to provide the best solution but to open new encounters with the world. Most of all, it requires appreciating the kinds of inconvenience that give rise to intrigue and wonder, the inconveniences of designed worlds complex enough to be engaged with in multiple and divergent ways.

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Panel II

Kristina Höök | Royal Institute of Technology (KTH)

Kristina Höök is a Professor in Interaction Design at Royal Institute of Technology (KTH) in Sweden and part-time at SICS (Swedish Institute of Computer Science). She heads the Mobile Life centre. She is known for her work on social navigation, seamfulness, affective loops and most recently on somaesthetic design. Somaesthetic design engages with our somas – our living, sentient, selves – and to aesthetics, interactions that help us live a richer life – an "awakening" from the mindless, joyless, everyday habitual movements.

POSITION STATEMENT | THE AGE OF SENSE

Smart materials and related autonomous technologies offer the potential to auto-mate and hide much of the tedium of our everyday lives: logistics, transportation, electricity consumption in our homes, connectivity, or the management of autono-mous systems such as robot vacuum cleaners. Combined with the growth in ubiqui-tous- and Internet of Things-based systems there is now the opportunity to make significant improvements in how technology benefits everyday life.

Yet existing systems are beset with manifest human interaction problems. The fridge warns you with a beep if you leave the door open, the washing machine sig-nals when it is finished, or even chainsaws now warns you when you have been using them for too long. Each individual system has been designed with a particu-lar, limited, interaction model: the smart lighting system in your apartment has not been designed for the sharing economy, the lawn mower robot might run off and leave your garden. Different parts of your entertainment system turn the volume up and down and fail to work together. Each smart object comes with its own form of interaction, its own mobile app, its own upgrade requirements and its own man-ner of calling for users' attention.

The interaction models for these systems have been inherited from the desktop-metaphor, and today, each comes with their own mobile app using non-standardised icons, sounds or notification frameworks. When put together, the cur-rent forms of smart technology do not blend, they cannot interface one-another, and most importantly, as end-users we have to learn how to interact with them each time, one by one. The seams are hidden from view, and we have no idea how to

work with these systems when they fail – be it due to lack of connection, battery failure, or other problems.

I want to bring up three interconnected ideas that could shape the design practice in the years to come.

Soma-Based Design
First, I would love to exclaim "This is the age of the senses!" as I believe that would address some of the problem outlined above. But right now, I am sceptical as to whether this is the path industry will take. In fact, from what we have seen so far, it seems as if all our big companies are making the world even more focused on the language-, symbolic-, language-oriented interaction dialogues: Siri, Cortana, Nest are but a few examples of this development.

But in my view, in order to live in a world full of interactions, we need to involve more of our senses, be more subtle, integrate interactions more with the environ-ment, tone down the demands on our attention. We should be returning to the orig-inal ideas of Mark Weiser and how he saw ubiquitous computing as "walking through a forest", as calm computing, where interaction is downplayed, integrated, made part of our bodily movements.

This is why I decided to focus on aesthetics of soma-based design interesting [1,2]. In soma-based design, we emphasise a first person, aesthetic, sensual experience. In the interaction, immediacy, synchronization and correspondance is key. Ingold [3] introduced correspondence to describe a type of intimate relationship between a subject and an artefact (such as between a cello player and his cello). The immediate and synchronized feedback should rhyme with the rhythms and flows of the body or practices in our everyday life in a way that the interactive system is perceived more as

an extension of the body than as a separate entity or communication counterpart. To create these systems the designer's lived experience must be in place in order to feel the fine nuances of different movements, tactile experiences or mirrorings of our bodily processes in interactive design. By combining the perspective of our own soma (i.e. the "living, purposive, sentient, perceptive body or bodily subjectivity") with our designerly aesthetic sensitivities, we can create interactions that engage us without being solely an intellectual, visual engagement, pulling our attention.

Smart Implicit Interaction
But we also need to orchestrate the effects of all of that data that is collected about us – as a layer on top of everything. In some senses this is like personal computing before the desktop metaphor, the Internet before the web, or mobile computing be-fore touch interfaces. In short, IoT lacks its killer interface paradigm. It could be that the solution lies in somaesthetic solutions, or more generally, in what we could name smart implicit interaction [4]. Implicit interactions stay in the background, thriving on data analysis of speech, movements, and other contextual data, avoiding unnecessarily disturbing us or grabbing our attention. When we turn to them, de-pending on context and functionality, they either shift into an explicit interaction – engaging us in a classical interaction dialogue (but starting from analysis of the con-text at hand) – or they continue to engage us implicitly using entirely different mo-dalities that do not require an explicit dialogue – that is through the ways we move or engage in other tasks, the smart objects responds to us.

Data as a Design Material
When it comes to data, we should start treating the data and data analytics as yet another design material. It should be placed alongside all the other materials: sen-sors, actuators, wireless communication, interactive textiles, visualisations, screens and so on. "Data as design material"

will be a key insight we need to communicate to young design students. This in turns requires tools that make data and data analyt-ics accessible to us as designers. It also requires human values to be at the core of our design practice.

Challenges to Design Research
The existing design knowledge and methods for web and mobile apps design are successfully addressing and emphasising symbolic, language-oriented and predomi-nantly visual interactions. This stands in stark contrast to the knowledge and meth-ods employed by those who successfully address somaesthetics and implicit interac-tion. The difference is not only in which questions are asked about the computer models of our movements, but entails a qualitative shift from a predominantly sym-bolic, language-oriented stance, to an experiential, felt, aesthetic stance permeating the whole design and use cycle. While design has always engaged with form-giving and aesthetics, design research, in particular interaction design, needs to return to those roots, to the basis in human movement, somatics and first person perspectives.

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Panel II

Turkka Keinonen | Aalto University

Turkka Keinonen is a professor of industrial design and the head of Department of Design at Aalto University School of Art, Design and Architecture. Keinonen has a Doctor of Arts degree from the University of Art and Design Helsinki (1998). He has worked for Finnish design consultancies and medical and technology industries (1990-1995), been a principal research scientist at Nokia Research Center (1998-2001) and worked as a visiting professor at the National University of Singapore (2007-2008).

Keinonen's publications include One-dimensional usability (1998), Mobile Usability (McGraw-Hill 2003), Product Concept Design (Springer 2006), Designers, Users and Justice (Bloomsbury 2017) and about 100 articles, conference papers and patents on human centred design, concept design and design strategy. His recent research deals with ethics of human centred design.

POSITION STATEMENT | DESIGN FOR DISTRIBUTIONAL JUSTICE

Design is a societal function that allocates assets between individuals. Design enables, forces, disables or inhibits people to achieve goals and be somebodies. Physical objects, build environment, communication solutions and services are essential for our abilities to lead lives that are flourishing or at least satisfactory. How these are designed, has an impact on who gets the benefits. Design does not only define artifacts, but design also defines whom they are available and who are influenced by their use.

Human centered design is often seen as a branch of design that walks along with an individual protecting her from the greed of the businessmen or anonymous technology push. While HCD has succeeded, every now and then, in protecting the interests of individuals trying to cope with their work or have meaningful experiences at their leisure time, the question of the impact of design on just distributions has been seldom discussed.

The most well known theories of distribution justice include utilitarianism introduced in its classical form by Jeremy Bentham[i] and John Stuart Mill[ii], justice as fairness by John Rawls[iii] and more recently Amartya Sen's[iv] capability approach. Each of these aims at distributing good things in a manner that the outcome is good on terms about which they disagree. The differences most essentially deal with choosing the units of distribution: Should we focus on happiness, resources or capabilities? Another set of approaches on distribution include the libertarian stands suggesting what one has created and legally acquired belongs to her. Robert Nozick's[v] entitlement theory is an

example of these.

Theories of distributional justice have been developed to provide theoretical and conceptual support for planning societal order, i.e., legislation, taxation, and social polices. Applying those on design might appear far-fetched. However, design has been moving from stand along objects towards systems, services and recently increasingly deals with governance and new forms of democracy. When it comes to equal opportunities there is no foundational difference between a fair law and fair transportation services, for instance.

Theories of distributional justice make often a separation between fundamental human rights that are absolute and non-commensurable, and material equality, i.e., distribution of income and property – money for short. Recently the increasing inequality of wealth has received a lot of attention and there is evidence of inequality being a major source for decreased quality of life measured on a range of indicators – inequality more than lower GNP. But money is an abstraction and influences on wellbeing through consumed products and services. Consequently, among the societal functions dealing with distributions, design has the special role, opportunity and responsibility to explicitly address the conversion of wealth to quality of life.

Designers committed to a change for the preferred should address the impacts of their work on distributions. Applying theories of distributional justice helps designers to more analytically approach the secondary impacts of their work and articulate its impact on development and social justice.

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Panel II

Pieter Jan Stappers | Delft University of Technology

P.J. Stappers is chair of Design Techniques at TU Delft's Faculty of Industrial Design Engineering, where he currently also has the role of Director Graduate School and Research. His work in ID-StudioLab focuses on tools and techniques for the early phases of doing design, including methods of user and stakeholder involvement, the role of designerly activities in research. A recent focus is bringing core design competences such as future-thinking, visualisation, dealing with ambiguity, and prototyping to the creative processes of people who are not professional designers. Key terms in this are contextmapping and research through design.

POSITION STATEMENT | DOING DESIGN AND THE GROWTH OF KNOWLEDGE

Over the past decades, design has been growing as an academic discipline, and exploring its positions in the research landscape. As a result, there is a growing discussion about what designers bring to research, how doing design can be a part of research, and who is the audience for its outcomes.

Doing design brings skills and focus
Design skills are not standard for academics. Repeatedly, when we ask companies about the strengths of our design graduates, they often mention creativity, building on incomplete and ambiguous information, interacting fruitfully with all stakeholders and representing their perspectives, shaping a new concept and supporting that with visualizations and other manifestations, and learning from prototyping. Another quality was managerial: designers are particularly valuable at keeping the entire project in balance and progressing toward the intended goal.

These design skills are equally important in doing research, especially when research is moving into uncharted territory.

Doing Design spins off knowledge, but whereto?
Designers often deal with knowledge that is in-the-making in multiple senses: the knowledge is incomplete, and is a mix of many incompatible facets on different levels of abstraction. And the

knowledge is in part produced in the creative acts of shaping a concept or making a prototype, after which some of the findings can be validated in a formal way, and preferably shared. But that only goes for part of it. A large part remains in the tacit knowledge of the designer's grown expertise.

When design research is done within the framing of a mature theory, often from another discipline, validation of pre-formulated concepts can dominate. Knowledge produced here is the answer to a stable question, addresses a controlled and isolated facet of reality, and both question and possible answers are anticipated before the design/research started. Here the designer is a contractor or handmaiden for another discipline.

But, increasingly, design is also placed in the core of the action. Often in explorative research, multidisciplinary settings, around societal challenges, sometimes characterized as 'wicked problems'. Here, the aims of discovery and constructing possibilities in the multifaceted nature of the world rule the game. In this latter form, knowledge is more a serendipitous spin-off from the design and construction activity, rather than an intended answer to a prepared question. The spinoffs can concern disciplines/fields aspects that were not anticipated to be part of the problem/solution. There may be a potential audience for this, but this audience may not be identified, and is not waiting for the new insights which were conceived and framed outside their familiar domain, community, and language.

It is not at all clear which of these insights can or should be shared, and with whom in what ways? Some remain tacit in the researcher, some are shared through experience with collaborators and participants, others are demonstrated, exhibited, or become part of a solution-in-the-world. A few are channeled through academic outlets. In all of these, the prototype can serve as a carrier of the

knowledge, but it needs to be framed in discourse.

If the major contribution of design is (re)framing, we should become much better at formulating frames, communicating them beyond the limits of a project, and at building incrementally on top of them.

There is not one design, and Doing Design is not just for Designers
The language of design has not been clear. The label 'designer' covers a wide variety of practitioners, communities and cultures across crafts, arts, engineering, consultancy. And many 'design skills' are now brought into mainstream education as '21st Century skills,' further democratizing design, but also diluting the image of what design can bring.

Where some regard their 'practice' as the way they work in the studio, others see it as the context of a client, a contract, a brief, a deliverable, and a finite and very dominant budget.

Industrial Design and Interaction Design now finds themselves inbetween product design, experience design, service- and system design, and where HCI used to mean a clear focus on the interaction between a human and a computer. The problems we deal with have broadened, deepened, and moved. Multiple 'users' are in the focus of study, and the interactions between people and with parts of environments at different scales have become important. There is no clear image any more of what a 'computer' is.

The way we do research has been compared most closely to a narrow set of dominant methods from the sciences. There have been arguments about how design research is or can be or should be different from the 'standard experimental cycle' of hypothesis generation (through magic) and

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testing (through experiment), that psychology has adopted from the sciences, and that has been popularized in general education. Yet the variety of ways in which breakthroughs have been made in the history of science, technology, and design, is stunning in itself. Many of the great scientific discoveries were made in the pursuit of effect or solving problems, and involved breakthroughs in our abilities: technology and engineering.

There may be more allies there dealing with the same challenges than we realize.

Panel II
Question List

Bill Gaver

Q1: How can design research address the politics of IoT and Big Data designs? They can provide great convenience and functionality, but they can also invade our privacy and impose normative values on our personal lives. What are our responsibilities as designers? How might such considerations affect the issues design researchers study, the methods we use, and the ways we assess our work?

Q2: Many accounts seem to portray design research as a focused enquiry motivated by the aim of producing new knowledge about a predetermined set of issues. But design, and particularly design research, often seems emergent in nature, with issues, concerns, and even topics changing over the course of a project. If this is the case, how do we rethink the way we motivate and structure design research projects? What are the implications for their evaluation?

Kristina Höök

Q1: Are there novel theories that will let us engage more closely with our senses - given that interaction is moving out into the world?

Q2: If we shift away from a dialogue-driven ways of seeing interaction - what are the other options for interaction?

Q3: What is rigour in design research to you? What does it mean to validate a design and put it under scrutiny? What forms of articulated design knowledge do you find to give us most "power" in terms of potentially influencing design practice?

Turkka Keinonen

Q1: How can design promote equality and social justice?

Q2: Are the concepts, methods and practices of human centred design just?

Q3: How to evaluate design from the point of view of social justice and equality?

Pieter Jan Stappers

Q1. How do we assess that the outcomes of design research are (useful and) used?
purpose: if we strive for research to produce knowledge that is relevant for practice, academia, and society, we should find ways of finding out if we were successful. Mere academic validation that a finding is 'true' doesn't establish that.

Q2. How do we report the knowledge that is found through design research?
purpose: Hook and Gaver both have proposed how intermediate levels of knowledge inbetween artefact and abstract concept can be made. Their views are also different. And I have another point to make, in that design research produces knowledge on many levels with many facets. And probably, from his broad experience, Keinonen will have something to say on that. And there is the matter of new journals (ijdesign, She Ji) but in how far is it journals?

One floating question by Pieter (which can go to another panel)
Q. How will the designer of the future fit between other professionals?
purpose: I find it difficult to speak of 'the' designer, as if there is only one type of designer; designers from arts and engineering backgrounds are quite different, and those who design services from managerial backgrounds do the work of designers without being labeled 'designer'. And in more complex matters, the design professional will work closely and depend on others for the set of competences that is necessary. Some of those may be typical 'design' competences.

Panel III

03 DESIGN EDUCATION

Post-education and practice :

Rethinking the elements, limits, and potentials
of education and practice in design

Panel III

Eli Blevis is Professor of Informatics in the Human-Computer Interaction Design (HCI/d) program of the School of Informatics and Computing at Indiana University, Bloomington. He is also a Visiting Professor at the Hong Kong Polytechnic School of Design. His primary area of research, and the one for which he is best known, is sustainable interaction design. His research also engages visual thinking—especially photographic foundations of HCI, and design theory—especially transdisciplinary design.

Eli Blevis | Indiana University

POSITION STATEMENT | MUST DO, WANT TO DO, CAN DO, CAN KNOW (Transdisciplinary Design)[1]

The Fundamental Question of Design

How can we be sure that what we design truly matters?

This question represents a simply stated and foundational goal. Nonetheless, there are a wide variety of perspectives about what design is and what truly matters. My perspective and the perspective that I want to advance is that design—to be design that truly matters—must as both an ethical and a practical matter concern sustainable and adaptive ways of being. In what follows, I explain how I have come to this perspective and explain why I think you should too. I believe that this perspective applies equally to Design education, practice, and scholarship.

Sustainability includes notions of mitigation from harms and adaptation to changing conditions in the service of preserving life. In the scientific literature on climate change (viz. IPCC [38]), mitigation and adaptation are represented as equal concerns. I write sustainable and adaptive ways of being, because many in the popular press consider only mitigation when writing about sustainability. Not everyone will accept that sustainability—preserving life—is the most central goal of design. Some do. I am one.

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1 This statement is extracted from Eli Blevis. (work in progress). Design in the Age of Climate Change. MIT Press. Kindly quote as such.

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(Transdisciplinary Design)

Inventions and Innovations

One way that many people think about design is as a process. There are many accounts of design processes (e.g. Moran & Carroll [48], Hanington & Martin [31]). Many of these accounts generally attempt to codify procedures that may be followed to create designs. Some distinguish design frameworks from design processes, as a matter of belief that design cannot be fully proceduralized (e.g. Nelson & Stolterman [50]).

Such accounts are oftentimes neutral with respect to perspectives about what design is ontologically (see Willis [71]) and what truly matters. They oftentimes target the invention of new things. Such inventions are more often than not marketed without regard for what will happen to the things that these inventions are meant to replace.

Sometimes, the object of design processes and procedures is not a thing at all, but rather a new way of doing business or providing a service. Such innovations are often conceived without regard for what will happen to the workers or infrastructures that these innovations are meant to replace.

Inventions and innovations are the staple of commonly held understandings of design. Inventions and innovations are also quite often the unintended or even intended cause of breakdowns left by the outcomes of design practices. I am not the first to notice this. I describe the notion of breakdown in design elsewhere and attribute it to (e.g. Heidegger [34], Willis [71], and Winograd & Flores [72]).

Reaching Beyond an Enlightened Few

In adding my voice to those who have noticed this, I hope to contribute some thoughts about a better way forward. Importantly, I do not here propose what I propose from the perspective of any sense of a morally superior position. Few of us are entitled by our own histories to do so. I am not one of those few. Like most of us, I always hope to do better.

Rather than take a morally imperative perspective, I propose a way of thinking about design that seeks to lead to sustainability and adaptability as a matter of design's connection to survival and quality of life. To be design that truly matters, this way forward cannot depend alone on the behavioral changes of an enlightened few, but rather must target all of us, collectively.

To be clear, I am not arguing that designers can build design knowledge and engage in design practice without developing a deep sense of values and ethics. They must develop a deep sense of values and ethics, or they are not designers in my view.

I am arguing that designers cannot presuppose that people in general will comply with the intentions of designs that assume an altruistic orientation. Few if any people are altruistic in all contexts. Some people are altruistic in many contexts. Some people are not altruistic at all in a very many contexts. Some people are not altruistic at all in any contexts. And, everything in-between occurs.

Here is an easy example of what I mean by design that does not presuppose individual behavioral change as an axiom of designing for sustainability:

Design Beyond Individual Behavioral Change

Plate 1 shows an escalator that has been turned off on a Sunday when it would otherwise see little use. I have used this image before in Blevis [7]. In [under review], I give the following explanation: The sign reads 'Not in Use, Energy Saving.' … The Design decision to stop the escalator on

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Sundays does not rely on individual behavioral change. Rather, it is a public policy decision. Public compliance is not an optional act of an enlightened, sustainability-minded few, but rather affects everyone equally regardless of commitment to sustainable behaviors. The escalator has been turned off and simply can't be used on this Sunday.
W
A Transdisciplinary Design Frame (TDF)
To move forward, we need to extend our methodological approaches to Design. For me, this extension is based in notions of transdisciplinary design. My account appears in part in certain prior work (e.g. Blevis & Stolterman [14][15]), wherein I explain how it owes deeply to writings of Manfred A. Max-Neef [47] and Basarab Nicolescu [51].

The theory is intricate, but for our introductory purposes here we can state that to be transdisciplinary—a portmanteau of transcend and disciplinary—requires in a minimal sense that an interdisciplinary or multi-disciplinary project is not just a mixture of any disciplines at all, but rather a mixture of specific disciplines that distribute in their foci over four foundational questions. Borrowing terminology from Blevis [7] that is directly inspired by Max-Neef [47], these questions are:

(1) **Must do**: How does what we propose to do contribute to understanding or doing what we must do, as a matter of values and ethics—and as a matter of sustainable and adaptive ways of being?
(2) **Want to do**: How does what we propose to do contribute to understanding or doing what we want to do in support of what we must do?
(3) **Can do**: Can we do what we must do and want to do?
(4) **Can know**: What can we know about what we propose to do?

Hereafter, I refer to the frame that these four questions comprise as the Transdisciplinary Design Frame (TDF). Even though I refer to this TDF as the TDF, there is actually another transdisciplinary design frame that I describe later.

As described by Max-Neef [47], note that transdisciplinary design is neither a logistical blurring of disciplinary boundaries, nor a logistical exchange between disciplinary inputs and outputs. Rather, transdisciplinary design is a values-first approach that requires that designs scaffold ways of being that truly matter to wellbeing.

The TDF is for most intents and purposes a simple renaming inspired very directly by Max-Neef's [47] account of weak transdisciplinarity. Describing a (lattice-structured) graph of (four equivalence classes of) disciplinary foci, he writes:

> "Transdiscipline. Reading the graph from bottom to top, the lower level refers to what exists. The second level to what we are capable of doing. The third to what we want to do. And finally, the top level refers to what we must do, or rather, how to do what we want to do. In other words, we travel from an empirical level, towards a purposive or pragmatic level, continuing to a normative level, and finishing at a value level. Any multiple vertical relations including all four levels, defines a transdisciplinary action." Max-Neef [47]: 9.

There are some small differences in the TDF as I describe it above. These differences are in no way designed to minimize the contribution of Max-Neef's original description as quoted. Rather, they are intended to build on and deeply honor his work in a way that is easily understood and adapted into design. Must do, want to do, can do, can know is simply easier to remember and teach.

Of these differences, one is a specialization to design and another is an adaptation into a design

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frame. There is a third I present after explaining these two. These are small contributions that do not substitute for reading Max-Neef directly.

The specialization distinction between Max-Neef's account of transdisciplinarity and my account based on his of transdisciplinary design is that I am focused on Design specifically, Interaction Design or Human-Computer Interaction especially. This is a difference that is a matter of specialization. Max-Neef's account is more general and meant to encompass all of the disciplines. My focus targets those disciplines implicated in human interactivity specifically and is based primarily in the HCI and Design literatures—these are the literatures in which I claim expertise. Moreover, I hold and argue that sustainability and adaptability are the fundamental values and ethics of HCI and Design, regardless of how widely or narrowly this belief is held within and outside of these and associated disciplines.

The adaptation distinction between Max-Neef's account of transdisciplinarity and my account based on his of transdisciplinary design is that I am arguing that the TDF—Must do, want to do, can do, can know—is not just a way of transcending disciplinary boundaries. The TDF is also a frame that may be used to gauge if particular designs truly matter, as a matter of design criticism. The TDF is also a frame that may be used to conceptualize designs that truly matter, as a matter of design practice. This is a difference that is a matter of methodological adaptation.

As promised, there is a third, more important distinction. This one entails a shift in emphasis. I develop this in detail below and it may seem strange at first—that is, the disciplinary in transdisciplinary does not matter very much. The trans(scendence) part is what matters—that is, the action part. Let me explain:

Why Must do, Want to do, Can do, Can know is a Better Name than Transdisciplinary Design

Max-Neef's diagram I refer to above lists particular disciplines at each level. I refer you to the original paper [47] for the diagram and his lists of which disciplines appear at which levels, rather than reproduce it here. The hazard of listing particular disciplines at each level is that some—perhaps many—will object to how their disciplines are characterized or may be interpreted as constrained to a particular level. For example, Max-Neef lists chemistry at the foundational, empirical level of what exists. However, there must surely be chemists who believe that the other levels are part of what they do from within their discipline. The more important point is Max-Neef's notion of levels that define transdisciplinary actions, regardless of if within, across, or between disciplines and disciplinary boundaries.

If—as we contemplate—what matters are transdisciplinary actions, rather than which disciplines are named at which levels, then it may be the word transdisciplinary itself that is confusing. In fact, it seems no matter how much one makes the distinction between the terms transdisciplinary, interdisciplinary, multidisciplinary, and pluridisciplinarity, people persist in using the terms more or less interchangeably.

Most reasonable people care about breaking down barriers between disciplines. If you work at a University, you likely know a few possibly less reasonable people who care about constructing barriers between disciplines, typically as a matter of guild logic. By guild logic, I mean that sometimes disciplinary boundaries are defended in order to control who is credentialed as a matter of membership that is at best but not always aligned with actual skills and qualifications.

Credentials that guarantee skills and qualifications are an essential thing if we are talking about,

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for example, medical physicians. The hard-won skills of medical physicians are possibly more measureable than for some other disciplines. Notwithstanding, medical physicians also take a Hippocratic Oath. The Hippocratic Oath is an affirmation of commitment to transdisciplinary actions. I reproduce one version here (source: en.wikipaedia.org, wherein this modern 1964 version of the oath is attributed to Louis Lasagna):

• *"I swear to fulfil, to the best of my ability and judgment, this covenant...*
• *I will respect the hard-won scientific gains of those physicians in whose steps I walk, and gladly share such knowledge as is mine with those who are to follow.*
• *I will apply, for the benefit of the sick, all measures which are required, avoiding those twin traps of overtreatment and therapeutic nihilism.*
• *I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug.*
• *I will not be ashamed to say 'I know not,' nor will I fail to call in my colleagues when the skills of another are needed for a patient's recovery.*
• *I will respect the privacy of my patients, for their problems are not disclosed to me that the world may know. Most especially must I tread with care in matters of life and death. Above all, I must not play at God.*
• *I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick.*
• *I will prevent disease whenever I can, for prevention is preferable to cure.*
• *I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm.*
• *If I do not violate this oath, may I enjoy life and art, respected while I live and remembered with affection thereafter. May I always act so as to preserve the finest traditions of my calling*

and may I long experience the joy of healing those who seek my help."

Thus, we have another example that cross cuts Max-Neef's characterization that specific disciplines are constrained to specific levels of transdisciplinary actions. This is not to say that specific disciplines cannot have characteristic foci corresponding to specific levels of transdisciplinary action as I have stated at the outset of this essay—however, we need to be cautious in how much we make of these assumptions about scope with respect to particular disciplines.

As a matter of understanding Design's transdisciplinary agency, I believe that we can and should care much more about making sure that what we design truly matters—to sustainability and adaptability and wellbeing. In this sense, the naming Must do, Want to do, Can do, Can know is a much better naming than transdisciplinary design frame because it gives us the framing we can use to be sure that we consider all aspects when designing for what matters, regardless of if or if not disciplinary boundaries are crossed. There may be other framings aside from Must do, Want to do, Can do, Can know, but few if any that I know of afford the values first orientation as a practical as much as the ethically imperative tool we seek.

If the word transdisciplinary causes confusion, I should name the Transdisciplinary Design Frame (TDF) differently. Sadly, it is hard to shorten Must do, Want to do, Can do, Can know— it seems much too awkward to consider something like mustwantcancan or dododoknow, or mustwantcanknow? MDWDCDCK as an acronym also seems very awkward. It seems the only solution is to stick with TDF as an acronym and continue to write out Must do, Want to do, Can do, Can know. I suppose that mustwantcanknow may be used as a mnemonic.

I claim that the TDF has a practical side. Let me give some examples below, namely Fairphone

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and Sourcemap. I'll use the TDF to give an analytic explanation of these two projects. Since these projects are projects that already exist, these analyses are exercises in design criticism.

Fairphone
The Fairphone project is described in Joshi & Cerratto-Pargman [40] and Roedl [61]. The Fairphone (www.fairphone.com) is a fully modularized phone with consumer repairable and upgradeable, fairly sourced components. While modularity has long been a principle of durability in Design, market forces are nowadays typically opposed. The Fairphone takes the perspective that consumers are willing to pay a little more in order to discard less.

We can understand the Fairphone according to our frame of Must do, Want to do, Can do, Can know. What we must do is live more sustainably. What we want to do is prefer renewal and reuse to recycling and disposal (see Blevis [17][18]). What we can do is make products from consumer repairable and upgradeable modular components. Such products can be marketed to sustainability and human rights (apropos of fair sourcing) conscious consumers who may be willing to pay a little more in order to have a more durable product. If implemented well, these products may appeal more widely, building market share even among those who are not so concerned about sustainability and human rights. Larger market share has the potential to lower costs per unit and make the Fairphone competitive with respect to more traditional product forms in the category (think Tesla). What we can know are things like how much material is saved by the Fairphone, how fair the sourcing of materials for the Fairphone actually is, rates of adoption and market share, and other aspects of the "can do" scheme which may be measured.

Sourcemap
The Sourcemap project is described in Bonanni [19], and Bonanni et al. [20]. Sourcemap (www.

sourcemap.com) is a supply chain mapping and visualization service targeted at improving sustainability through transparency. In addition to a commercial service, Sourcemap offers an open source service (open.sourcemap.com). Reference Plate 1 shows the supply chain map for the Fairphone 2. The data are supplied by Fairphone. We can understand Sourcemap according to our frame of Must do, Want to do, Can do, Can know. What we must do is act more sustainably. What we want to do is make our manufacture, distribution, and consumption of things transparent.

What we can do is provide supply chain mapping. Bonanni has done this both as a successful commercial enterprise and as an open source service. What we can know are the details of supply chains insofar as we have confidence in the reporting by companies themselves, or by open source contributors. I use this form, Must do, Want to do, Can do, Can know, throughout my work and in my syllabi and teaching. Each of the levels of the frame won't always be obvious or needed.

A Word about Strong Transdisciplinary Design
Must do, Want to do, Can do, Can know is based on Max-Neef's account of what he terms "weak" transdisciplinarity. In my reading, Max-Neef means "weak" in the sense of epistemologically generic—if that helps, and it may not. I don't use the word weak for the TDF, because I think it will be misunderstood. Max-Neef and Nicolescu also provide a notion of strong transdisciplinarity. In the Hippocratic Oath cited above, the phrase
   "I will not be ashamed to say 'I know not,'"
is a form of knowing what you don't know. Knowing that you don't know when you don't know is a key epistemological commitment of these notions of strong transdisciplinarity.

Strong transdisciplinarity is very important, but it is also a bit more esoteric and may be less generally accessible. That notion centers on an idea that to be strongly transdisciplinary requires a

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less common epistemological perspective.

The "rules" of strong transdisciplinarity as they owe to [47][51] are:

1. All knowledge is probabilistic.
2. The middle is included.
3. Solving problems that matter requires 1 and 2.

Strong transdisciplinarity is different than weak transdisciplinarity, because it focuses on the nature of truth and knowing.

We can translate these "rules" of strong transdisciplinarity into questions that may make the ideas more accessible. I need four questions to translate the three rules.

1. **Really know**: How well do we really know what we know?
2. **Still know**: How likely is what we believe we know now the same as what we will know tomorrow?
3. **Don't know**: What middles exist between knowing something is and knowing something is not?
4. **Know matters**: What actually matters?

Why are there four questions to translate the three rules? Still know and Really know both correspond to the "rule" that all knowledge is probabilistic.

Intuitionistic Truth

To truly understand strong transdisciplinarity, one must first understand intuitionism. In a 2015 Communications of the ACM article, Philip Wadler [68]:79 presents what must certainly be the most lucid and accessible account. He writes:

"In Gilbert and Sullivan's The Gondoliers, Casilda is told that as an infant she was married to

the heir of the King of Batavia, but that due to a mix-up no one knows which of two individuals, Marco or Giuseppe, is the heir. Alarmed, she wails "Then do you mean to say that I am married to one of two gondoliers, but it is impossible to say which?" To which the response is "Without any doubt of any kind whatever."

Logic comes in many varieties, and one distinction is between classical and intuitionistic. Intuitionists, concerned by cavalier assumptions made by some logicians about the nature of infinity, insist upon a constructionist notion of truth. In particular, they insist that a proof of A ∨ B must show which of A or B holds, and hence they would reject the claim that Casilda is married to Marco or Giuseppe until one of the two was identified as her husband. Perhaps Gilbert and Sullivan anticipated intuitionism, for their story's outcome is that the heir turns out to be a third individual, Luiz, with whom Casilda is, conveniently, already in love. Intuitionists also reject the law of the excluded middle, which asserts A ∨ ¬A for every A, since the law gives no clue as to which of A or ¬A holds. Heyting formalised a variant of Hilbert's classical logic that captures the intuitionistic notion of provability. In particular, the law of the excluded middle is provable in Hilbert's logic, but not in Heyting's."

The cornerstone of intuitionism then is the idea of included middle. There are many ways to state this. One way to understand included middle is to understand that between Truth and Falsehood are intermediate states, such as a state of knowing that you don't know or a state of not knowing that you don't know. Another way to understand included middle is to understand that you can know less today than you did yesterday—in formal terms, that is the idea that knowledge is nonmontonic. Still another way to understand included middle is to understand that from each new instance of something we learn new things and also may learn that some things we thought we knew, we do not.

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A Word about Strong Transdisciplinary Design: The Idea of Photography in HCI and Design

Photography in HCI and Design is a theme of my research and teaching. The idea of strong transdisciplinary design may seem remote to the idea of being oriented towards photography in HCI and Design, but it is not. The practical implications of included middle and knowledge as probability are that generalization is not only something that may be avoided for some purposes, but it is something that is not needed for rigor. In logical terms, the included middle means that we do not allow implication—that is excluded middle—to construct proofs—that is acts of knowing objects of knowledge (see Martin-Löf [46]). Another way to state this is that in intuitionism, we do not allow proofs by contradiction.

In some disciplines, notions of what it means to be systematic and the notion that knowledge arrives in the form of general rules go hand in hand. In photography, the ongoing collection of photographs is a form of rigor. Each photograph is an object of knowledge in and of itself. Some photographs are better than some others—that is, some photographs are more significant as objects of knowledge than some others.

There is never a need for generalization, only comparison of one or more individuals one with another. Reduction—the loss of information through generalization—of any sort is not really a goal in the ordinary case. The photographs are individually constructive objects from which we can reason with no more or no less than what we hold in our hands and behold in our eyes at a moment in time. This notion of constructive systematicity has many names— in particular, constructivism, intuitionism, and case-based reasoning.

In practice, we can find examples to consider how notions of reasoning reductively and reasoning

non-reductively and everything in-between may be represented in photography. Some photographs average details reductively (e.g. Salavon, Reference Plate 2). Some photographs encode levels of detail (e.g. Jordan, Reference Plate 3). Some photographs editorially use highly selective focus to privilege some fine details and background others (e.g. Gathering Black Locust Flowers, Plate 2). Some photographs record special moments in time in wholly non-reductive, superbly composed, fine detail—universally unique and extraordinary moments rather than average and everyday (e.g. Hine, Reference Plate 4). Of these examples, it is not surprising that Hine's photograph from 1920 is the most iconic—it is the least reductive and in so-being it is the most universal record of human condition. I take up this sort of analysis in (e.g. Blevis [8][11]) and throughout my research and teaching.

The Farther One Travels

Let me end this essay with an appeal to the reader to consult the Max-Neef [47] paper I have referred to so much directly. Basarab Nicolescu's Manifesto of Transdisciplinarity [51] is also an important source, but copies are sadly now hard to find. The Max-Neef paper ends with a quote from Lao Tzu. I'll end this essay also with a quote from Lao Tzu—a different quote. This is one that George Harrison adopted into his composition "The Inner Light." This quote seems to greatly anticipate the notions of nonmonotonicity—the idea that we can know less today than we did yesterday—in these notions of strong transdisciplinarity:

> Without going out of my door
> I can know all things on earth
> Without looking out of my window
> I could know the ways of heaven
> The farther one travels

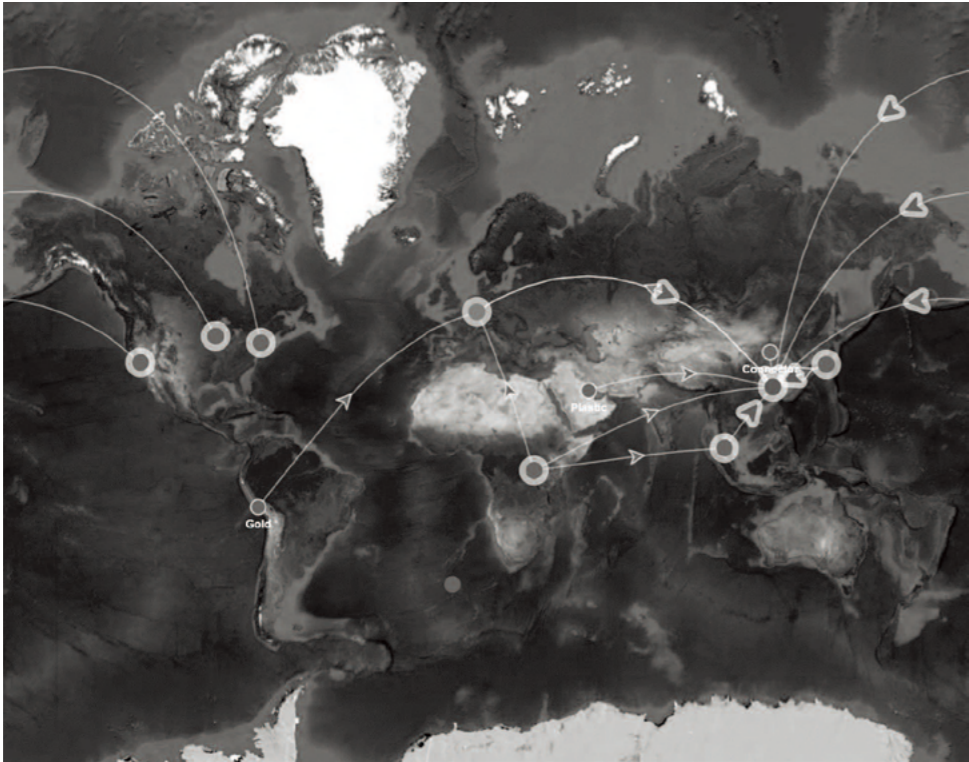**|** MUST DO, WANT TO DO, CAN DO, CAN KNOW
(Transdisciplinary Design)

The less one knows
The less one really knows
Without going out of your door
You can know all things on earth
Without looking out of your window
You can know the ways of heaven
The farther one travels
The less one knows
The less one really knows
Arrive without traveling
See all without looking
Do all without doing

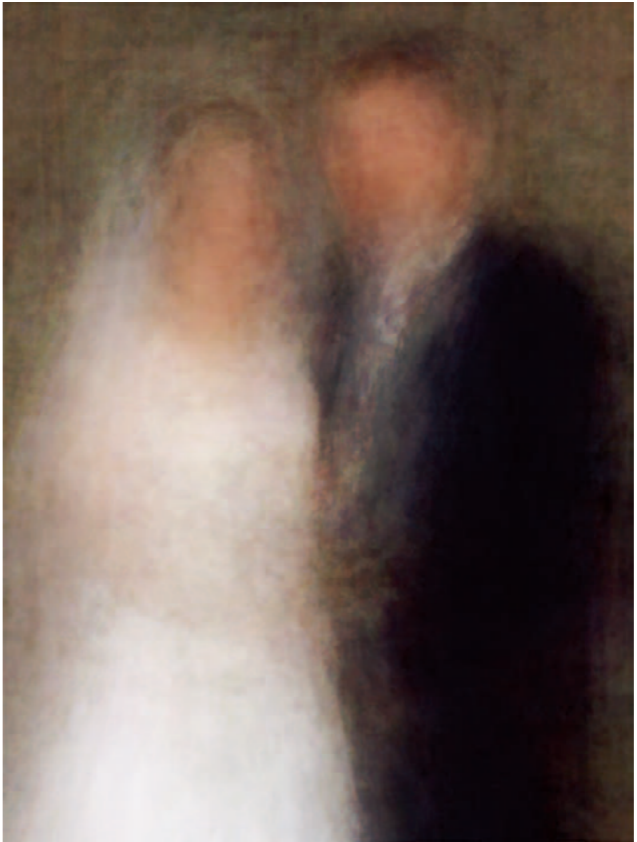
Plate 1: Not in use, energy saving, 2015 [Source: E. Blevis]

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Reference Plate 1: Fairphone 2 Supply Chain [source: open.sourcemap.org]

Reference Plate 2: Jason Salavon. 2004. 100 Special Moments (Newlyweds).
[Academic fair use, only, additional permissions pending]

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Reference Plate 3: Chris Jordan. 2007. Plastic Bags: Depicts 60,000 plastic bags,
the number used in the US every five seconds. Two Details.
[Academic fair use only, additional permissions pending].

Plate 2: Gathering Black Locust Flowers [Source: E. Blevis]

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Reference Plate 4: Lewis Hine, 1920. Power house mechanic working on steam pump.
[USA public domain. source: en.wikipedia.org]

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Panel III

Zhiyong Fu | Tsinghua University

Dr. Zhiyong Fu is an associate professor of Information Art and Design Department, Academy of Arts and Design, Tsinghua University. His research interests include information and interaction design, service design, smart city and social innovation design. He is the member of Innovation and Entrepreneurship Teaching Steering Committee at Tsinghua University, the main organizer and planner of China-US Young Maker Competition initiated by Chinese Ministry of Education. He is the academic director of Tsinghua Technology Innovation & Entrepreneurship Minor on Connected Device, Robotics, Smart Transportation, and dedicate to integrate design thinking and maker practice to promote the future innovation and entrepreneurship education of China.

POSITION STATEMENT | RECONFIGURE DESIGN EDUCATION IN THE TREND OF GLOBAL INNOVATION

Q1: How can university reconfigure design education to innovate and compete in trend of globalization?

In the trend of globalization, design education also needs to actively adjust in the attempt to solve the common problems faced by human society. At the same time, the designer's knowledge and ability structure will also change, which requires the adjustment of education content and patterns design.

1. How to face the common problems, how to solve the problems with a global vision has become the new mission of design education. The establishment of a number of platforms such as impact hub, living lab has provided methods and resources in exploring of social issues and enhancing social impact and social value. From the design of education itself, it is also important to go out of the classroom, use the city as our test Field, and explore new learning and training patterns.

2. Responding to globalization, we need not only innovative technology, but more importantly, ideas and methods to develop students' ability to identify problems, opportunities and to integrate. At the same time, university should dedicate to cultivate students' imagination, flexibility, cross-cultural communication skills, and also emphasis more on leadership training which can help the team to bring ideas into reality.

3. Take the Tsinghua-Stanford Human Cities Program as an example. Beginning in 2014, the summer workshops and collaborative courses and exhibitions have been supporting interdisciplinary and intercultural students to understand the impact of globalization on urban sustainability, to discover design opportunities in real-life situations by exploring urban lifestyles and urban experiences under different cultures, to solve problems and challenges faced by cities and communities through design thinking with collaboration with social organizations and government agencies. We support students to become change makers.

4. Another program is the Tsinghua-Santander World Challenges of 21st Century Program. Inspired by the maker movement that is popular around the world today, there is a group of change makers who aspire to make a difference in the world with their innovative solutions to the challenges and with the open source equipment that turns their ideas into reality. Sponsored by Tsinghua University and Banco Santander, the program is designed for talented youths who aspire to make a real impact on the world. They are encouraged to find the problems and to propose solutions to the challenges. The finalist teams will be invited to a two-week workshop in Beijing, China and will be supported by the innovation and entrepreneurship platform of Tsinghua University and experts from innovative companies and organizations to develop their own projects.

Q2: What is the new trend on innovation and startup that is changing the design education and practice?

Today, the Enterprise Research Center is playing a leading role in innovation. Based on the kickstarter and indigogo platforms, more and more independent startups are launching innovative products, but universities that used to pioneer innovation have moved away from product

innovation. It is necessary to explore the new model to integrate innovation and entrepreneurship into the training system.

1. Recently we saw IDEO join Kyu Collective - the CEO Tim Brown called it "the next big thing in design". We can see the design agency is re-positioning themselves. John Medea, the former professor of MIT Media Lab and president of RISD, has become the design partner of KPCB. He has brought design DNA into the enterprise. His focus has shifted from product and education to capital and the value of design has played an important role in organization management and ecology. Just as the International Council of Societies of Industrial Design (ICSID) will be renamed the World Design Organization, the idea of big design, the innovation ecology is becoming a trend.

2. Innovation has become a combination of design, technical realization, social and business value, and corporate ecology. Design is no longer just to provide planning and proposals, or rendering and model, but need to provide a complete solution. In today's innovation and entrepreneurship context, a variety of rapid prototyping tools and methods, all kinds of creative space and incubators, angel investors, mentors in various fields, have been able to support this trend of product innovation, while at the same time challenge the formal design teaching.

3. In 2013, through the organization of a series of innovative workshops called Designow, Tsinghua University's teaching practice is driven by design to find solutions to social problems through an interdisciplinary team approach. The 2014 Design Partner Program provides a range of standard design processes and tools that encourage designers to collaborate as design partners with startups incubated by Tsinghua University, to bring DNA into the startups and create incentives for innovation, making progress among enterprises and designers together.

4. Practical education plays a more important role in design education. Maker space and innovative learning space is creating a new platform for campus innovation. 2015, in response to the growing enthusiasm towards innovation and entrepreneurship, the newly-built Tsinghua iCenter, a 16,500 m2 maker space that provides the tools and resources needed for autonomous discovery, design and implementation is launched.

5. In September 2016, Tsinghua University launched the minor programs in technology, innovation and entrepreneurship. Based on the innovation-driven development strategy, Tsinghua University has made great progress in its global frontier areas such as intelligent hardware, robotics and intelligent transportation. Through cross-border learning and practice, the programs will allow students to learn about the theories, methods and tools in Innovation and entrepreneurship in the background of globalization. Focused on innovative product development, the program will expand students' ability in innovation and leadership, and cultivate students' pioneering spirit and entrepreneurial spirit. This minor will cultivate students with design thinking, technology capability and leadership to develop the innovative products with interdisciplinary team, and complete the business planning.

Panel III

Peter Lloyd | University of Brighton

Peter Lloyd is a Professor of Design in the School of Architecture and Design at the University of Brighton and Associate Editor for the Journal 'Design Studies'. He teaches in the areas of design methods, design thinking, and design ethics and his research looks at all aspects of the design process. He was previously Professor of Design Studies at The Open University. You can read his blog at https://iprofessdesign.wordpress.com

POSITION STATEMENT | DESIGN EDUCATION 3.0

An interesting video concerning Design Education can be seen on the web. It's called 'Design and Democracy' and was given by Alistair Parvin, co-founder of WikiHouse, an organization that promotes open-source construction. It's well worth watching, as he brings the threads of modern architecture and market economics together, and you can see it here[1].

Trained as an architect it's enlightening to hear his views on design education in the Q&A following the talk. In the UK, architectural education is regulated by the Royal Institute of British Architects (RIBA) who set out the basic requirements for curriculum. Becoming a qualified architect takes six years. Part 1 involves 3 years of study at a University, there then follows a year of working in architectural practice, and finally Part 2 involves a further 2 years of study. At the end of all that you can just about call yourself an architect.

Parvin remarked that, for his peer group, coming back to study for Part 2, following working for a year, was a strange experience. The general view was that the world that they thought they were being prepared for in their Part 1 qualification didn't really exist. The commercial business of architecture had completely overridden their fledgling theoretical and ideological concerns. Architecture, as they had been taught it, seemed like a figment of imagination; a flight of fancy.

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1 https://www.youtube.com/watch?v=0K4iEwlhgnc

What has changed? Like many creative professions there is a paradox at the heart of architecture. While espousing free-thinking, and indeed helping to create large scale changes in society, the institutions that educate and regulate creative professions are themselves deeply resistant to change. The institutions are institutionalised! Old and established traditions and methods are rehearsed and repeated year after year as wide-eyed graduates emerge, blinking, into a wired and weird world.

So the web has changed the world; in terms of information, communication, connectivity, global consciousness, social mores, you name it the web has changed it.

The real question is how has design education changed? The answer is, not much at all. The design-tutor-sitting-across-the-table-from-the-student-and-critiquing-their-work model is alive and mostly well, albeit played out in slightly different environments – at the computer rather than the drawing board, though, even now, often still at the drawing board.

There are signs of wear and tear. Expertise, it seems to me, is so distributed now, and insight so available, that design tutors are fast becoming institutional ciphers; the necessary but increasingly ignorant gatekeepers to qualifications. If, for example, I wanted to teach you about democratic design, why would I not direct you to Parvin's video and ask you to critically examine the concepts he talks about? We could talk about that thing about ethics at the end – who is responsible if an open-source structure falls down? Or his idea that democracy is problematic – does that hold water? And is democracy an unalloyed good thing anyway? Or I might ask you if the commercial business model he sketches at the beginning is reasonable and viable?

In short, Parvin has already done a lot of my teaching work, there on the web. My task as a

modern teacher is more curatorial – to select, explain, criticise, and interpret – rather than to attempt to transfer knowledge (my out-of-date knowledge!) from my head to yours. Design education, rather than teaching technique, is finally free to think about larger issues of value, connectedness, system, responsibility, or maybe just how the wired world is such a weird place. Perhaps design education is scared of the freedom?

Panel III

Miles Pennington | Royal College of Art

Professor Miles Pennington from the Royal College of Art (RCA) in London is Head of Programme of the Innovation Design Engineering (IDE) joint Masters programme with Imperial College - Miles is an alumni of the IDE programme and graduated in 1992. Following that he worked for four years as a designer for Sekisui in Osaka, Japan before returning to the UK to start his own design consultancy. He joined the RCA, as staff in 2001 and was the founder of the Global Innovation Design (GID) programme in 2012. In parallel to his work at the RCA he is currently a Director of the of the innovation consultancy Takram.

POSITION STATEMENT | RUNNING FORWARD WHILE LOOKING BACK

I currently lead the Innovation Design Engineering (IDE) programme at the Royal College of Art, London. It is a joint programme with Imperial College London and was started over 35 years ago with the question "Can you teach design to engineers?" – seemingly obvious today but in the late 1970's this was a radical departure from the siloed discipline approach in art and design. The answer was of course 'yes' - if you find the right engineers and the programme has been building on this foundation of inter-disciplinarity over the last three decades. In that time some interesting things have happened; first we have ceased to take only engineers into the programme; we still have people (about one third) from engineering, technology or science backgrounds; but alongside that we have people (again one third) from design backgrounds and the rest are a diverse set of different backgrounds from fine art to banking. The second major change has been we have switched from training people to work in the field of Industrial Design to developing people capable of operating in an extraordinarily wide spectrum of work – I often use the following Peter F. Drucker quote to describe our current intentions "Since we live in an age of innovation, a practical education must prepare a person for work that does not yet exist and cannot yet be clearly defined." We take people from any kind of background and put them through an intense experiential educational journey and when they graduate they do so into almost any field. What does that make the programme now? We see IDE now as a cutting-edge innovation programme where design and engineering are tools to achieve it. What is the IDE graduate? A new type designer; or an engineer or an innovator – that's a difficult question. There is a combination of innovation focus; engineering and technology understanding as well as design and creative flair

and it is a potent mix, but it is difficult to define exactly what you would call the final output. There is no specific goal, and no specific way of getting there – as one of our research staff, Professor Ranulph Glanville once said "There is no book of spells…but there is magic". For me it is no longer important to talk about the IDE programme in terms of a particular discipline – I'd rather let the work of the graduates define it. I agree with Drucker, the future isn't clearly defined, we need many elements to come together to help build it. Design is one of them – it's what the others are that is intriguing.

Within the IDE programme though we do talk a lot about directions and approach. Whilst at the RCA I have overseen the development of two methods to allow students to explore projects in different ways. These we call Directional Innovation Methods. At the moment there are two well resolved methods – Experimental Design (EXP) and Disruptive Market Innovation (DMI). EXP is about lateral exploration - design and technological, commercial and societal innovation at a fundamental level which may incorporate the exploration of new technologies, new product categories or new contexts and could form the basis of advanced research at a later date. Rigour in research methodology and an intelligent formation of a hypothesis are important features as well as innovative and explorative experiments and results. Disruptive Market Innovation (DMI) on the other hand is about delivering functioning innovative products that disrupt the market or create new markets. DMI outputs must be technically feasible and proven, manufacturable as well as desirable. Disruptive innovation is well accepted as the creation of a product or system which radically changes a market or builds a new one. Using these two methods as beacons to navigate the direction in a design project allows student to safely experiment whilst also delivering original and challenging work. What's next? Technology Led Innovation – It is now obvious that within 10-20 years of a new wave of technologies and sciences will become available to industry. For example, nanotechnology, bio-medical advancements, new material innovations, advanced

computing - there are so many frontiers that are being pushed forward outside of the normal realm of design and innovation. However there is a risk that new technologies are developed without thought for real people. We have a keen interest in exploring ways in which meaningful deployable innovations can be generated from technology improvements – not technology gadgets without a human orientated need or desire. We need design students to stretch well beyond the traditional foundations to be able to tackle these emerging technologies and lead them into people's lives.

However the breaking down of traditional discipline boundaries and looking far-forward to emerging science for influence on design education doesn't mean that we leave everything behind. I am a strong believer in the core foundations of creativity and diversity – original thinking and wide ranging opinions. We are lucky in the Royal College of Art that the institute itself provides an incredibly rich source of both. As an art school that still has a wide variety of courses from painting to vehicle design means that students are exposed to opinions 180 degrees different from their own as a matter of everyday occurrence. It's important that the designers of the future respond to broad influences – that starts at school and extends throughout their careers – they should look to social, political, economic, industrial and other themes for inspiration for their creative work – sensitive creative responsiveness to the evolving world is the character that is key – that hasn't changed and continues to be critical. We always need to ensure that these foundational approaches that are instilled in education; the core requirements haven't changed even if other layers are appearing.

Miles Pennington (October 2016)

Panel III
Question List

‎ ‎ ‎

Eli Blevis

Q1: How can a transdisciplinary perspective foster values among design students, educators, and practitioners so that their design work scaffolds ways of being that truly matter to well being?

Q2: How does a transdisciplinary design framing of design compare to other framings of design?

Zhiyong Fu

Q1: How can university reconfigure design education to innovate and compete in trend of globalization?

Q2: What is the new trend on innovation and startup that is changing the design education and practice?

Peter Lloyd

Q1: Should all people have at least some education in design?

Q2: How can distance play a role in the future of design education?

Q3: Does new technology mean new education?

Miles Pennington

Q1: Is it design? In the mosaic of multi-disciplinary influences that is now 'design' what are we really teaching? Is 'design' just a tool, part of the picture or is it still the main title?

Q2: New directions. Are we better off teaching genome sequencing programs rather than 3D modelling software? What does leading edge science have that is going to be influencing design activities in 20 years from now?

Q3: What's holding it all together? What are the skills, approaches, experiences, characteristics or methods that are absolute core to what we do in 'design'?

Schedule

DAY 01	●	104
DAY 02	●	108

Schedule

_____ _____

DAY 01 • NOV 3rd

09:00
-
09:30

Registration

In front of
Ullim Hall
(N13-1)

Faculty Club
(E5)

Lunch

12:00
-
13:30

09:30
-
09:40

Opening of the day
- Introducing chairs and panelists & schedule
for the day
- presented by Youn-kyung Lim

Ullim Hall
(N13-1)

Ullim Hall
(N13-1)

Panel 2: Speculation, research, and design inquiry:
the roles of theory, methods, and assumptions of
interaction design/HCI
- led by Youn-kyung Lim

Each panelist present his/her position in 10 minutes.   60 mins
Q&A session   60 mins

13:30
-
15:30

09:40
-
10:00

Introduction to Design 3.0 Forum
- presented by Kun-pyo Lee

Ullim Hall
(N13-1)

In front of
Ullim Hall
(N13-1)

Coffee break

15:30
-
16:00

10:00
-
12:00

Panel 1: Open creativity and design:
The rise in importance of user creativity, social
innovation, and personal production
- led by Ron Wakkary

60 mins   Each panelist present his/her position
in 10 minutes.
60 mins   Q&A session

Ullim Hall
(N13-1)

Ullim Hall
(N13-1)

Panel 3: Post-education and practice:
rethinking the elements, limits, and potentials of
education and practice in design
- led by Ron Wakkary

Each panelist present his/her position in 10 minutes.   60 mins
Q&A session   60 mins

16:00
-
18:00

DAY 01 • NOV 3rd

18:00
-
18:10
    Closing of the day   Ullim Hall
    - by Youn-kyung Lim   (N13-1)

18:20
-
19:10
    ID KAIST Demo Exhibition   ID KAIST 1st floor
                                (N25)

19:10
-
21:00
    Dinner   ID KAIST 3rd floor
                                Faculty Lounge
                                (N25)

Schedule

09:00 - 09:10

Opening of the day
(Introduction to the schedule of the day)

ID KAIST
Woonbum Hall
(N25)

09:10 - 11:20

Synthesis of the discussions from Day 1
(Parallel Sessions)

AK Lounge
(N25)

~11:10　Respondents synthesize the discussions from
　　　　the assigned panel and come up with
　　　　3 most important responding questions.

~11:20　Break - Hand over their synthesis statement
　　　　(i.e. list of thoughts on the discussions from
　　　　the assigned panel) and 3 responding
　　　　questions to the corresponding panelists.

Panel 1 respondents: Bill Gaver, Pieter Jan Stappers, Zhiyong Fu, Miles
　　　　　　　　　　Pennington
Panel 2 respondents: Silvia Lindtner, Eli Blevis, Peter Lloyd, Elizabeth Gerber
Panel 3 respondents: Kristian Hook, Turkka Keinonen, Caroline Hummels,
　　　　　　　　　　Hiroshi Tamura

AK Lounge
(N25)

ID KAIST graduation project exhibition & Lunch

11:30 - 13:30

AK Lounge
(N25)

Synthesis of the discussions from Day 1 (continued)
(Parallel Sessions)

13:30 - 15:00

The panelists who received the questions from the　90 mins
respondents discuss to answer those questions and
finalize all the discussions to be synthesized.
They should propose the 3 most important issues
and the suggestions of what to do for those issues.

In front of the
AK Lounge
(N25)

Coffee break

15:00 - 15:20

DAY 02 • NOV 4th

**15:20
-
16:50**

Presentation by the panelists regarding the synthesis statements and the 3 most important issues and the suggestions of what to do for those issues (Plenary session)

ID KAIST
Woonbum Hall
(N25)

**16:50
-
17:00**

Break

In front of
Woonbum Hall
(N25)

**17:00
-
17:30**

Wrap up the forum - Brief introduction of the plan for Design 3.0 forum for the next step (Plenary session)

ID KAIST
Woonbum Hall
(N25)

**18:00
-**

Dinner

When

+

Where

When

+

Where

Ullim Hall
(N13-1, B1F)
Day1, 9:00

ID KAIST Building
(N25)

3mins by walk

10mins by walk

Back Gate

Faculty Club (E5)
Day1, 12:00
Lunch

Main Gate

4

ID KAIST

< 3rd Floor >

*ID KAIST
Faculty Lounge
Day1, 19:10
Dinner*

*Seminar Room
Day1, 18:20
Open-lab Demo Exhibition*

*Woonbum Hall
Day2, 09:00 Opening
15:20 Presentation
& Wrap up*

*AK Lounge
Day2, 9:40 & 13:30
Discussions - Parallel Sessions*

P1 P2 P3

*Lobby
Day2, 11:30
Graduation Show
& Lunch*

< 1st Floor >

id KΛIST