The Designer's Behaviour Change Model: A Tool for Disseminating Inclusive Design

By

Kyrie Vala-Webb

Submitted to OCAD University in partial fulfillment of the requirements for the degree of **Master of Design in Inclusive Design**

Toronto, Ontario, Canada, April, 2017

Creative Commons Copyright Notice

Author’s Declaration

I hereby declare that I am the sole author of this MRP. This is a true copy of the MRP, including any required final revisions, as accepted by my examiners.

I authorize OCAD University to lend this MRP to other institutions or individuals for the purpose of scholarly research.

I understand that my MRP may be made electronically available to the public.

I further authorize OCAD University to reproduce this MRP by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

Abstract

The emerging field of inclusive design has great potential to support more innovative, higher-quality design work and greater social good. However, there is still work to be done in both disseminating inclusive design, and changing the culture and practices of designers in the public and private sectors. This paper explores the question of how to increase the uptake of inclusive design. Using a qualitative meta-synthesis methodology, the author examined the current initiatives for and research on the dissemination of inclusive design, models of behaviour change and habits from psychology, as well as the cognitive habits of designers from the literature of design studies. The meta-synthesis analysis resulted in the creation of the Designer's Behaviour Change Model, a tool to be used by inclusive design scholars and professionals to design effective interventions aimed at creating long-term, sustained change in designer behaviour, and the mainstream uptake of inclusive design methods and approaches.

Keywords: Inclusive design, uptake of inclusive design, behaviour change, models of behaviour change, Designer's Behaviour Change Model, habit change, habit development, design approaches, design training

Acknowledgements

I would like to acknowledge the support and contributions of my primary advisor, Cheryl Giraudy, and my secondary advisor, Vera Roberts. Without your guidance, wisdom and expertise, I would have been lost. Thank you for your time, energy and nurturing. I will be proud to build on the work we have done together for the rest of my career.

To my classmates and friends in the Echo Cohort of the Inclusive Design program, thank you for keeping me balanced, for contributing to our learning community and for standing up for me when my energies flagged.

I am deeply grateful for my parents, whose love and support at every stage of this journey made it possible for me to complete this degree.

Thank you also to my friends and colleagues who have shared my burdens and my joys, and made me laugh along the way. Your kindness and support was invaluable.

Lastly, I would like to thank Ryan, who encouraged me to take the plunge into the world of inclusive design, and continually inspires and surprises me. I look forward to the countless challenges, adventures and discoveries we will face together.

Table of Contents

List of Tables

List of Figures and Illustrations

Section 1: Introduction

Inclusive design is an emergent field that has the potential to create powerful positive impact and improve the quality of thinking and work of designers across design disciplines. While much exciting work is being done and “the inclusive design knowledge base has achieved a degree of maturity in recent years…the current goal must be to ramp up the level of knowledge transfer to industry.” (Clarkson, Coleman, & Dong, 2012, 229).

This project acknowledges and supports the work already being done in the inclusive design field. The purpose of this project is to explore the challenge of increasing the uptake of inclusive design, with the hopes of inspiring new strategies for the dissemination of inclusive design approaches and methods. These new strategies should not replace, but add to and enrich current activities and programs aimed at promoting inclusive design and increase its uptake with designers in the public and private sectors.

Increasing the uptake of inclusive design is fundamentally about radical change– change at the personal, organizational and societal levels, change in the culture of design, and change and evolution in the designer’s practice. This change will be good, but it will also be hard. Designers need help and motivation to enact this change.

This paper will frame the uptake of inclusive design as a challenge of individual behaviour change for designers, and will argue for a new model of behaviour

change specific to this audience and objective. The new model of behaviour change is proposed as a tool to guide the design of future interventions aimed at increasing the uptake of inclusive design with designers.

Section 2: Methods

Research Question

The primary concern of this project is to contribute to the efforts around the dissemination and uptake of inclusive design. This requires an understanding of the current efforts in this area, the barriers and challenges that are preventing mainstream uptake of inclusive design, and a creative exploration of potential solutions to this challenge. The primary research question of this project is, “how can we increase the uptake of inclusive design by designers?” The methodology used to answer this research question was meta-synthesis or qualitative meta-analysis.

Research Goals

There were three main research goals for this project that were developed in service of answering the primary research question. These research goals were: 1) examining the current initiatives for and research on increasing the uptake of inclusive design; 2) gathering research from the relevant fields of psychology and design studies; 3) developing a model of behaviour change to support the design of future interventions aimed at increasing the uptake of inclusive design.

These goals emerged throughout the project as the meta-synthesis process evolved, causing questions to be answered, new ones to emerge, and the framing around this problem to become more refined. At the outset, one research

goal was defined. Subsequently, as this goal was achieved, a new goal emerged. This cycle was repeated one more time before the project reached a conclusion.

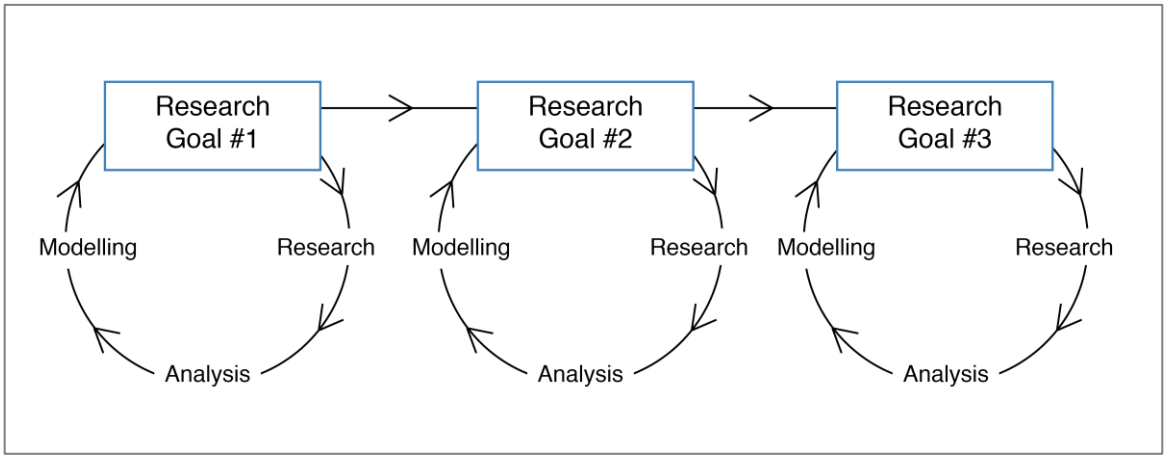

Figure 1: Diagram of the Iterative Development Process of Research Goals

The first research goal was to examine the current initiatives aimed at increasing the uptake of inclusive design and the established research around the uptake of inclusive design, looking for principles, gaps and opportunities that could be leveraged for this project. The resulting analysis formed a foundation of knowledge and understanding that led to the development of the second research goal.

The second research goal of this project was to gather research from psychology and design studies, fields that provide novel resources and perspectives to support the development of new solutions for increasing the uptake of inclusive design. This cross-disciplinary research and analysis served several purposes. First, it brought new perspectives to the problem–what the challenges and

opportunities are. This also provided additional theoretical and conceptual frameworks for developing a solution. From this cross-disciplinary scan and analysis, the third and final research goal emerged.

The last research goal of this project was to develop a model of behaviour change and design principles specifically to support the design of interventions aimed at increasing the uptake of inclusive design with individual designers. The behaviour change model needed to be specific to this particular problem, tailored to designers and their working contexts, and usable for inclusive designers or researchers attempting to increase the uptake of inclusive design.

Approach

The methodology of this project was meta-synthesis conducted across the fields of inclusive design, psychology and design studies. In the analysis process, different methods, such as modelling and gap analysis, were used.

Meta-synthesis is a methodology in which papers and articles from a body of literature are deemed the data, and are gathered, reviewed and synthesized into a significant and novel contribution to the field (Bondas & Hall, 2007, p. 116). The resulting synthesis of information is the primary way in which meta-synthesis differs from a literature review in that, “a literature review contains no mechanism for meaningful, interpretive synthesis” (Schreiber, Crooks, & Stern, 1997, p. 314).

In its earlier forms, meta-synthesis was called qualitative meta-analysis (Bondas & Hall, 2007, 114). Schreiber et al. (1997) define qualitative meta-analysis as,

> *the aggregation of a group of studies for the purposes of discovering the essential elements and translating the results into an end product that transforms the original results into a new conceptualization. (p. 314)*

The synthesis and transformation that occurs through meta-synthesis is an essential feature of the methodology. It is also a defining characteristic of this project, which reviewed literature from various fields and produced a new and integrated model of behaviour change for specific application with designers and the challenge of the dissemination of inclusive design.

The meta-synthesis methodology was chosen for this project because it enabled the synthesis of research from multiple fields. It was essential for this project that previous research in disparate fields be leveraged in service of creating an overarching model, or theory, about how to create a cultural change in mainstream design practice towards inclusive design methods and approaches.

The Frame

The meta-synthesis methodology was framed by the research question of this project, as well as the emergent research goals. The studies and papers collected and analyzed were selected in an iterative approach as the research goals were achieved and evolved. This iterative approach is in keeping with many meta-synthesis methods, as Barnett-Page and Thomas (2009) point out, “all synthesis methods include some iteration but the degree varies” (p. 12). The

frame of the project then impacted the searching and analysis approaches employed.

Searching Approaches

The primary technique used to search for articles and papers, which served as the data in this project, was through online searches using the Google Scholar and Google search engines. Various query terms were used to locate relevant papers (see Table 1 for a list of the major search queries used). The "'pearl-growing' technique" referenced by Barnett-Page and Thomas (2009) wherein additional references are found by searching through the bibliographies of papers that have already been located, was also used as a searching method (p. 4).

The criteria for the selection of academic sources was based on peer-review and publication. Popular sources were also used to support the modelling activities in this project. The credibility of these sources was evaluated through two criteria– the classification of "best-selling" and the foundation of the claims made in research from academic sources.

The inclusive design initiatives reviewed in Section 4 were gathered through online research and by visiting the websites of groups already known to the author. Additional initiatives were also discovered through a distributed, social

version of the pearl-growing technique–members of one inclusive design initiative[1] were consulted for suggestions on other initiatives to examine.

The following table outlines the key search terms and author names used during the searching process for the four major topic areas in this project: uptake of inclusive design, behaviour change, habits, and designer skills. While the table of terms and authors is not exhaustive, it highlights the most essential and useful discoveries during the searching process.

Topic Area	**Uptake of inclusive design**	**Behaviour change**	**Habits**	**Designer skills**
Search Terms	Uptake of inclusive design Barriers to inclusive design	"Behaviour change" + Model	Definition of habits Habits + psychology	Designers + habits Design thinking
Key Authors	Dong, Hua Cassim, Julia Clarkson, P. John	Fogg, B.J.	Neal, David T. Wood, Wendy Quinn, Jeffrey M.	Cross, Nigel

Table 1: Meta-Synthesis Search Terms and Authors

Approaches for Analysis

Gap analysis and modelling were the two primary methods used for analysis and synthesis of the gathered sources. For the research on the uptake of inclusive

[1] Advisors to this project, Cheryl Giraudy and Vera Roberts, are members of the Inclusive Design Research Centre at OCAD University and were consulted here.

design, as well as the review of inclusive design initiatives, gap analysis was used to identify overlaps in approaches and target audiences of initiatives, as well as opportunities that have not yet been addressed by any known work.

Visual modelling, such as sketching and making diagrams, was an essential method used in the analysis and synthesis of the behaviour change models and habit definitions. The creation and use of “visual data displays” is cited by Sandelowski et al. (1997) as an important analysis method, which “permit synthesists to recognize similarities and differences” in the findings of the data set (p. 369). This method was essential in the development of a new model of designer’s behaviour change by integrating the different models and definitions analysed during this project.

Analysis was also guided by the author’s personal perspectives and experiences, both as a designer employed by a private sector design consultancy, and as a student studying inclusive design at OCAD University. These personal reflections necessarily biased the results of this project, but also provided a unique grounding in the experience of a design practitioner, a member of the audience targeted by research on and interventions for the uptake of inclusive design.

Section 3: Current State of Inclusive Design

Inclusive design is an emerging field, but has already established strong theoretical footing, as well as methods and tactics that are unique to the discipline. However, much work remains to disseminate the theories, methods and issues that are central to inclusive design, and have effective adoption of these within design organizations and by designers.

This chapter reviews existing initiatives and strategies for disseminating inclusive design theories and methods in order to identify opportunities for innovation and contribution to this effort. The strengths and weaknesses of current strategies are explored, and research on the efficacy of these strategies support this analysis. Barriers to inclusive design that exist within design organizations are also outlined. Lastly, two examples of successful practice and culture change in design fields are highlighted.

Inclusive Design Initiatives & Dissemination Strategies

There are many groups and initiatives that operate within the field of inclusive design. These groups and initiatives conduct research and develop inclusive design practices, while also sharing methods and approaches of inclusive design with practitioners in other fields and contexts. The following are some key initiatives and strategies used by inclusive designers and researchers to raise awareness for and increase the uptake of inclusive design.

Academic Research Centres

Academic research centres have a number of functions related to the dissemination of inclusive design theories and methods. Teaching inclusive design to students, creating publicly-available resources, advocating for inclusive design approaches and raising awareness about inclusive design issues are all important contributions to increasing the uptake of inclusive design. Research centres and their members can also act as experts and consultants for public and private sector projects.

Inclusive Design Research Centre

The Inclusive Design Research Centre is an interdisciplinary centre for research and development operating out of OCAD University (Toronto, Canada). The stated purpose of the group is to “ensure that emerging information technology and practices are designed inclusively,” through a number of design and research projects. The centre works in collaboration with groups worldwide, and is affiliated with a Master of Design program in Inclusive Design.

The Inclusive Design Research Centre defines inclusive design as “design that considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference.” The centre’s website also articulates “three dimensions of inclusive design” which are: “recognize diversity and uniqueness,” “inclusive process and tools,” and “broader beneficial impact.” These three dimensions are connected in a diagram that shows the concepts that fall within each dimension.

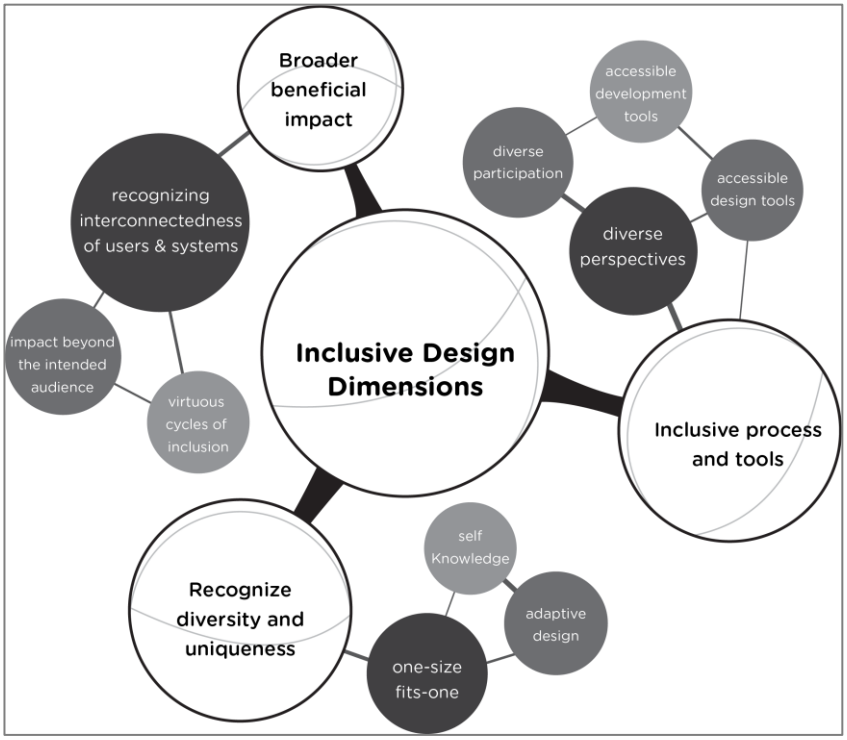

Figure 2: Inclusive Design Dimensions Diagram (IDRC, n.d.)

Helen Hamlyn Centre for Design

The Helen Hamlyn Centre for Design is a design research centre based out of the Royal College of Art (London, UK). The centre "undertakes design research and projects with industry that will contribute to improving people's lives," and is organized around 3 areas of study: "age & diversity," "healthcare" and "work futures." While the centre's mandate is not specifically "inclusive design," these areas of study create a focus on questions of diversity and inclusion, particularly those related to diversity of age and ability. The centre also emphasizes that they take an "inclusive and interdisciplinary" approach to the projects they do, and

collaborate with a variety of groups, including government, academic and business groups.

The Helen Hamlyn Centre for Design also engages with students at the Royal College of Art, through two programs–their annual Helen Hamlyn Design Awards and through workshops for students that “encourage RCA students to engage with social changes and adopt inclusive and participatory design methods.”

Strengths & Weaknesses of Academic Research Centres

Academic research centres are powerful actors in the dissemination of inclusive design theories and methods. These centres are responsible for creating and sharing new knowledge and approaches in the field, becoming reliable and recognizable resources on inclusive design. Members of these research centres advocate for the field in different settings and with different professional networks, which is another key activity in the spreading of inclusive design. Research centres are also successful ambassadors for inclusive design because they build up a portfolio of work that demonstrates how inclusive design can be implemented effectively.

However, academic research centres also have weaknesses. These organizations can be out of touch with design industries, meaning they may not share the same values and language as designers in public or private sector contexts, and do not work within the same business models and organizational constraints. This can make the messages and work of research centres less

accessible and relevant for designers and design companies. Experts from academic research centres may also be perceived as outsiders when communicating about inclusive design to public or private sector organizations, which could create barriers to uptake.

Inclusive Design Toolkits

An effort has been made by various organizations to create and share resources that support the uptake of inclusive design. The three primary examples of these resources are toolkits developed by expert groups to articulate the goals and methods that form the core of an inclusive design process. These toolkits are freely available online.

IDRC Toolkit

The Inclusive Design Research Centre has developed an online Inclusive Design Toolkit that introduces and teaches methods for inclusive design and research. The website is organized into four sections: “insights,” “practices,” “tools,” and “activities.” These sections cover the inclusive design perspectives, ideas and methods that designers can incorporate into their practice to be more inclusive. The toolkit is available online and is intended to be a collaboration with the inclusive design community, since it is editable through GitHub.

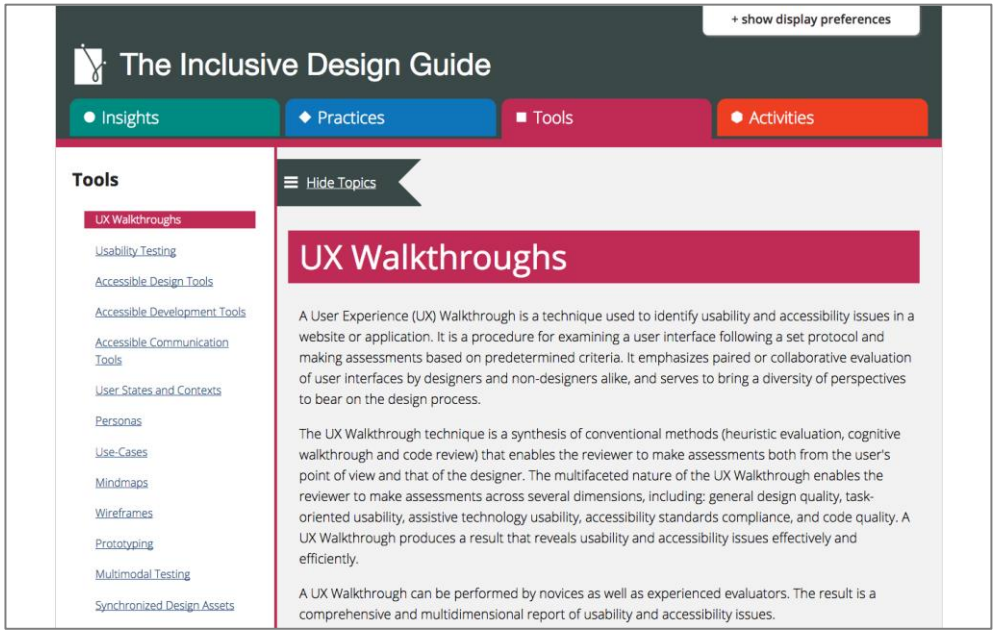

Figure 3: Inclusive Design Toolkit Tools Page (IDRC, n.d.)

University of Cambridge Toolkit

The Engineering Design Centre of the University of Cambridge also has developed an online inclusive design toolkit. This online platform presents information about inclusive design, the benefits of doing inclusive design and some key guidelines, tools and case studies. This toolkit focuses primarily on designing for different physical and cognitive abilities. For example, the “About Users” section includes content on: vision, hearing, thinking, communication, reach and stretch, dexterity and mobility. The toolkit is available online and maintained by the Engineering Design Centre. Feedback from users is collected through surveys at the bottom of every page, or can be sent to the Centre’s email address.

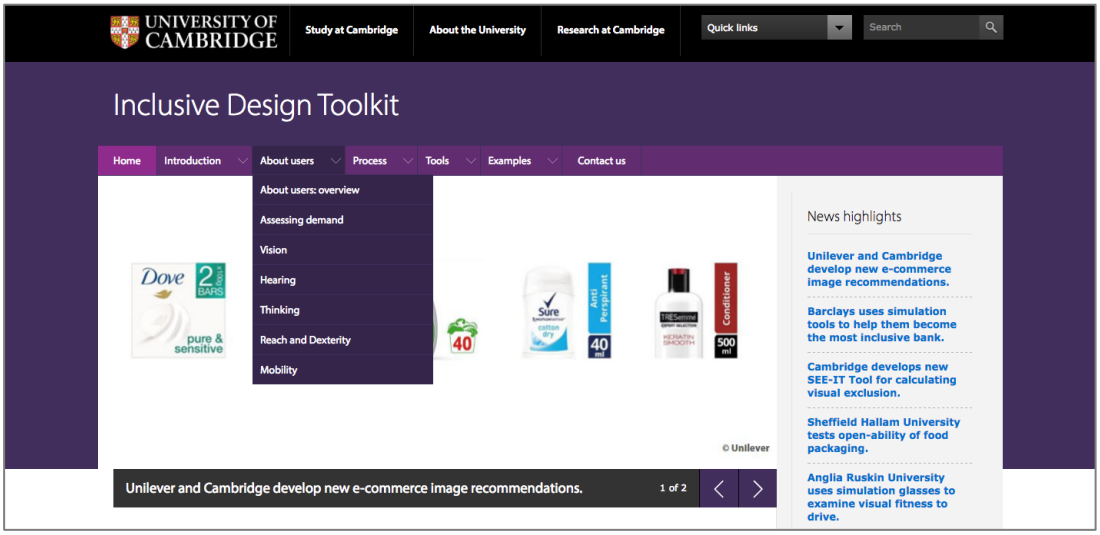

Figure 4: University of Cambridge Toolkit Homepage (2017)

Microsoft Toolkit

Microsoft has developed a two-part toolkit that combines a manual explaining inclusive design and the benefits of this approach, and a set of “activity cards” that outline methods and activities to conduct inclusive design work. These two pieces are downloadable PDFs, available for free from a Microsoft website. This website also includes video case studies that are intended to show “inclusive design in action.”

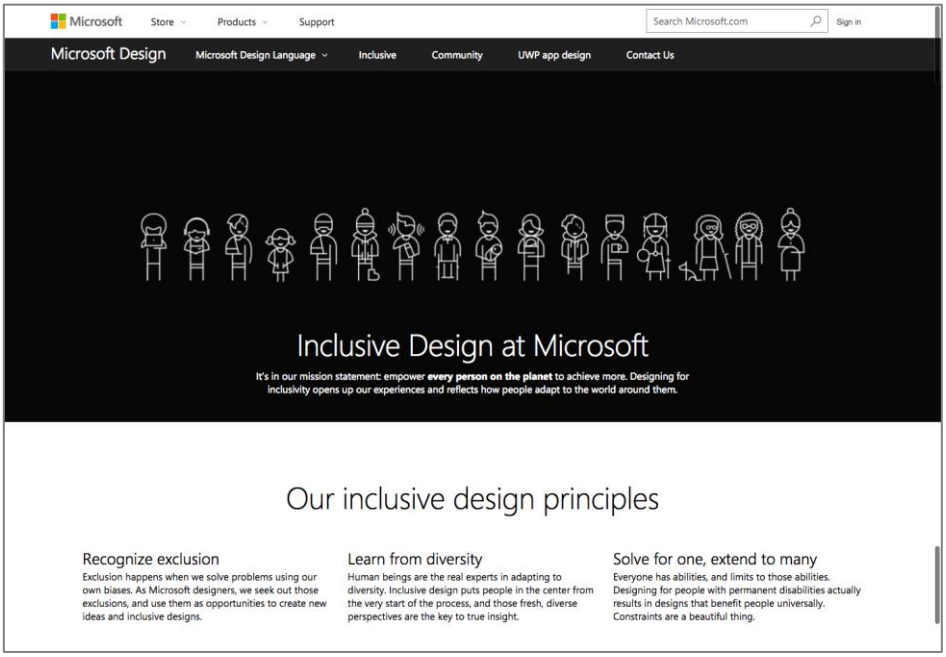

Figure 5: Microsoft Toolkit Homepage (Microsoft, 2017)

Strengths & Weaknesses of Toolkits

Toolkits can be useful for designers, acting as a resource that they can reference repeatedly, over time. Toolkits can be developed iteratively and modularly, to manage the cost of development, and be made widely-available online, with the potential to reach a large number of people. Based on their research, Dong and Clarkson (2005) deemed toolkits to be successful at both raising awareness and improving perceptions of inclusive design (p. 12).

Two primary challenges exist with toolkits, however. First, designers must be motivated enough to seek out these toolkits, or come across them in their work. The most effective mechanisms for sharing toolkits with practitioners is not clear. Second, it is unclear how long the positive effects last after the designers interact

with a toolkit. The long-term, positive impact of inclusive design toolkits has not been measured, and the intervention has not been designed to support sustained behaviour change.

Teaching Inclusive Design at the Post-Secondary Level

Another proposal for sharing inclusive design principles and approaches is by reaching new designers through educational institutions. In a study evaluating the efficacy of three pilot projects, Dong (2010) explored different approaches to teaching inclusive design to students. The author concluded that, “design lecturers play an important role in taking initiatives to help students appreciate inclusive design and user-led innovation” (p. 250). The strategies that proved effective in different educational contexts included “using ‘personas’ and ‘scenarios’ to engage large groups” and “involving people with disabilities in small-scale co-design projects” (Dong, 2010, p. 250).

Strengths & Weaknesses of Teaching Inclusive Design

Design education processes and institutions, are undoubtedly an important part of spreading inclusive design methods and approaches. Providing students with inclusive design perspectives and tools early in their careers will undoubtedly impact their work and their industries. Teaching these skills in an educational setting also enables young designers to internalize the values, mindsets and methods of inclusive design, making inclusive design core and foundational to their design approaches.

Unfortunately, it is quite likely that design students who begin their careers will find it challenging to implement their inclusive design practices with teams and companies that are not acquainted with or open to inclusive design. Additional interventions must be targeted at increasing the uptake of inclusive design within organizations and with mid-to-late career designers. In addition to creating strong uptake of inclusive design overall, this is required to support newly-educated designers to successfully transfer inclusive design perspectives from their degrees to their workplaces.

Workshops for Practitioners

Workshops have been tested as a tool for spreading inclusive design awareness and methodologies. In 2005, Cassim began development and evaluation of a design workshop aimed at introducing designers to principles and methods of inclusive design. When the workshop design was tested and evaluated, the author found it to be a successful form of “concentrated knowledge transfer” (p. 44).

There were several elements identified by the author that were key to the success of this workshop were: a guided process, involving people with disabilities “as design partners,” and framing disability, “not as a restrictive status quo but as a creative state” (Cassim, 2005, p. 38).

In 2013, Cassim and Dong conducted another analysis of workshops offered in a similar format and context. These workshops emphasized interdisciplinary

collaboration involving designers, engineers and people with disabilities. Again, workshops were found to be an effective way of “engaging business with inclusive design” (Cassim & Dong, 2013, p. 5).

One of the reasons given by the authors for the success of workshops is that they “provide an intense learning experience that suits the learning styles of designers” (Cassim & Dong, 2013, p. 5). Unfortunately, the reasons for and implications of this are not explored further in the research. However, this comment provides an interesting hint at an opportunity in this space–primarily the opportunity to more deeply understand designers, how they learn and what motivates them to make changes in their practice. A more concrete understanding of these elements could support a more robust strategy for disseminating methods and practices of inclusive design.

Strengths & Weaknesses of Workshops for Practitioners

Workshops seem to be an effective strategy for introducing designers to inclusive design practices. However, questions remain about whether this strategy creates long-term, sustained change in behaviours. It is probable that designers need additional support, interventions and resources to maintain their learning and change in practice over time, once they leave a one-time workshop. In addition, workshops will suffer from selection bias, whereby designers who are already pre-disposed to learning about and incorporating inclusive design approaches will be more likely to attend than designers who have neutral or negative views on inclusive design. As a result, workshops will not be effective for making large-

scale practice changes in design, unless most designers are already interested in inclusive design.

Legislation & Guidelines

The major legislation in Ontario that applies to inclusive digital design is the Accessibility for Ontarians with Disabilities Act (AODA). The AODA will force the compliance of companies to design guidelines outlined in WCAG 2.0 (World Wide Web Consortium Web Content Accessibility Guidelines), which provide clear guidance around digital accessibility. Legislation and guidelines can be considered a form of dissemination, as they outline the requirements for design (at least digital and print) that companies must meet in order to be considered "accessible." There are also numerous resources produced to communicate these guidelines and requirements, which share information about inclusive design. Legislative imperatives and supporting guidelines are useful, but they have not been enough to force a wholesale change within the design industry, or with clients of design consultancies. It appears that legislation is necessary but not sufficient for creating mainstream uptake of inclusive design.

Strengths & Weaknesses of Legislation

Legislation is a powerful system for motivating and holding companies accountable for employing inclusive practices. However, legislation and guidelines are often created to be generalized, so that they apply across many fields and industries. This vagueness makes it difficult for practitioners to

understand what is required of them and how to implement those requirements. Another downside to legislation is that it creates an obligation around accessibility and inclusive design, making it something that is forced upon companies and designers. It emphasizes the requirement and the punishments for failing to comply, as opposed to the benefits and innovations possible when inclusive design is applied.

Barriers to Uptake of Inclusive Design in Industry

Increasing the uptake of inclusive design is a complex challenge. Design companies have many potential reasons for not incorporating inclusive design methods and ideas into their work, including perceived higher costs and longer timelines, as well as a lack of understanding the need for inclusive design. As the field of inclusive design develops, researchers have been studying the barriers to the uptake of inclusive design in industry. It is essential to understand these barriers in order to design effective interventions that will bring inclusive design to design industries.

Lack of Awareness

The first set of barriers relate to a lack of awareness of inclusive design and the need for it. For example, some designers reported that inclusive design is “not perceived as a need” of the target audience (Goodman, Dong, Langdon, & Clarkson, 2006, p. 144). These designers are not likely to incorporate inclusive design methods, since they are not aware of the need for them. This problem

also manifests through a lack of inclusive design goals for projects and organizations, which means designers do not need to be aware of inclusive design in their process and project workflows. Some design organizations reported that “a formal design assessment before and after” was missing from their design process, which would encourage and enforce the use of inclusive design methods (Dong, Keates, & Clarkson, 2003, p. 9). This indicates that interventions focused on creating awareness of the need for and uses of inclusive design would be useful. Also needed are interventions that promote the introduction of inclusive design goals and metrics across projects within design organizations.

Lack of Resources and Skills

A second set of barriers relate to a lack of resources and skills. Designers and their organizations cannot implement inclusive design if they lack the ability to do so. In a study on barriers to inclusive design, designers reported a “lack of knowledge or tools for practicing” inclusive design (Dong & Clarkson, 2007, p. 5). While this appears to be a relatively simple challenge to solve, thought needs to be given to what skills and tools are most useful, and how designers can internalize inclusive design values and approaches, instead of relying on checklists, toolkits and step-by-step instructions. Experimentation and refinement are required to establish the right content and methods for teaching inclusive design to achieve deep and sustained uptake of inclusive design skills and

methods, and to support companies in incorporating inclusive design in their work.

Lack of Motivation

The last set of barriers result from a lack of motivation to incorporate inclusive design methods. One such barrier is a “lack of requirements from clients” to employ inclusive design (Dong & Clarkson, 2007, p. 5). This means that design organizations are not typically motivated by client requests to use inclusive design approaches. Also, a lack of managerial interest could lead to this, as well as negative views of inclusive design. For example, a “lack of time and budget” to incorporate inclusive design methods was commonly reported as a barrier to industry uptake (Goodman et al., 2006, p. 144). This negative view of inclusive design means that organizations are not motivated to explore the use of inclusive design theories and methods.

These barriers are perhaps the most concerning, since it is difficult to encourage an individual or organization to change if they have no motivation to do so. The diversity of these barriers also demonstrates that motivation can come in many different forms. This is beneficial because there may be multiple forces, both within and outside an organization, that could be applied to motivate the uptake of inclusive design. However, it also makes the design of interventions more difficult, as it is difficult to ascertain what types of motivation will be most successful with each individual or company.

Framework for Categorizing Barriers

Dong (2004) developed another framework for categorizing and understanding barriers to the uptake of inclusive design in industry through work with retailers and manufacturers. In this model, barriers fall into 3 different categories - perceptual, technical and organizational (Dong, 2004, p. 1036). Perceptual barriers have to do with attitudes towards inclusive design, such as inclusive design being viewed as more expensive (Dong, 2004, p. 1036). Technical barriers occur when designers or companies do not have the right skills and tools to apply inclusive design in their work (Dong, 2004, p. 1036). Organizational barriers develop when a company does not have policies that support inclusive design (Dong, 2004, p. 1036).

Dong's framework loosely maps to the categories of barriers outlined in this paper. The perceptual barriers are related to the motivation of organizations and individuals to take up inclusive design practices. If they have negative perceptions about inclusive design, they will be unlikely to incorporate it into their practice. Technical barriers are directly related to a lack of skills and resources. Lastly, organizational barriers are somewhat related to the lack of awareness of inclusive design and the need for it. When organizations have incorporated inclusive design goals and metrics into their workflows, these tools create awareness of the need for inclusive design for all designers and even clients, throughout project lifespans.

Examples of Successful Practice Changes in Design

Inclusive design is not the first field that has attempted to make practice-level and cultural changes in design fields. Two examples of successfully-adopted design movements, human-centred design and sustainability, will be examined briefly. Inclusive designers and scholars wishing to create broader uptake of their methods and approaches can learn and draw hope from these two successes.

Human-Centered Design

Human-centred design is an approach to design that places a focus on "the people you're designing for" and results in "new solutions that are tailor made to suit their needs" (IDEO, n.d.). It has become a common practice used by design companies, teams, and even in business leadership. Zhang and Dong (2008) suggest that human-centred design is part of the evolution of the entire practice of design (p. 4). They argue that design has shifted from being "function-focused" before the 1950s, through a "consumer-focused" phase between the 1950s and the 1980s, to the "human-focused" phase, which started in the 1990s (Zhang & Dong, 2008, p. 4).

Zhang and Dong's (2008) inclusion of human-centred design as an entire phase in their model of the evolution of design (p. 4) indicates that human-centred design has had great success in becoming both influential and widely-used in the public and private sectors.

IDEO is a primary example of a company that has built a very successful, well-recognized business around the implementation of human-centred design in business (also humanitarian) applications. The company, started in the 1980s, became famous with their 1999 “Shopping Cart” video, which showed the complete design process of the IDEO team re-designing the humble shopping cart (IDEO, n.d.).

IDEO’s complete adoption of human-centred design was hugely impactful on their business. Not only did human-centred design become a key differentiator that helped IDEO stand out from its competitors, the design methods and tools continue to drive highly innovative and creative work that the company has become known for. In addition, by adopting human-centred design earlier than most companies, it honed the skills, workflows, tools, and branding messages surrounding its offerings. This put them at a distinct advantage as human-centred design became more mainstream, and other companies began adopting it.

IDEO’s recognition and early adoption of human-centred design processes and principles has led to increased profitability and competitiveness for the company, and a stable standing as a sought-after consultancy. This successful uptake of human-centred design demonstrates the benefits for public and private sector organizations of implementing new design processes. It also proves that change in the culture and practice of designers is possible, and often positive and beneficial to designers and the organizations that employ them.

Sustainability & the Built Environment

Just as human-centred design in product and service design, sustainability is a concept that has had a significant impact on the design of the built environment. Although the meaning of “sustainability” has branched out and evolved in different fields (Morelli, 2011, p. 2), sustainability is generally defined as a solution that, “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland & World Commission on Environment and Development, 1987, p. 16). Typically, sustainability refers, at least in part, to impact on the natural environment and the consumption of natural resources.

Sustainability was not always a consideration in the design of the built environment. However, it has now become an integral part of the practices of architects and interior designers.

The success and widespread recognition of LEED, an international environmental rating system, is an example of the significant uptake of sustainability. According to the Canada Green Building Council (2016), “LEED works because it recognizes that sustainability should be at the heart of all buildings – in their design, construction and operation.” The website also states that, “Since 2004… over 2,800 LEED buildings in Canada” have been certified, and more than 5,000 have been registered (2016). This demonstrates that sustainability is a key

consideration for many building projects, and that companies and residents are seeking out formal acknowledgement of the sustainability of their projects.

The results of sustainable design and development extend well beyond the positive environmental impacts. LEED Canada claims that buildings that meet LEED standards lead to “healthier indoor environments,” and “drive innovation,” because of the creativity required to meet the certification standards (2016).

Companies and practitioners who have made sustainability a key part of their business offering have benefited from the differentiation and positive brand association that comes with sustainable design and development. The adoption of sustainability is another example of a paradigm shift in a design field that has led to higher creativity, innovation and profitability. It is proof positive that changes in design culture and practice can occur at large scale, across an entire industry or field.

Gap Analysis of the Current State of Inclusive Design

All of the initiatives, programs, and research reviewed in this chapter play important roles in increasing the uptake of inclusive design. However, there are still gaps in the initiatives and knowledge in this field that must be filled in order to achieve large-scale uptake across design fields.

First, there is a dearth of initiatives and research that focus on increasing uptake of inclusive design at the organizational level–with companies that either sell

design services or have internal design teams. Much of the research conducted by Cassim, Dong and Clarkson focusses on the perceptions of and barriers to inclusive design at the organizational level. This leaves a gap in initiatives that focus on individual designers, as well as little understanding of what drives individual designers to change their behaviour and incorporate inclusive design into their practice.

Interventions that do focus on individuals, such as teaching inclusive design at the post-secondary level, toolkits and workshops, are either focused on new designers or are one-off interventions. These approaches may be effective for new designers, and those established designers who are pre-disposed to valuing an inclusive design approach. However, designers who are mid-to-late career will likely require differently-designed interventions that take place over a longer period, which would enable them to develop an awareness and interest in inclusive design, as well as make shifts in their practices which are already well-established.

The involvement of design practitioners themselves is another element that is missing from the creation and delivery of interventions aimed at increasing the uptake of inclusive design. Involving practicing designers could ensure that the industry contexts and constraints are considered, and that the interventions will be relevant and useful for industry colleagues. In addition, these interventions will

have more credibility and social acceptance because of the members of industry who are involved.

Another major gap in these programs and initiatives is that these interventions lack an overall strategy that informs the design of the interventions, as well as the measurement of short and long-term effectiveness. While the interventions are well-designed, there seems to be little guiding strategy to the different approaches that are being tested. The field could benefit from some overarching strategies or frameworks, which would focus the development and evaluation of different interventions, as well as provide a structure for investigation and theory-creation in the research.

Observation	**Gap**
Dearth of initiatives & research focused on organizations	Need to focus on individual designers
Initiatives focus on teaching new designers	Need to address more established, working designers
Initiatives focus on one-off engagements with practicing designers	Need to design for long-term behaviour change
Lack of designers involved	Need to engage with designers
Approaches are not co-ordinated across projects or authors	Need for overarching strategies to guide design and evaluation efforts
Practice changes have occurred successfully in some fields of design	Need to learn from successes of other design movements

Table 2: Summary of Observations & Gaps in Current State

Lastly, it is noted that changes in design practice and methods have successfully occurred with other methodologies, for example, human-centred design and sustainability. These examples provide hope that inclusive design can successfully be incorporated into mainstream design practices, but should also be examined for useful insights and learnings that could be applied in the dissemination of inclusive design. There is a need to learn from other changes in design culture and practices in order to support the design of successful interventions to spread inclusive design methods and approaches.

Summary

Inclusive design is a rich, growing field, and many initiatives have been developed to spread inclusive design methods and approaches to public and private sector organizations. Examples of other design concepts–human-centred design and sustainability–being taken up at scale across entire design industries provide hope that the widespread adoption of inclusive design is possible. However, there are some key gaps in the initiatives, approaches and research on the uptake of inclusive design that need to be addressed.

In the next section, these gaps will be addressed with opportunities for increasing the uptake of inclusive design. These opportunities emerged from the gap analysis of initiatives, barriers and examples of successful practice change reviewed in this chapter.

Section 4: Opportunities for Increasing the Uptake of Inclusive Design

There is extensive work currently being done to share the knowledge and practices of inclusive design. However, there are also gaps in these approaches (examined in the previous chapter) that reveal opportunities for new strategies and interventions designed to increase the uptake of inclusive design with designers. The opportunities presented in this chapter form the foundation for this project, by outlining what gaps and possibilities have yet to be addressed by inclusive designers, scholars and researchers in this field. The gaps and the corresponding opportunities are summarized in the table below.

Gap	**Opportunity**
Need for overarching strategies to guide design and evaluation efforts	**Opportunity #1:** Create a design strategy for spreading inclusive design
Need to focus on individual designers	**Opportunity #2:** Focus on designers
Need to address more established, working designers	**Opportunity #2:** Focus on designers
Need to engage with designers	**Opportunity #2:** Focus on Designers
Need to learn from successes of human-centred design and sustainability)	**Opportunity #2:** Focus on designers
Need to design for long-term behaviour change	**Opportunity #3:** Design for long-term, sustained change

Table 3: Gaps in Current State Mapped to Opportunities

Opportunity #1: Create a Design Strategy for Spreading Inclusive Design

There is a significant gap in the ways we are thinking about spreading inclusive design. Although there is strong motivation to disseminate the theories and methods of inclusive design, there has been little development of overarching strategies for doing so. This is understandable, since inclusive design is a diverse field and is spread out across organizations, countries and continents. There will be no single strategy for increasing uptake, nor should there be.

However, there is a need to step back and examine the thinking behind the different approaches for bringing inclusive design to various design industries. We need frameworks for understanding **how** to design for an increase in inclusive design, when there is currently a focus on **what** to design for this purpose. There was a need, when this challenge was very new, for rapid action and learning, to build up knowledge in this area about what content and formats are effective. However, now that there is a growing body of knowledge in this area, we need to pause, reflect, and start building a set of cohesive, strong strategies for disseminating inclusive design, which leverage existing knowledge in this field and from others about creating change in behaviours, practices and cultures.

There is an opportunity and a need to create design strategies that will guide, support and organize our collective efforts around increasing the mainstream uptake of inclusive design.

These design strategies could take many forms. This project proposes a design strategy in the form of a model for behaviour change. In this case, the model synthesizes insight and knowledge from various fields about how to create an uptake of inclusive design. It provides guidance and tactical direction for inclusive designers wishing to create an intervention that will promote the use of inclusive design. This is one example of a design strategy that is intended to support and organize efforts around the uptake of inclusive design, but there could be many others.

Design strategy has many definitions, but generally it is the application of strategy to design efforts. Olson, Cooper and Slater (2014) define design strategy as, “the effective allocation and coordination of design resources and activities to accomplish a firm’s objectives” (p. 55). Although this definition comes from a business context, it is still applicable to the challenge of increasing the uptake of inclusive design. Design strategy can be applied to this problem by directing “design resources and activities to accomplish” the objective of increasing uptake.

Vossoughi (2007) explains that design strategy, “cuts costs and increases ROI by streamlining and focusing product development” (p. 80). This means design

strategy could be useful in increasing the uptake of inclusive design, by focussing the efforts of individuals and organizations attempting to spread inclusive design methods and practices. In addition, Vossoughi (2007) argues that design strategy improves the quality of design outputs, “because experience is leveraged from one product to [the] next” (p. 80). The design strategy lends a framework for understanding the problem, and then contextualizing and keeping track of the learnings gained through different interventions.

Those working to increase the uptake of inclusive design could benefit from the creation of one or multiple design strategies, which would focus and direct efforts, resulting in more efficiency in the design and implementation of interventions and initiatives. Design strategy would also provide a framework for capturing and understanding the lessons learned from interventions as they are implemented, evaluated, and refined.

Opportunity #2: Focus on Designers

Another opportunity is to focus on individual designers, instead of companies or organizations, as catalysts for the uptake of inclusive design in industry. Much of the research on industry uptake of inclusive design has focused on companies and an organizational perspective on barriers and opportunities. However, Cassim (2007) notes that focusing on individuals may be essential to making change. The author states, “designers have the potential to play a key role as continuing advocates of inclusive design, irrespective of the design firm that

employs them" (Cassim, 2007, p. 37). Developing an approach that focuses on changing the behaviour of individual designers will be a core feature of this project.

There are two important elements that must be considered when focusing on individual designers as the target for interventions aimed at increasing the uptake of inclusive design. First, we must understand how designers work, so that we can design specifically for them. Second, there is evidence that shows that our focus for interventions must be on fostering creativity.

Understand How Designers Work

Although designers are trained at different schools and work in different fields, they do share commonalities. There are specific perspectives, language, experiences, methods, and practices that unite designers and make them different from practitioners in other fields. The culture and practices of design have been the objects of study in the field of design studies for many decades.

The commonalities between designers, particularly those share features that distinguish them from other experts or practitioners, must be understood and leveraged when trying to motivate designers to change. If focusing on designers as catalysts for the uptake of inclusive design, it is crucial that designers and design culture must be understood in order to effectively design for it–either by using existing norms and practices, or by knowingly challenging them. The body

of knowledge in the field of design studies is a vast and powerful resource that should be used in support of the dissemination of inclusive design.

In addition to examining insights from design studies, it would also be beneficial to work with practicing designers, themselves, in order to understand their goals, values, challenges, and work contexts. By collaborating with designers in designing, implementing, and evaluating inclusive design interventions, new approaches and perspectives may be uncovered. This will also demonstrate how inclusive design methods work, since participation of target audiences is a key value in inclusive design.

Foster Creativity

Fostering creativity, by emphasizing the creative challenge and potential in a problem, as opposed to offering restrictive requirements, has been shown to be an effective approach for motivating designers to take up inclusive design methods. Cassim (2007) reported that inclusive design can change a designer's perspective about disability, from viewing it as "a restrictive status quo" to "a creative state, that can supply designers with a set of stimuli and creative triggers" (p. 38). This means that, with the right framing, inclusive design can be viewed as a point of inspiration, as opposed to a set of negative constraints to creativity.

Cassim and Dong (2013) also note that their inclusive design workshop was effective at transforming "designers' negative perceptions of disability as a set of

creative handcuffs that significantly restricted their ability to design" to a highly creative and inspiring perspective on inclusive design (p. 1). Both examples demonstrate that inclusive design can be viewed as a creative space for innovation, but that designers may need help shifting their perspective in order to see this benefit. There is an opportunity, then, to design effective interventions by framing inclusive design as an exciting, creative challenge for designers, as opposed to a negative constraint, when approaching individual designers.

Opportunity #3: Design for Long-term, Sustained Change

Another primary opportunity for increasing the uptake of inclusive design is the possibility of creating long-term, sustained change by fostering new designer behaviours. Currently, the strategies and initiatives aimed at practicing designers (instead of students) take the form of workshops or toolkits. These are valuable resources for designers, but are add-ons to current behaviour; they do not ensure sustained uptake of inclusive design, or create long-term change in designer behaviours. To be successful in creating a full-scale cultural shift in design towards inclusive design practice, we must create plans for changing behaviour in permanent, sticky ways.

There are two ways in which we can move towards interventions that create long-term sustained uptake. First, we can leverage research on behaviour change– how does behaviour change work, and how can behaviour change be driven through design? Second, we can design interventions that address barriers to

uptake in all or multiple categories (lack of awareness, lack of resources and skills, lack of motivation), so that inclusive design becomes an easy and accessible practice for designers to take up.

Leverage Research on Behaviour Change

Increasing the uptake of inclusive design is a matter of changing the behaviour of designers. Designing effective interventions that create long-term, sustained behaviour change requires a deep understanding of how behaviour change works. Research from psychology and other fields has led to the development of many models of behaviour change, which could be leveraged by inclusive designers hoping to increase the uptake of their methods and approaches.

Address Multiple Types of Barriers

As outlined in the previous chapter, there are many barriers that prevent designers from taking up inclusive design methods and approaches. In this paper, these barriers have been grouped into three categories–a lack of awareness, a lack of resources and skills, and a lack of motivation. In order to create long-term, sustained change in designers' behaviour, we need to address barriers from each of these categories with each intervention. This is because designers typically face barriers from all of these categories at the same time. Thus, they need interventions that will support them in overcoming all types of barriers, not just one or two.

Summary

Three key opportunities for increasing the uptake of inclusive design were presented and explored in this section. These opportunities are to: create a design strategy for spreading inclusive design, focus on individual designers by understanding how they work and fostering creativity with inclusive design interventions, and lastly to design for long-term, sustained change in behaviour. The next section will examine three models for behaviour change that will primarily address this last opportunity.

Section 5: Examining Models of Behaviour Change

Increasing the uptake of inclusive design is, at its core, an endeavour of changing people's behaviour. There are many different models of behaviour change which could be applied to this problem. Three models will be outlined below, as a way of exploring different perspectives on what is required to change people's behaviour.

Fogg Behavior Model (FBM)

The Fogg Behavior Model (FBM) outlines three primary factors involved in the behaviour of an individual: motivation, ability and triggers (Fogg, 2009, p. 1). It states that all three of these factors must be present, in some form, in order for a behaviour, or a change in behaviour, to occur. Since the first publication outlining the FBM, Fogg has elaborated on each of the three factors, providing an in-depth discussion of these elements.

Motivation

Motivation is the urge or desire to do something (Fogg, 2009, p. 1). In the case of this project, motivation refers to the practitioner's desire to incorporate inclusive design methods, tools and mindsets into their daily work. Fogg outlines three different motivation pairs that account for the core motivators people experience: "pleasure/pain," "hope/fear" and "social acceptance/rejection" (Fogg, 2009, p. 4). The "hope" motivator, described as "the anticipation of something good happening," is a particularly useful motivation to explore for this project (Fogg,

2009, p. 4). Designers could be motivated to change their practice to be more inclusive if they felt that a positive outcome, such as higher quality work, or a more innovative, creative process, could be anticipated.

Ability

In this project, ability defines the practitioner's capability to implement inclusive design practices or methods. Fogg argues that ability and motivation are linked (Fogg, 2009, p. 3). For example, the author states that, "people with low motivation may perform a behavior if the behavior is simple enough (meaning, [they are] high on ability)" (Fogg, 2009, p. 3). In an intervention aimed at increasing the uptake of inclusive design, the relationship between ability and motivation should be considered. If the method or approach is difficult to implement, designers need to have high levels of motivation. However, if the incorporation of inclusive design is made easier, designers will require less motivation to change their behaviour.

Trigger

In the FBM, a trigger is an event or change of state that prompts the change in behaviour. Triggers are very important in this model because, as Fogg (2009) explains, "without an appropriate trigger, behavior will not occur even if both motivation and ability are high" (p. 3). Fogg (2009) also describes the elements that make up a good trigger–that it must be noticeable, related to the specific behaviour and must also come at a time when it is possible to accomplish the

behaviour (p. 3). In relation to this project, a trigger appropriate to the context would be required to stimulate designers to implement inclusive design methods or approaches, and unobtrusively support them in changing their behaviour.

Below is the diagram that the author, Fogg, used to describe the FBM in the first publication about the model. It shows the three essential elements–motivation, ability, and trigger–as well as the target behaviour and the relationships between the elements in the model.

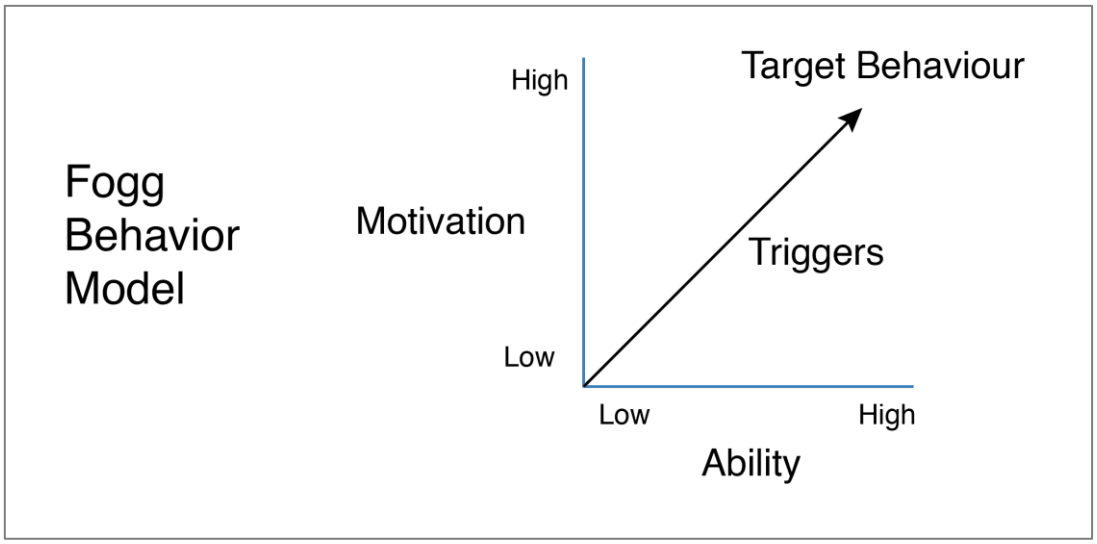

Figure 6: Fogg Behaviour Model (Fogg, 2009)[2]

The Fogg Behaviour Model is a useful model for this project because it outlines three elements that must be present to successfully create behaviour change. The model lays the foundation in this paper for an understanding of how

[2] This diagram is a reproduction of the original diagram created by the author and published in the original publication.

behaviour change occurs. The definition of the “trigger” as a specific and contextual is an especially useful contribution, since it provides guidance and criteria for the design of a potential “trigger” element.

The FBM was developed primarily as a tool to help “designers and researchers…think about the factors underlying behavior change” (Fogg, 2009, p. 1). As such, it is very applicable to the aims of this project, particularly since the language and model is accessible for designers. This makes it easy to apply to the design of interventions aimed at increasing the uptake of inclusive design.

The COM-B Model

The COM-B model was developed by Michie, van Stralen, and West (2011) to support the design of public health interventions intended to change behaviour around smoking and obesity. The COM-B model consists of three elements that lead to behaviour, “capability, opportunity, and motivation” (Michie et al., 2011, p. 4). “Capability,” as with “ability” in the FBM, describes the designer’s ability to complete the behaviour. This model explicitly includes the “psychological and physical capacity” of the individual. “Opportunity” is the set of environmental factors that enable or support the behaviour (Michie et al., 2011, p. 4). The authors note that this also includes factors that might “prompt” the behaviour, which is similar to the “trigger” element in the FBM (Michie et al., 2011, 4). Lastly, “motivation” is defined more broadly by these authors than by Fogg, and

“includes habitual processes” in addition to explicit and goal-directed motivations (Michie et al., 2011, 4).

Below is the COM-B model diagram as it is presented by the authors. It shows the three elements, the relationships between them, and the resulting behaviour.

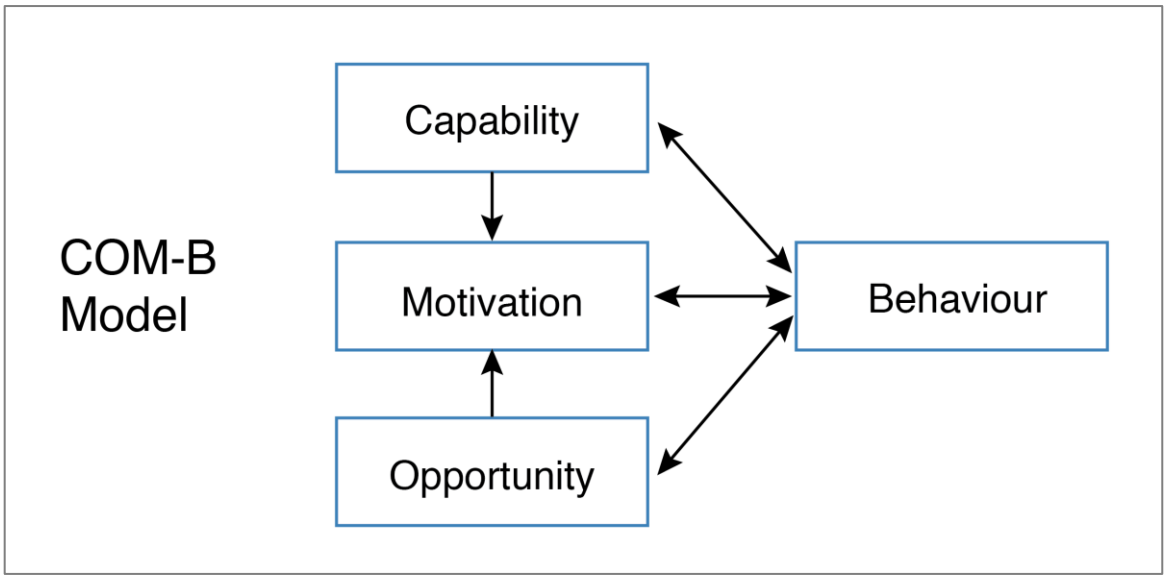

Figure 7: COM-B Model (Michie et al., 2011)[3]

The COM-B model presents a very similar view of behaviour to the FBM, particularly in the number and definition of the key elements that combine to produce a behaviour. However, The COM-B model is useful for this project because it incorporates the idea of habits into the model of behaviour and behaviour change. In the COM-B model, habitual processes can be a motivating factor for a particular behaviour. This is a key addition to the puzzle of how

[3] This diagram is a reproduction of the original diagram created by the author and published in the original publication.

behaviour change works, and will be explored further in the next section of this paper.

The Change Equation

The Change Equation is another model for behaviour change that comes from the field of organizational development (Cady, Jacobs, Koller, & Spalding, 2014, p. 32). The Change Equation, which was first published in 1975, has undergone a number of revisions and has been developed by figures such as Gleicher, Beckhard, Harris, and Dannemiller (Cady et al., 2014, p. 33).

The Change Equation articulates the process for behavioural change within large groups, like organizations (Cady et al., 2014, p. 34). It includes both the elements required and the relationships between them. The Change Equation is:

> D x V x F > R
>
> Dissatisfaction x Vision x First steps > Resistance to change
>
> (Cady et al., 2014, p. 34)

The first element, “D,” stands for “dissatisfaction with the current state of affairs.” The second element, “V” represents the strength and clarity of the “vision” of the desired future state. “F” stands for the “first steps” that will move in the direction of the future state. Lastly, the “R” represents the current “resistance to change.” If the first three elements–dissatisfaction, vision, and first steps–are stronger than

the force of the resistance to change, the desired change within the large group will occur (Cady et al., 2014, p. 34).

Below is an image of the Change Equation as presented by Cady, Jacobs, Koller, and Spalding in their summary of the evolution of the model. The diagram shows the three required elements on the left side, which must outweigh the resistance to change element on the right side of the equation.

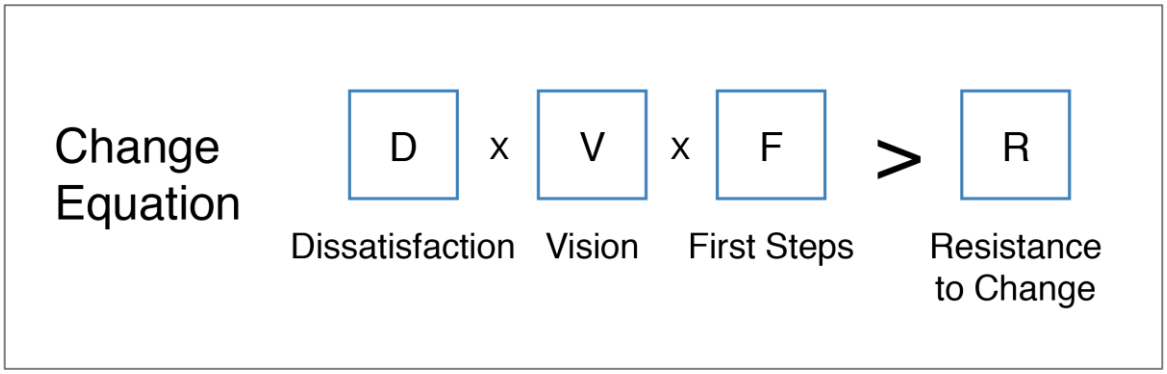

Figure 8: The Change Equation (Cady et al., 2014)[4]

The Change Equation frames behaviour change differently from the FBM and the COM-B model, which deepens the exploration of behaviour change and the motivations behind it. The most important difference is that the Change Equation explicitly discusses the “resistance to change” element, which must be overcome in order to achieve successful behaviour change. It could be argued that resistance to change is present in the other models of behaviour change, in that

[4] This diagram is a reproduction of the original diagram created by the author and published in the original publication.

the resulting new behaviour is proof that resistance to change has been overcome. However, this model explicitly incorporates this element, suggesting that it must be understood and considered by those working to increase the uptake of inclusive design.

Summary

Increasing the uptake of inclusive design with designers is closely related to changing the behaviour of individual designers. These three models of behaviour change (in figure below) are useful tools for exploring the elements required to create behaviour change in designers and their organizations.

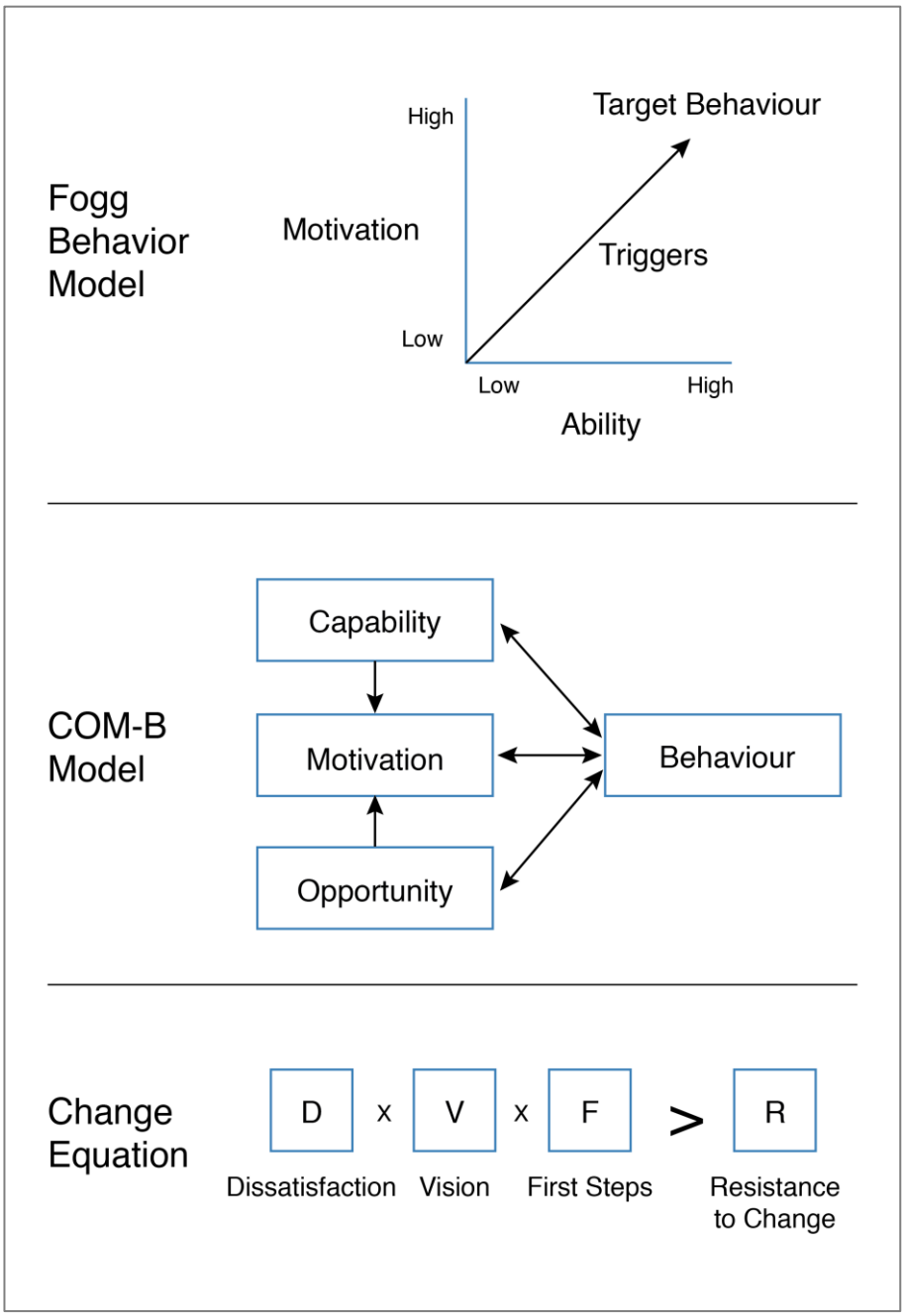

Figure 9: Fogg Behaviour Model, COM-B Model, and the Change Equation

The Fogg Behaviour Model, COM-B Model and the Change Equation can all be applied in this problem space. In fact, these models share many commonalities

which can be explored to find alignment between them, while considering the unique context, behaviours and habits of designers. Adapting these models of behaviour change to address the specific ways that designers work and think about their practice is an essential step towards a model that is most effective in the designer context. The next section will explore the ways that designers cultivate habits in their practices, to inform the development of an adapted model of behaviour change.

Section 6: Changing Designers by Changing Habits

Increasing the uptake of inclusive design requires a behaviour change model that is tailored specifically to designers, as well as a model that aims at long-term, sustained change in behaviour. Habits, or habitual behaviours, exist at the intersection of these considerations. In general, changing habits, or creating new ones, is a useful approach to behaviour change. Designers are already using cognitive habits in their practices, such as analogous thinking, iteration and non-verbal expression. Supporting designers in creating new cognitive habits related to inclusive design practice could enable significant uptake of inclusive design theories and methods.

To explore this idea further, this chapter will outline some key habits of designers, as identified by scholars in design studies and designers in popular publications. Then, some useful definitions of habits will be outlined to gain a deeper understanding of what habits are and how they are formed.

Designers and Habits

Designers use methods and tools in their practice, but they also cultivate and rely on cognitive habits in order to be successful in their work. Pivotal findings in design studies and some popular publications have identified key habits and mindsets that are already known to be part of a designer's approach. These habits will be reviewed below, demonstrating that designers already use habits in

their practice. A review of these habits will also enable distinctions to be made between the habits of designers and specifically the habits of inclusive designers.

Analogous Thinking

Analogous and abductive thinking are considered a key part of a designer's process. Cross (1990) argues one of the "core features of design ability" is to "employ abductive/productive/appositional thinking" (p. 10). Raney and Jacoby also suggest that applying metaphors and unusual connections is a useful tool for designers to explore a solution space. They say that, "designers use art, metaphors, analogies and other elements to provoke inspiration around form, function, feel, and experience" (Raney & Jacoby, 2010, p. 36). For the purpose of this project, the regular use of analogous thinking could be considered a cognitive habit that designers employ in their design practice.

Non-verbal Expression

Another habit of designers is to sketch, draw and use methods of communication that do not rely on words. Cross (1990) argues that these methods are crucial both "to the generation of solutions and to the very processes of thinking about the problem" (p. 10). He goes on to say that, "design ability therefore relies fundamentally on non-verbal media of thought and communication" (Cross, 1990, p. 10).

Carlgren, Rauth, and Elmquist (2016) also report that designers they interviewed placed high importance on the skill of "visualization," which they define as the

method of “making ideas tangible by means of low-resolution representations or mock-ups of ideas or solutions” (p. 47). This demonstrates that successful designers cultivate a habit of modelling, sketching, drawing, and prototyping as a way of working through problems and presenting their ideas.

Iterative Approach

An iterative approach to problem definition and solution design is another common habit of designers. This habit is sometimes described as, “the co-evolution” of the problem and solution (Dorst & Cross, 2001, p. 13). Dorst and Cross (2001) suggest that this cyclical definition of problem and solution is a core characteristic of design process, stating that, “creative design seems more to be a matter of…constant iteration of analysis, synthesis and evaluation processes” (p. 11). An iterative approach to design work is, therefore, a cognitive habit designers develop in their practice.

Iteration enables designers to test their ideas rapidly, and learn about the problems they are trying to solve. Cross (1990) argues that the need to iterate “arises from the nature of design problems…[because] some of the relevant information can only be found by generating and testing solutions” (p. 8). Another benefit of an iterative approach is that designers can identify successful and unsuccessful elements of their designs quickly. Raney and Jacoby (2010) suggest that through iteration, designers “winnow small decisions down until they

arrive at the final object" (p. 36). An iterative approach is therefore a useful habit that designers cultivate in their practice.

Comfort with Ambiguity

Comfort with ambiguity is an important habit of designers. Cross (2004) argues that, "designers characteristically deal with ill-defined problems," noting this as an experience that is common to many designers (p. 428).

To solve these nebulous problems, "designers have to learn to have the self-confidence to define, redefine and change the problem" (Cross, 1982, p. 7). In fact, Carlgren et al. (2016) view a "comfort with complexity and ambiguity" as so crucial to the designer mindset that they include this in their framework outlining "characteristics of design thinking" (p. 50).

Design work is typically ambiguous and complex. As a result, designers are forced to develop a habit of being comfortable with ambiguity. This habit is a key part of any design practice.

Empathy

Empathizing with and understanding their users is a habit many designers strive to incorporate into their practice. Carlgren et al. (2016) found that "an inherent user focus" was considered an essential part of design thinking amongst participants interviewed from businesses with a design-thinking focus (p. 46).

While empathy was not always emphasized in design, it is, “core to newer design approaches such as user-centred” design practices (Carlgren et al., 2016, p. 51). Norman’s *Design of Everyday Things* (2002) highlights the importance of focusing on the needs of users, thus “ensuring that products do fit real needs” (p. 231). Brown (2008) also features “empathy” as the first characteristic in his “Design Thinker’s Personality Profile” (p. 87). These references come from sources beyond the traditional confines of design theory, but express a commonly-held industry view that designers must have a habit of empathizing with their users to be successful.

Defining Habits

Designers are already cultivating cognitive habits, such as analogous thinking, iteration and non-verbal expression, in their design practices. In order to understand how we might leverage this insight in the dissemination of inclusive design, we must first understand what habits are and how they form.

A habit is a specific type of behaviour that is automated and “cued by aspects of the performance context (i.e., environment, preceding actions)” (Neal, Wood, & Quinn, 2006, p. 198). This means that an individual performs a habit when they encounter a specific context or trigger, and that their performance of that behaviour is fairly automatic.

An individual forms a habit over time, as an association between a behaviour and a “performance context” is created (Wood & Neal, 2007, p. 843). While people

can form habits in response to intentional goals they might have, “once a habit is formed, perception of contexts triggers” the habitual behaviour automatically (Wood & Neal, 2007, 843). This means that habits can be hard to break. In fact, as Neal, Wood, and Quinn (2006) point out, “habits keep us doing what we have always done, despite our best intentions to act otherwise” (p. 202).

Habits are a useful type of behaviour because they do not require significant energy or attention to complete. This “cognitive economy and performance efficiency of habits” is the main reason habits are of interest in this project (Wood, Quinn, & Kashy, 2002, p. 1295). If designers can not only change their behaviours, but change their automatic behaviours or habits at work, the uptake of inclusive design could be very successful. Habitual behaviours related to inclusive design would also be much more difficult for designers to reverse or discard.

Covey Definition of Habits

Covey’s book “7 habits of highly successful people” was first published in 1989 and became a bestselling resource for personal change and wellbeing. The book is made up of 7 cognitive habits designed to “represent the internalization of correct principles upon which enduring happiness and success are based” (Covey, 1989, p. 10).

In his introduction, Covey (1989) defines a habit, “as the intersection of knowledge, skill, and desire” (p. 25). He asserts that a habit cannot be formed

without these three elements. This definition is very similar to the previously outlined models of behaviour change, the FBM and the COM-B Model. “Skill” is the ability of an individual has and “desire” is defined as “the motivation” (Covey, 1989, p. 25). “Knowledge” is the only slight difference, referring to an awareness of the behaviour, “the what to do and the why” (Covey, 1989, p. 25).

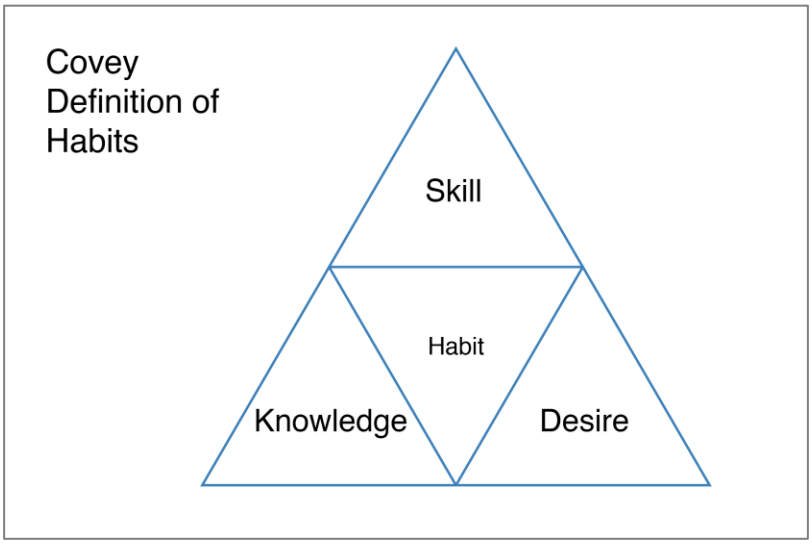

Figure 10: Covey’s Definition of Habits (Covey, 1989)[5]

The Covey definition of habits is relevant to this project because it supports the previously outlined models of behaviour, and because it comes from a popular source. While the formal definitions of habits from academic research are powerful and informative, the public perception of habits must also be considered

[5] This diagram is created as a representation of the definition from the original author. No diagram was presented by the original author in their paper.

in this project, since the target audience (designers) will be most familiar with the colloquial definitions of habits.

Another important contribution of the Covey definition is that it does not require a specific, tangible trigger element, but rather states that habits can be initiated by a new awareness or knowledge about oneself or others. This is different from the triggering elements for behaviour change outlined in the FBM and COM-B Model, and contributes additional depth to the understanding of behaviour change and the development of habitual behaviours.

Duhigg Definition of Habits

Duhigg's "The Power of Habit" is another popular book that revolves around the concept of habits and using habits to make change. This book explores how habits can be formed, personally and within organizations, to create success.

Duhigg's (2012) model of habits is called "the Habit Loop" and involves three elements (p. 19). The loop starts with a cue, which the author describes as "a trigger that tells your brain to go into automatic mode and which habit to use" (Duhigg, 2012, p. 19). This trigger initiates the second element, a behaviour, which the author calls "the routine" (Duhigg, 2012, p. 19). Duhigg (2012) notes that this behaviour can be, "physical or mental or emotional" (p. 19). Lastly, there is the reward.

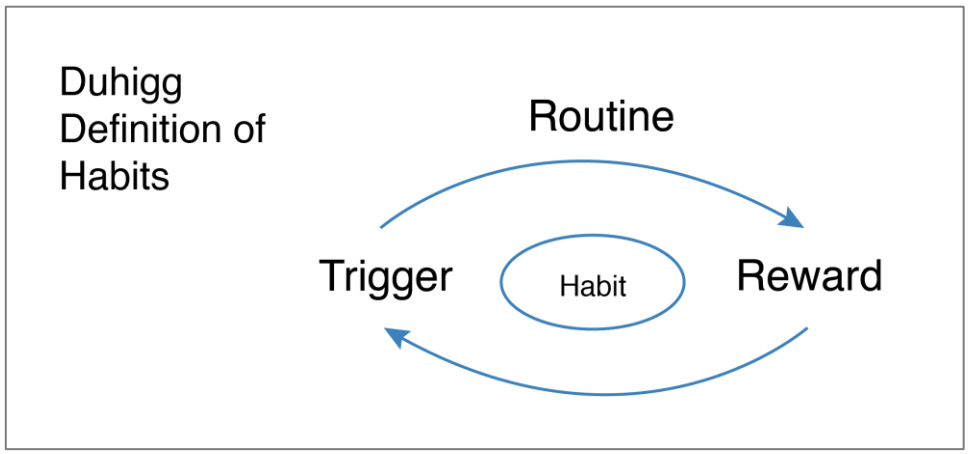

Figure 11: Duhigg's Habit Loop (Duhigg, 2012)[6]

Duhigg (2012) argues that the reward is a key part of the habit loop because it teaches the brain, "if this particular loop is worth remembering for the future" (p. 19). This reward mechanism is a key part of how the author articulates the habit formation process. He states that, as the habit loop is repeated, the behaviour becomes "more and more automatic," and the brain starts to anticipate the reward when the cue is present (Duhigg, 2009, p. 19). As a result, habitual behaviours form and are repeated.

The Duhigg Habit Loop is a strong model for understanding how to form new behaviours and convert them into habitual behaviours. However, it does not include mention of the underlying capabilities, such as skills or resources, that are required to support the development of new behaviours. For example, if a designer does not know how to apply inclusive design methods in their work, they

[6] This diagram is a reproduction of the original diagram created by the author and published in the original publication.

will not be able to develop inclusive design habits, even if they have an effective cue and motivation. For this reason, the Duhigg Habit Loop must be combined with the other definitions and models outlined previously, in order to have a more complete view of how habits are formed.

Benefits of Focusing on Designers' Cognitive Habits

There are several benefits of focusing on changing and creating new cognitive habits, as an approach to increase the uptake of inclusive design with design practitioners. First of all, designers already use cognitive habits in their practices. They are familiar with cultivating habits and using them to achieve more creative, efficient, and successful results.

Also, creating habits around inclusive design would ensure long-term, sustained change in the behaviour and practices of designers. Inclusive design habits would make these behaviours relatively automated and make it easier for designers to regularly use inclusive design theories and methods. Once these habits are formed, it would also be less likely that designers would revert to previous habits that were less inclusive.

Another benefit of focusing on cognitive habits is that individual designers have control over their own habits and how they use them in their practices. This means that, even if an employer or client is not in favour of incorporating inclusive design into a project, the designer can use their inclusive design cognitive habits to create a more inclusive project outcome. This is a particularly important point.

It is essential that interventions intended to increase the uptake of inclusive design offer at least some approaches and methods that designers are able to incorporate into their work without the approval of their peers, managers, and clients. Designers who are interested in inclusive design must be supported in ways that are relevant to their contexts and leverage their agency in the development of their own practice.

Lastly, cognitive habits that promote inclusive design are useful because the habits will be general enough that they can be adopted and applied across organizations, projects, methods, and design disciplines. Cognitive habits, like those that have been examined in this chapter, tend to be applicable and effective no matter the project or organizational constraints, such as budget, timeline, attitudes, subject matter or design discipline. Therefore, the cognitive habits that promote inclusive design practices and perspectives can be developed once, and then shared across design disciplines and organizations, making these interventions more efficient.

Summary

Designers already cultivate and employ cognitive habits in their practices, including habits such as non-verbal expression, iteration, comfort with ambiguity and empathy. This section has explored how designers use these habits, and how habits or habitual behaviours work. The psychology definition of habits, as

well as two specific definitions of habits–the Covey definition and the Duhigg Habit Loop–have been examined (pictured below).

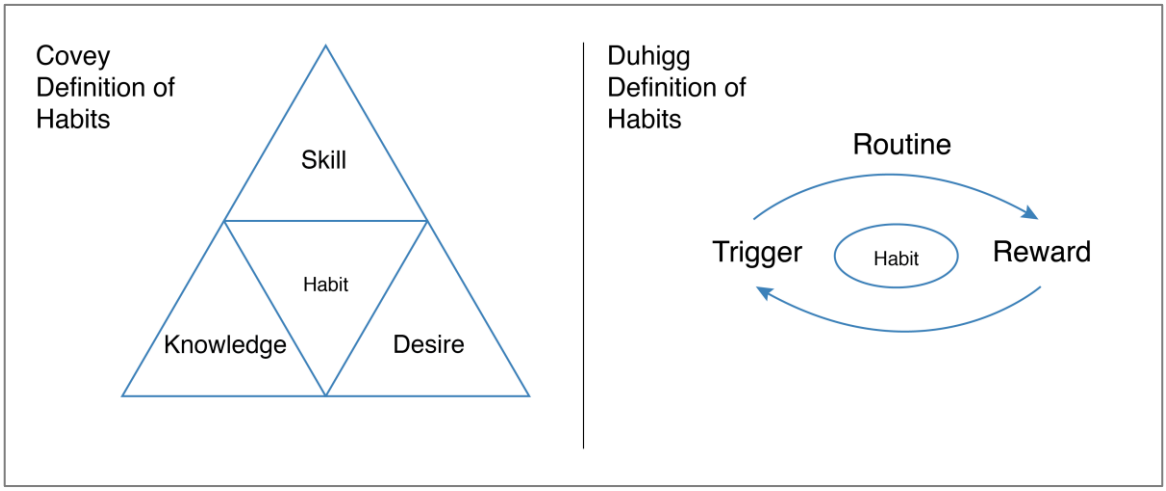

Figure 12: Covey and Duhigg Definitions of Habits

In addition, it has been proposed that interventions which focus on cultivating inclusive design habits in designers could be very successful, both because it is tailored to the ways designers already work and because changing habits will bring about long-term, sustained change in behaviour.

In the next section, a new model of behaviour change that incorporates habits will be outlined and explored. This model forms the core of the design strategy proposed for increasing the uptake of inclusive design with individual designers.

Section 7: The Designer's Behaviour Change Model

Increasing the uptake of inclusive design amongst designers is primarily a problem of behaviour change. Designers are used to working and thinking in certain ways, and are often constrained by elements of their working environment, such as managerial and client attitudes, limited timelines and prescribed workflows or procedures. They also may not be aware of the barriers they inadvertently create for people using their designs, or the need to design more inclusively.

Analysis of the current initiatives and research in this area revealed a need for a guiding strategy for designing interventions that are targeted specifically to designers and their specific working contexts. It also highlighted a lack of interventions that are focused on creating long-term, sustained change in the behaviour of individual designers who are already established in their careers. In this section, a new model of behaviour change will be proposed that directly responds to these opportunities.

Introducing the Designer's Behaviour Change Model

The Designer's Behaviour Change Model (DBC Model) describes the essential elements required to create behaviour change in designers, and the relationships between these essential elements. It synthesizes the relevant commonalities between several models of behaviour change and models of habitual behaviour. The addition of habitual behaviour takes advantage of the ways in which

designers already cultivate and rely on cognitive habits in their practices, and also addresses the need in this context for long-term, sustained behaviour change.

The DBC Model is intended to be a tool that can be used to design an intervention to increase the uptake of inclusive design with practicing designers. The model offers an overarching strategy that is versatile enough to apply in many different contexts, and with a wide variety of intervention forms and content. The intention is that this model will make it easier and more efficient for people to design successful interventions to increase the uptake of inclusive design.

This section will introduce the DBC Model by first showing the evolution from current models of behaviour change and habits to the new model, and then by discussing the utility of the model and presenting the design principles that can support the use of this model.

Current Models of Behaviour Change & Habits

The current models of behaviour change and habits that informed the DBC Model are: the Fogg Behaviour Model, the COM-B Model, the Change Equation, Covey's definition of "habits," and Duhigg's Habit Loop. Examining these models and definitions, we can see that each model outlines four key elements. Three of these elements are the factors that are required to establish a new behaviour, and the fourth element represents the new or desired behaviour, or, in the case

of the Change Equation, the change in behaviour which results when resistance to change is overcome.

Abstracted Models of Behaviour Change & Habits

Not only do the models of behaviour change and definitions of habits have the same number of elements, there is also strong alignment around what these elements are. The following diagrams (below) demonstrate this alignment by showing an abstracted version of each of the models and definitions.

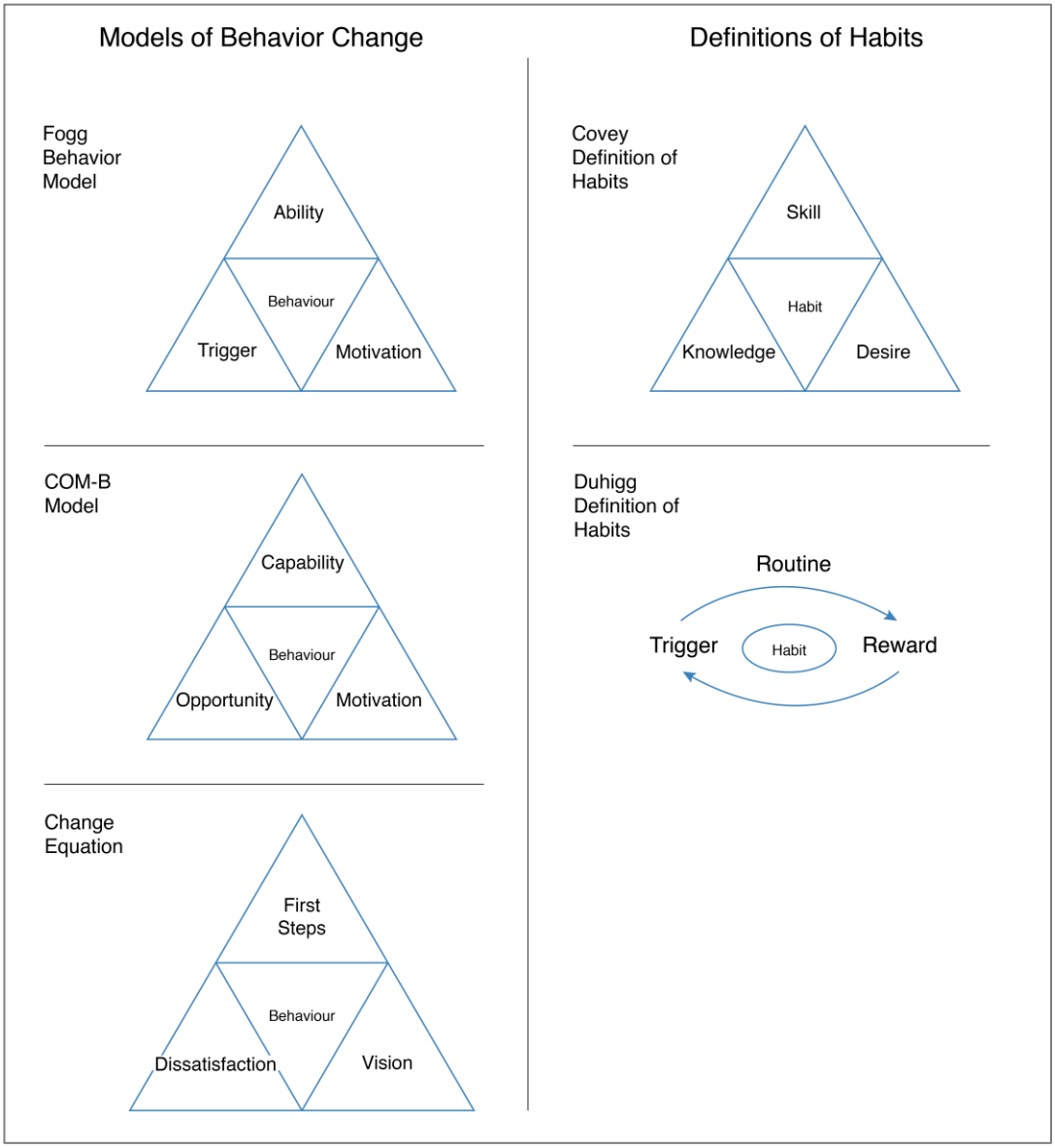

Figure 13: Abstracted Behaviour Models and Habit Definitions

In these diagrams, the models and definitions are abstracted slightly and rearranged in a consistent graphical representation (except for Duhigg's Habit Loop, which will be discussed later). Each element that is required to create a change of behaviour or a habit is placed at one of the three corners of the triangle

for each model. The desired behaviour or habit is placed in the middle of the visual representations.

This abstraction and visual modelling reveals a pattern across the models of the three essential elements required for behaviour change. The bottom left corner of the triangle in each of the models represents the cue or trigger that creates the opportunity for the change in behaviour to occur. The top corner in each model is related to the individual's ability to make the desired change–representing whether the designer has the skills and resources to accomplish the new behaviour. The bottom right corner in each model represents the motivation or desire an individual must have to create the change. Another way to map the similarities across the models and definitions is by matching the terms from different models used to describe the same element (see table below).

	Fogg Behaviour Model (FBM)	**COM-B Model**	**Change Equation**	**Covey Definition of Habits**	**Duhigg Definition of Habits**
Element 1	Trigger	Opportunity	Dissatisfaction	Knowledge	Trigger
Element 2	Ability	Capability	First Steps	Skill	Routine
Element 3	Motivation	Motivation	Vision	Desire	Reward
Element 4	Target Behaviour	Behaviour	Change in Behaviour	Habit	Habit

Table 4: Comparison Chart of Author Terms Across Models and Definitions

The apparent outlier in this set is the Change Equation, but with some examination, even the elements of this model align with the others. The “first steps” element is very similar to the “ability” or “capability” element, in that it represents the practical know-how and skills required to create a change. “Dissatisfaction” fits as the “trigger” element in the Change Equation model, since this is the element within the model most related to an external push to create change (although the “trigger” in the other models is more broadly defined and could encompass a larger range of forces, including positive forces, that instigate change). “Vision” aligns well with the “motivation” element in other models, since it represents the positive force that inspires individuals to change their behaviour.

The last element of the Change Equation is “resistance to change,” which must be outweighed for a change in behaviour to occur. This element will be incorporated into the new model of behaviour change in two ways. First, this element can be represented as “change in behaviour,” which is the positive outcome when the individual’s resistance to change is overcome (“behaviour” or “habit” in other models. Thus, this element is aligned with the fourth element of the other models. Secondly, resistance to change will inform the “barriers” part of the model, which will be further explored after the model is introduced.

New Model of Behaviour Change for Designers

When all the models for behaviour change and definitions of “habits” are depicted in a similar graphical format, it becomes easy to identify the parallel concepts

between them. Since these models and definitions align so well, the strong elements of each can also be synthesized into a single model as depicted in the figure below.

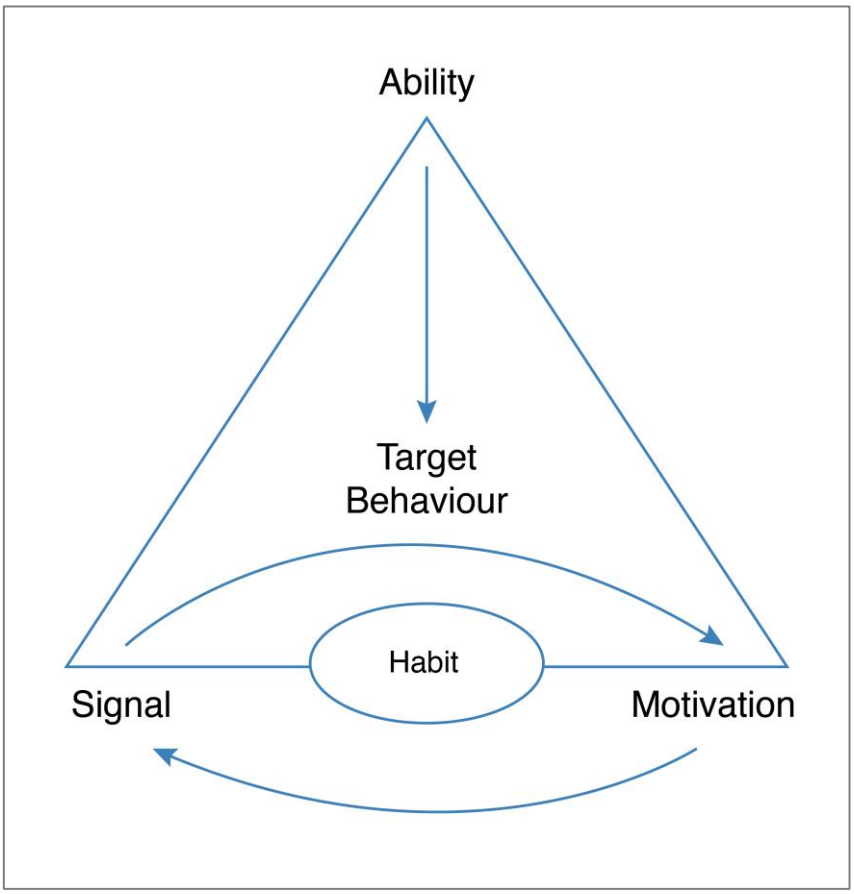

Figure 14: The Designer's Behaviour Change Model[7]

The Designer's Behaviour Change Model shows the three elements that are required to create a change in behaviour: signal, ability, and motivation. It also shows the relationships between these elements, as well as the process through

[7] The Designer's Behaviour Change Model (DBC Model) was developed by Kyrie Vala-Webb, 2017.

which a habitual behaviour is formed. First, a signal pushes the individual, in this case a designer, to enact a new behaviour, in this case an inclusive design practice. A change in behaviour also requires the individual to have motivation, which will pull the individual towards the new behaviour. The final element that is required to create behaviour change is the ability to make the change. In this model, the individual draws on their skills and abilities in order to make the behaviour change.

This model also incorporates a habit-creation loop based on the Duhigg definition of habits. At the bottom of the triangle, the model shows that the signal, behaviour and motivation can form a loop when repeated, which leads to the formation of a habit. The motivation, in this case, draws individuals to make a change in their behaviour, but also acts as the “reward” that Duhigg outlines in his definition of habits. A change in behaviour that results in a positive outcome can create further motivation to sustain this change in behaviour. As this sequence is repeated, the new behaviour develops into a habit.

In order to clarify the Designer’s Behaviour Change Model, each element will be presented and defined in more detail.

Target Actor

The model is specifically focused on an individual as the main actor, creating behaviour change for themselves. The individual must be a designer, but could be from any type of design field or discipline.

Target Behaviour

The desired or target behaviour in this model is the implementation of an inclusive design practice, activity or principle.

Signal

The signal in this model is the factor that triggers the designer to implement the behaviour change. A signal is defined as the Merriam-Webster dictionary as, “something that incites to action,” which makes it a useful label to cover the varied possibilities for a triggering element that are possible within the DBC Model.

A signal could be an environmental cue, such as those that trigger a habitual action, like a poster, a time of day, a step in the workflow process (as in the psychology definition of habitual behaviour and the FBM). In the DBC Model, a signal could also be more general, such as an individual gaining an awareness of a particular issue, method or problem related to inclusive design (as in the Covey definition of habits). Lastly, a signal could also be a growing dissatisfaction with the status quo (as in the Change Equation model) or recognition of a change in the expectations of the designer’s field or clients, for example. The signal is an experience or thought process that triggers the designer to take up an inclusive design idea or method.

Ability

Ability refers to the skills and resources required by the individual to implement the behaviour change. The ability of a designer to actually take up inclusive

design is required for the change to occur. This element includes theoretical knowledge or framing, as well as the practical and tactical skills necessary. "Ability" also includes the environmental factors that would enable the designer to implement their new behaviour, which could include managerial and client buy-in, the right budget and timeline, or the cultural acceptance of inclusive design practices by colleagues.

Motivation

Motivation is the personal drive that encourages an individual to make a change in their behaviour. It can refer to personal values and other forms of intrinsic motivation, or external forms of motivation, such as increased business or a better business reputation. Motivation is the element that will attract designers to implement inclusive design in their daily work. It also will act as the reward for designers–when they feel as if they have been successful based on whatever metric is important to them, designers will be more motivated to continue using inclusive design methods and practices.

Habit

Habitual behaviours are automated and create long-term, sustained change in behaviour, which is especially important when attempting to create an evolution of design practice towards more inclusive methods. For this reason, the habit creation loop is included in this model. Habits are created when an individual associates a signal or cue with a particular behaviour and reward. This reward becomes a motivating factor for future enactments of the habitual behaviour.

The Habit Loop from Duhigg is integrated in this model to demonstrate that behaviour change can lead to a sustained, even permanent, change in behaviour. While this need not be the goal for every intervention related to the uptake of inclusive design, it should become a focus for more interventions, particularly since cognitive habits are so commonly used among designers already.

How to Use This Model

This model is intended to be a tool that inclusive designers and researchers can use to develop initiatives and programs intended to increase the uptake of inclusive design with designers. The model provides a framework for the design of these interventions, highlighting the elements that must be included for the intervention to successfully create behaviour change. The model is also supported by a set of design principles for each element, which map back to previous research conducted in this problem area.

Identify the Context

The first step in using the Designer's Behaviour Change Model is to identify the context that is being designed for. For example, if the context is specific to one organization or workplace, specific constraints and opportunities will need to be considered. Physical environment, business model, workflows and team dynamics are examples of features within an organization's context that might change the way the target audience will perceive the intervention or inclusive

design methods. These unique characteristics should be evaluated prior to designing any intervention aimed at sharing inclusive design within this particular context.

Identify the Barriers Causing Resistance to Change

In addition to understanding the specific context of the intervention, it is also important to understand what barriers are causing resistance to change for the specific audience. The awareness of resistance to change stems directly from the Change Equation model of behaviour change.

Identifying the barriers that exist in a particular context, and being intentional about selecting specific barriers to address, will support the design of successful interventions aimed at increasing the uptake of inclusive design. Intentionally designing to address these barriers will create an intervention that actively breaks down resistance to change, which must be overcome to create behaviour change.

The barriers to inclusive design that have been identified by previous research on this topic are a useful place to start this process. In Chapter 4, these barriers were reviewed and grouped into three categories: a lack of awareness, a lack of resources and skills, and a lack of motivation. In fact, these categories of barriers map closely to the three main elements of the Designer's Behaviour Change Model–signal, ability, and motivation. These barriers are shown in relation to the model in the figure below.

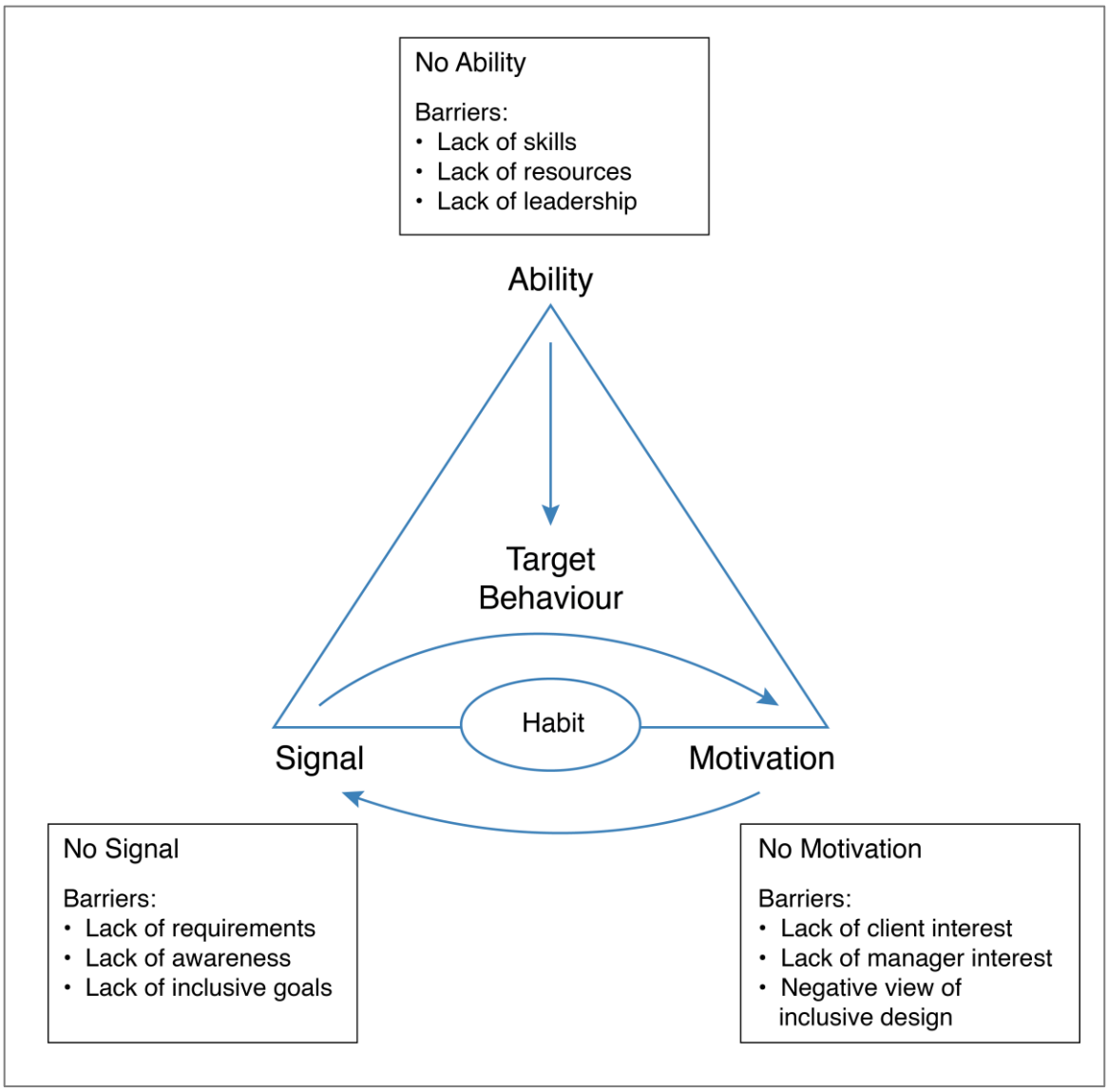

Figure 15: The Designer's Behaviour Change Model with Barriers

The "lack of awareness" barriers occur when designers are unaware of the need for inclusive design, inclusive goals, or metrics for projects that would support the implementation of inclusive design approaches. These barriers occur when there is no signal to make designers aware and remind them of the need to apply

inclusive design during their work. There is no thought process, experience or environmental cue to push designers to take up inclusive design.

The “lack of resources and skills” barriers create a situation in which designers are unable to take up inclusive design because they do not have the know-how or resources to do so. This directly relates to the “ability” element in the Designer’s Behaviour Change Model.

Lastly, the “lack of motivation” barriers include a lack of client, managerial or individual motivation for using inclusive design, as well as any negative views of inclusive design that discourage its uptake. These barriers map directly to the “motivation” element in the Designer’s Behaviour Change Model. When motivation is missing, a designer will not be attracted to the behaviour change, and will not take up inclusive design.

Understanding the barriers that exist in the particular context being targeted, as well as additional characteristics of that context, is an essential first step in designing an effective intervention for increasing the uptake of inclusive design. It may be that there are many barriers that exist in a population or group. Not every barrier must be addressed by one intervention. However, the barriers that will be targeted in the design should be well considered and identified before the intervention is designed. This will ensure that interventions are actively working to overcome the resistance to change that is identified in the Change Equation model of behaviour change.

Design Principles for Model Elements

The next step in designing an intervention is to design for the elements of the Designer's Behaviour Change Model. All of these elements should be considered and included in the design process for the inclusive design intervention. The elements of the model are also accompanied by design principles aimed at ensuring success of the overall intervention.

Signal

The signal is the element that triggers the designer to take up inclusive design. A particularly successful signal will be linked to a specific time, event, or environment so that designers are reminded to perform an action or thought process related to what they are doing. This comes from the definitions of habits from psychology literature, the FBM, and Duhigg. The concept of a signal can, where useful, be extended somewhat to include a designed element that creates awareness of inclusive design and the need for it in the individual designer.

The signal in a designed intervention should be:

- **Perceivable –** The signal should be something that the designer will notice and perceive, particularly something that grabs the attention and interest of the designer.
- **Contextual –** The signal should be something that exists in context with the designer and their practice. This could be related to the physical or

digital environment in which the designer usually works, or tied to a particular type of event, action or process.

Examples of signal could be:

- A poster about inclusive design on the designer's studio wall (visually-perceptible, in the designer's work environment)
- An interview about inclusive design on a podcast the designer already listens to (auditory perception, contextual to the designer's typical professional development activities)
- An inclusive design process that is integrated into the formal process of a project kick-off meeting (tied to a common event or action, contextual to the designer's typical process)

Ability

Designers must have the right knowledge and skills to enable them to incorporate inclusive design into their practice.

The "ability" element must support designers through providing knowledge and skills. Design principles related to this element are:

- **Plain language** – Designers must be able to understand the language used in the intervention. Jargon should be avoided and terms that are potentially unfamiliar or are necessary to understand should be explained in plain language before use in context.

- **Actionable tactics** – The intervention should provide actionable tactics for incorporating inclusive design into their practice, or changing their practice to be more inclusive. Designers must clearly see how they can implement inclusive design theories and methods, otherwise they will not be able to make the desired change.
- **Relevant** – The inclusive design strategies or skills offered by the intervention must work within the specific working context. If designers feel the content or approach is not relevant to their challenges, needs, and business models, they will not take up inclusive design.

Motivation

Motivation provides the positive attraction and anticipated reward for using inclusive design theories and methods. As mentioned in Section 4, motivation is perhaps the most complex element, since it varies so widely between individuals and across organizations. Luckily, Cassim and Dong have reported that designers respond positively when inclusive design is framed in terms of creative potential and challenge, as opposed to being restrictive to creative solutions (Cassim, 2007, p. 38; Cassim and Dong, 2013, p. 1).

The “motivation” element must inspire designers to want to transform their practice into an inclusive one. Design principles related to this element are:

- **Focus on Creativity** – Inclusive design must be shown to have creative potential. This can be done by demonstrating that creativity is increased

through the use of inclusive design methods. It can also be achieved by equating inclusive design requirements to the constraints of design problems that create the challenging, exciting problems designers love to solve.

- **Appeal to Value Systems** – Motivation can also be created by appealing to the different values systems individuals have. For example, individuals can be passionate about inclusive design for many different reasons, including personal ethics, value of community, pride in the quality of one's work, interest in innovation, or a desire for fairness and justice. These different value systems should be considered in the design of the intervention.

Target Behaviour

Thought should be given to the target behaviour that the intervention is designed to elicit. The target behaviour will shape the content and form of the intervention, as it is designed. Target behaviours could be the application of inclusive design methods, activities or tools.

Habit

Habits are difficult to form and can be more difficult to break. As a result, not all interventions will be designed to help designers cultivate inclusive design habits. However, habits are a powerful tool for behaviour change, particularly since designers are already using cognitive habits in their practices. As a result, it should be considered in the process of designing interventions whether a habit

can be formed for designers around a particular inclusive design theory or method. It is also the author's belief that more interventions should be designed with this goal in mind, since there is a lack of current inclusive design initiatives that focus on creating long-term, sustained change in behaviour.

Summary

The Designer's Behaviour Change Model is a tool to support the design of interventions aimed at increasing the uptake of inclusive design with designers. Research on the uptake of inclusive design, behaviour change, habits and design studies have been incorporated into the DBC Model. Methods for using this model to design interventions have also been explored, including design principles that correspond to each element of the model.

Section 8: Conclusion

The research question for this paper was, “how can we increase the uptake of inclusive design by designers?” In pursuit of this question, three research goals were developed. First, current initiatives to increase the uptake of inclusive design, and research on the efficacy of different dissemination strategies and barriers were examined. These were analyzed to identify opportunities and needs in this problem space. The analysis and resulting opportunities (Sections 3 and 4) formed a foundation for the next step, which was to identify research from psychology and design studies that could be leveraged in order to improve our approaches to disseminating inclusive design. Relevant research on behaviour change, habits, and habits of designers was reviewed (Sections 5 and 6). Finally, through modelling and analysis, a new model of behaviour change was developed (Section 7).

The Designer’s Behaviour Change Model brings together key insights on behaviour change, cognitive habits and the habits designers use in their practices. The model is intended to be a tool for designing effective interventions to increase the uptake of inclusive design by designers. The model outlines the three required elements that must be present in order to drive behaviour change. It also outlines design principles that address the needs of the target audience, and the barriers designers may face that cause resistance to change.

In response to the research question of this project, the author argues that we can increase the uptake of inclusive design by creating design strategies, focusing on individual designers, understanding how to design for them specifically, as well as designing for long-term, sustained change in behaviour. The Designer's Behaviour Change Model addresses all of these needs. It provides a design strategy, focuses on habits as a key part of the designer's practice, and leverages research on behaviour change and habits in order to target long-term change.

It is also useful to return to the objective of the main methodology used, meta-synthesis. Validity in meta-synthesis can take several forms, but Bondas and Hall outline some specific questions that evaluate validity in this method. They argue that, "criteria of validity include questions such as Does the report clarify and resolve rather than observe inconsistencies or tensions between material synthesized? Does a progressive problem shift result?" (Bondas & Hall, 2007, p. 119). The contributions of this paper, in conducting an overall analysis of work in this problem space, identifying key opportunity areas and synthesizing relevant research from psychology and design studies into a useful tool–the Designer's Behaviour Change Model–constitute both a resolution of tensions in literature around this problem and a "progressive problem shift."

Next steps

There are three major next steps for this research, focused on the refinement and implementation of the Designer's Behaviour Change Model.

Strengthening the DBC Model

The DBC Model is a new model. It was developed through a meta-synthesis method that was rigorous, but not exhaustive. It would be valuable to conduct further review of literature in psychology, design studies and other fields, in order to assess if additional concepts or theories could be incorporated into the DBC Model or be used to strength it. It would also strengthen the model to have other researchers review and critique the model, in order to identify opportunities to strengthen it.

Another approach to strengthening the DBC Model would be to examine how the model might work for other target audiences. Currently, the DBC Model focuses on individual designers. It would be interesting to explore whether the model should be different based on the target designer's work context. For example, does it matter if the designer is working at a consultancy or on an internal design team at a company? Also, examining how the model might work at an organizational level could potentially extend the usefulness of the DBC Model. If the model could be adapted to operate both at the individual and organizational level, it could become an even more powerful tool.

Testing the DBC Model

The DBC Model needs to undergo testing, by applying the model, reflecting on it, incorporating other relevant research, and simplifying it where possible. There are two primary lines of inquiry when testing the DBC Model. First, the DBC Model must be tested with those who are using it to design interventions. This will establish the usability and usefulness of the model. An example of a research question in this area might be: “how effective is the DBC Model at providing a useful framework for design rationale and decision-making when designing an intervention for increasing the uptake of inclusive design with designers?”

The DBC Model should also be tested in regards to the results it produces. Thus, the efficacy of the interventions designed using the DBC Model should be tested and the results used not only to refine and improve the interventions, but also the DBC Model, itself. For example, does this model support the creation of interventions that are successful at creating uptake of inclusive design with designers? Are there factors that are missing in the DBC Model, that are necessary to consider in the design of interventions for this purpose? In order for the DBC Model to be effective, these questions must be explored.

Lastly, additional exploration and research on the “signal” element of the DBC Model would be highly beneficial. The “signal” element was articulated in different ways throughout the research on behaviour change and habits. More needs to be understood about how to effectively trigger behaviours and what signals are most

useful in the development of habits, especially for designers in their working contexts. For example, do signals have to be highly specific and concrete, or is it sufficient for signals to cause a heightened awareness of particular issues or methods? Also, are there different types of signals that are more effective for specific types of behaviour changes or contexts? Resolving these questions would contribute to a more complete understanding of the DBC Model, as well as effective designs for interventions that increase the uptake of inclusive design.

Using the DBC Model

Perhaps the most important next step is to use the DBC Model to create change in the culture and practices of design. The DBC Model is a tool that is intended to guide the process of design and implementation for interventions aimed at disseminating inclusive design. This will make it easier for inclusive design ambassadors to consider the elements and context necessary for an effective intervention. It will also challenge these ambassadors to design and possibly build empathy for their intended audience and the constraints they face when attempting to incorporate inclusive design methods into their work.

The DBC Model is not prescriptive about the content, form or target for the interventions, as long as the intended audience cultivates some form of design practice. Thus, it could be used to design any number of programs, methods, or even physical interventions.

An example of a potential intervention could be a series of posters and postcards related to inclusive methods that could be designed and distributed to workplaces that employ designers. The physical form and visual design of the posters and postcards serve as the “signal” element of the DBC Model, making designers aware of the need for inclusive design. Postcards could be used by individual designers in their personal workspace, while posters could be placed in collaborative work spaces. This would ensure that the signal is both perceivable by designers and also contextual to where they are conducting their work.

The poster content would be designed to educate designers about how to implement inclusive design methods, and the benefits of using these methods. As a result, the content would act as the “ability” and “motivation” elements of the DBC Model. Lastly, as the designers become accustomed to using the inclusive design methods, discover the benefits of these methods through their own experience, and are reminded of this by the persistence of the posters and postcards in their physical space, a habit around inclusive design could form.

While this example is a fairly simple intervention, it illustrates the framework provided by the DBC Model for developing a holistic approach to disseminating inclusive design. It also demonstrates how easy it can be to develop an intervention, based on the DBC Model, and work towards behaviour change with designers. It is the hope of this author that the DBC Model will facilitate the faster and more effective development of interventions aimed at disseminating inclusive

design, and accelerate the behaviour and culture change in design fields towards more inclusive methods. Ideally, this project can empower inclusive designers, researchers, and scholars to design a plethora of interventions that will inspire designers to incorporate inclusive design approaches and methods into their practice.

Bibliography

Barnett-Page, E., & Thomas, J. (2009). Methods for the synthesis of qualitative research: A critical review. *BMC Medical Research Methodology, 9*(59). doi:10.1186/1471-2288-9-59

Bondas, T., & Hall, E. O. C. (2007). Challenges in approaching metasynthesis research. *Qualitative Health Research, 17*(1), 113-121. doi:10.1177/1049732306295879

Brown, T. (2008) Design thinking. *Harvard Business Review, 86*, 84–92.

Brundtland, G. H., & World Commission on Environment and Development (1987) *Our common future: Report of the World Commission On Environment and Development*. Oxford, England, UK: Oxford University Press. Retrieved from http://www.un-documents.net/our-common-future.pdf

Cady, S. H., Jacobs, R., Koller, R., & Spalding, J. (2014). The change equation: Myth, legend, or lore? *OD Practitioner, 46*(3), 32-89.

Canadian Green Building Council (2016). About LEED Retrieved from http://www.cagbc.org/CAGBC/LEED/CAGBC/Programs/LEED/_LEED.aspx?hkey=54c44792-442b-450a-a286-4aa710bf5c64

Carlgren, L., Rauth, I., and Elmquist, M. (2016). Framing design thinking: The concept in idea and enactment. *Creativity and Innovation Management, 25*, 38–57. doi: 10.1111/caim.12153.

Cassim, J. (2007). “It’s not what you do, it’s the way that you do it”: The Challenge Workshop - A designer-centred inclusive design knowledge transfer mechanism for different contexts. Paper presented at: Universal Access in Human Computer Interaction, Beijing, China, 22-27 July 2007.

Cassim, J., & Dong, H. (2013). Interdisciplinary engagement with inclusive design: The Challenge Workshops model. *Applied Ergonomics*, http://dx.doi.org/10.1016/j.apergo.2013.03.005

Clarkson, J., Coleman, R., & Dong, H. (2012). *Design for Inclusivity*. Abingdon, GB: Gower.

Covey, S. (1989). *The 7 habits of highly effective people*. New York, NY: Free Press.

Cross, N. (1982). Designerly ways of knowing. *Design Studies, 3*(4) pp. 221–227.

Cross, N. (2004). Expertise in design: an overview. *Design Studies, 25*(5) pp. 427–441.

Cross, N. (1990). The nature and nurture of design ability. *Design Studies, 11*(3) pp. 127–140.

Dong, H. (2004). Barriers to inclusive design in the UK. Proceedings from: Conference on Human Factors in Computing Systems: Doctoral Consortium, 1035-1036. Vienna, Austria.

Dong, H. (2011). Strategies for teaching inclusive design. *Journal of Engineering Design, 21*(2-3), 237–251.

Dong, H., & Clarkson, J. (2007). Barriers and drivers for inclusive design: Designers' perspective. Proceedings from: Include 2007 Conference, Royal College of Art, London, UK, 1-4 April 2007.

Dong, H., & Clarkson, J. (2005). Combating barriers to inclusive design: Evaluation of an inclusive design toolkit. Paper presented at: International Conference on Engineering Design ICED 05. Melbourne, Australia, August 15-18, 2005.

Dong, H., Keates, S., & Clarkson, J. (2003). Inclusive design in industry – motivations and barriers. *ACM SIGCAPH Newsletter, 75*, 9-10.

Dorst, K., & Cross, N. (2001). Creativity in the design process: Co-evolution of problem–solution. *Design Studies, 22*(5), 425–437.

Duhigg, C. (2012). *The power of habit.* New York, NY: Random House.

Fogg, B. (2009). A behavior model for persuasive design. Proceedings from: 4th International Conference on Persuasive Technology (Persuasive '09). ACM, New York, NY, USA, Article 40. http://dx.doi.org/10.1145/1541948.1541999

Goodman, J., Dong, H., Langdon, P., & Clarkson, P. J. (2006). Increasing the uptake of inclusive design in industry. *Gerontechnology Journal, 5*(3), 140-149.

Helen Hamlyn Centre for Design (n.d.). About. Retrieved from https://www.rca.ac.uk/research-innovation/helen-hamlyn-centre/about/

IDEO.org (n.d.). What is human-centered design? Retrieved from http://www.designkit.org/human-centered-design

Inclusive design at Microsoft. (2017). Retrieved from https://www.microsoft.com/en-us/design/inclusive

Inclusive Design Research Centre (n.d.) *The Inclusive Design Guide.* Retrieved from https://guide.inclusivedesign.ca/index.html

Inclusive Design Research Centre (n.d.). What is inclusive design? Retrieved from http://idrc.ocadu.ca/about-the-idrc/49-resources/online-resources/articles-and-papers/443-whatisinclusivedesign

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science, 6*(42). http://doi.org/10.1186/1748-5908-6-42

Microsoft Design (2016). *Inclusive design toolkit manual*. Retrieved from https://www.microsoft.com/en-us/design/inclusive

Morelli, J. (2011) Environmental sustainability: A definition for environmental professionals. *Journal of Environmental Sustainability* 1(1), 1-9. DOI: 10.14448/jes.01.0002

Neal, D. T., Wood, W., & Quinn, J. M. (2006) Habits—a repeat performance. *Current Directions in Psychological 15*(4), 198-202.

Norman, D. (2013). *The design of everyday things: Revised and expanded*. New York, NY: Basic Books.

Olson, E. M., Cooper, R., & Slater, S. F. (1998) Design strategy and competitive advantage. *Business Horizons 41*(2), 55-61.

Raney, C., & Jacoby, R. (2010). Decisions by design: Stop deciding, start designing. *Rotman Magazine,* Winter Issue, 35-39.

Sandelowski, M., Docherty, S., & Emden, C. (1997). Qualitative metasynthesis: Issues and techniques. *Research in Nursing & Health, 20*, 365–371.

Schreiber, R., Crooks, D., & Stern, P. N. (1997). Qualitative meta-analysis. In J. M. Morse (Ed.), *Completing a qualitative project: Details and dialogue* (311-326). Thousand Oaks, CA: Sage.

Signal [Def. 2b]. (n.d.). Merriam-Webster Online. In Merriam-Webster. Retrieved from https://www.merriam-webster.com/dictionary/signal

University of Cambridge (2017). Inclusive design toolkit. Retrieved from http://www.inclusivedesigntoolkit.com/

Vossoughi, S. (2007). The best strategy is the right strategy. *Design Management Review 18(*4), 73-80.

Wood, W., & Neal, D. T. (2007). A new look at habits and the habit–goal interface. *Psychological Review, 114(*4), 843–863.

Wood, W., Quinn, J. M., & Kashy, D. A. (2002) Habits in everyday life: Thought, emotion, and action. *Journal of Personality and Social Psychology 83*(6), 1281 – 1297. DOI: 10.1037//0022-3514.83.6.1281

Zhang, T. & Dong, H. (2009) Human-centred design: an emergent conceptual model. Proceedings from: Include 2009 Conference, Royal College of Art, London, UK, 8-10 April, 2009, Available from http://www.hhc.rca.ac.uk/2084/all/1/proceedings.aspx