

# The Evolution of Inclusive Design; A First Timeline Review of Narratives and Milestones of Design for Disability

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**Abstract:** This paper sets out to - for the first time - critically review the history of Inclusive Design on two distinct levels, i.e. the narratives that shape it and the historical milestones which contribute to its evolution. Through an illustrative review of literature and object ethnography, two sets of timelines are outlined. First, a milestone timeline helps establish the chronological evolution of Inclusive Design based on historical milestones and sociocultural perspectives. Second, a narrative timeline helps uncover the underlying narratives around matters of disability, design and inclusivity, and how they evolved. This first timeline review of narratives and milestones; a) identifies historical and emerging shifts in direction and mentality; b) offers granular as well as holistic views; and c) poses major questions onto Inclusive Design as a field in need of more critically reflective approaches - both conceptually and in practice.

**Keywords:** Inclusive Design history; ‘*objects of disability*’; disability narratives; milestone timeline

## 1. Introduction

### *1.1 Looking back to go forward: The landscape of historically reflective work on Inclusive Design and Objects of Disability*

*“Study the past if you would define the future”* - Confucius

History is a commonly understood resource that helps contextualise and comprehend past behaviours and mentalities as well as the evolution of present-day concepts. Furthermore, it offers a longitudinal glance and a critical oversight at patterns and narratives and how they have progressed or regressed - allowing us to engage, speculate and reimagine the future. It is therefore an imperative to examine the historical evolution of a field, in order to better understand and contextualise it, and more effectively contribute to realising its potential.

Inclusive design is a field in need of such a review as there are currently very little critically reflective accounts of its origin, evolution and history. An illustrative review of literature has revealed that in fact there appears to be only one academic paper dedicated to the History of Inclusive Design within the UK (Coleman, 2013) and other accounts look only at the evolution of a specific field such as inclusive paediatric mobility design (O'Sullivan and Nickpour, 2020), specific design object (Pullin, 2007) or focus on contemporary history only. The lack of diversity in perspectives, critical reflections, and reviews of the field as a whole, highlights an urgent necessity for a critically reflective review of the history and evolution of Inclusive Design as a field - both conceptually and in practice.

In '*History of Inclusive Design in the UK*' (2013), Coleman outlines the milestones of Inclusive Design from the perspective of the Royal College of Art, the birthplace of the term '*Inclusive Design*'. Starting with the coining of the term in 1994, this account focuses almost exclusively on contributions from the College. Dong (2020) also engages with the contemporary history of Inclusive Design through suggesting four high level stages starting in the 1990s and spanning across three decades. These include *Products*; *Interface & Interactions*; *Experience & Service*; and *Systems*.

Whilst not exactly intended to be historical work specifically, *Design Meets Disability* (Pullin, 2007), *Building Access* (Hamraie, 2017), *Accessible America* (Williamson, 2019), *Designing Disability: Symbols, Space and Society* (Guffey, 2017) and *Inclusive Design: Design for the Whole Population* (Clarkson et al., 2003) all offer valuable historical insights into dynamics of disability and design throughout time. However, these historical reflections are mostly specific and not within the context of an overall historical timeline.

Similarly, '*Design Histories: Disability Made Modern*' (Guffey and Williamson, 2020) provides a critical and detailed account of disabled individuals' perspective in a history of "*Objects of disability*". Interestingly, whilst not focused on Inclusive Design specifically, it helps outline some less visible perspectives relevant to the history and evolution of Inclusive Design.

Whilst these references help shed light on parts of the wider picture of the evolution of Inclusive Design, there does not seem to be an account that encompasses all criteria i.e. being a critically reflective historical account of the evolution of Inclusive Design/design for inclusion; being representative of voices from within as well as outside the field; incorporating lived experience accounts and contributions; capturing the underlying societal or disciplinary narratives as well as specific historical milestones; and accounting for the socio-technological and cultural contexts and attitudes towards disability. This paper is a first attempt at addressing what is currently missing in terms of a critical historical review of Inclusive Design.

### **1.3 Alluding to neighbouring concepts; A comparison of contexts**

Design Council (2008) defines Inclusive Design as “*neither a new genre of design, nor a separate specialism.*” But “*a general approach to designing in which designers ensure that their products and services address the needs of the widest possible audience, irrespective of age or ability.*”

Alongside Inclusive Design, Design for All in Europe and Universal Design in the US, have evolved around two major axes:

1. The ever-growing ageing population as well as growing visibility of integration
2. Consideration for users with needs within the mainstream society

However, Inclusive Design differentiates itself in that it is based on “*the concept of design exclusion as a quantifiable aspect of products and services*” (Clarkson and Coleman, 2015). In doing so, Inclusive Design acknowledges that there is no such thing as a one size fits all approach that is inclusive to everyone.

Additional to the core concepts outlined above, further branches of the EDI-centred design fields have evolved which are, though lesser known, nonetheless noteworthy. ‘*Kyoyo-hin (Kyoyohin) Design*’, which originated from the word “commonly usable” in Japanese, evolved as a Japanese equivalent to Universal Design in 1999, as outlined in a 2001 White Paper published by the Kyoyo-hin Foundation. ‘*Design for More*’ (Herssens, 2011) sets itself apart from existing notions by levelling otherwise idealistic aims to more realistic expectations and aims to highlight the “*iterative nature of an inclusive design progress*” (Herssens, 2011). In this paper will use the term Inclusive Design predominantly, though the content might equally apply to other relevant EDI-centred design approaches as outlined above.

## **2. Why a critical historical review of Inclusive Design**

### **2.1 Why a historical milestone timeline**

It is important to acknowledge that the practice of Inclusive Design merely marks one turning point in the history of design for disability and that precursors of the practice may have existed in various forms before the term was officially coined in 1994. Milestones predating the official identification of Inclusive Design as a field (1994), nevertheless mark important shifts in both technical innovation as well as social understanding of disability. These milestones have informed the foundations for Inclusive Design as we know it today and are therefore worth understanding.

If Inclusive Design is believed to have started in 1994, it is consequently not surprising that narratives within existing historical accounts are also limited to the perspective of key figures within Inclusive Design. Arguably, a critically reflective review would represent a more diverse range of voices and perspectives. Critical

Disability Studies as a reflective field, might lend interesting additional perspectives such as those of lived-experience individuals for instance.

## 2.2 *Why a narrative timeline*

Narratives are commonly understood to reflect associated meaning and stories of an individual's experience. The study of narratives, also known as narratology, is a field of study within the humanities and social sciences, focussing on principles, patterns and practices of narrative representation (Meister, 2011).

*“Narratives operate as an instrument of mind in the construction of reality and the way we perceive problems; they provide perspective or a point of view” (Bruner, 1991).*

As such, elements of narratology, such as object ethnography, are used as a means of gaining insights into the cultural, social and economic landscape of a given time, place and group particularly relevant to cultural perceptions and collective realities. Narratives of disability are a reflection of what it means to be disabled in a particular socio-economic time and place and how disability is viewed by the culture at large i.e. ‘societal’ narratives, by key stakeholders and decision makers i.e. ‘disciplinary’ narratives, and by lived experience experts i.e. ‘experiential’ narratives (O’Sullivan and Nickpour, 2022).

Consequently, there is strong potential for use of narrative analysis within the practice of Inclusive Design, as it is suggested to *“encourage a deeply humanised design process by nurturing empathy, enhancing multi-sensory conceptualisation and visualisation, and facilitating holistic designing”* (Danko, 2006, p.1). Hence, a narrative review of design and disability - beyond a mere historical milestone review - proves both significant and essential.

## 3. Aims & approach to critical historical review of Inclusive Design

### 3.1 *Research Questions*

As established, a mixed method approach analysing a combination of milestones and narratives within Inclusive Design is imperative. Hence, adopting a critical historical lens, this paper aims to address two key Research Questions (RQ):

- RQ1: What is the milestone timeline of Inclusive Design?
- RQ2: What is the narrative timeline of Inclusive Design?

*Table 1* outlines the research objectives, research questions and methods of enquiry for this paper.

*Table 1 Research objectives, questions and methods*

Objective	Research Question	Methods
Understanding the chronological evolution of Inclusive Design based on historical milestones	<b>1. What is the milestone timeline of Inclusive Design?</b>	Historical timeline Object ethnography
Understanding the evolution of narratives around Inclusive/ Design and disability	<b>2. What is the narrative timeline of Inclusive Design?</b>	Object ethnography

### **3.2 Methodology & methods**

Two distinct methods are adopted in order to ensure both *RQ1* and *RQ2* are thoroughly addressed. These are briefly outlined and discussed.

#### **[RQ1] Historical milestone timeline; Cultural, social and economic milestones and their relevance to the evolution of Inclusive Design**

An illustrative literature review on the history of Inclusive Design was conducted in order to outline the key milestones within the field. To correlate this to the socio-economic landscape of the given time, these milestones were contextualised in relation to historical events, moments and eras.

Secondary data collection was used as the main source of input. Key references from within the field of Inclusive Design and outside the field, including disability history and narratology, were used in order to collate and converge multiple points of historical reference from various sources into a single historical timeline.

#### **Inclusion Criteria**

The search scope covered a combination of EDI-centred design terms (Inclusive Design, Universal Design, Design For All) and history terms (including but not limited to timeline, milestones, history, etc.). The inclusion criteria for search results was:

1. Scope of document (reflected by occurring in title, abstract or keywords) including 'design terms' AND 'history terms'.
2. Not being about specific practice within design or specific object.

#### **[RQ 2] Object ethnography: Objects as agents of disability narratives**

As Anne-Marie Willis, the design theorist describes, "*the double movement of ontological designing*" or how "*we design our world, while our world acts back on us*

*and designs us*" (Willis, 2006), outlines the value of analysing objects of our past and present.

Object ethnography therefore is considered one most appropriate method for this purpose, in conjunction with the analysis of narratives. In combination, this should outline a holistic timeline of the evolution of disability narratives and within this, the evolution of Inclusive Design as a field of practice. Specifically, using "*objects of disability*" (Guffey and Williamson, 2020) is a method used for mapping disability narratives and to investigate the existence of any narratives of design objects which otherwise may be overlooked. The selection of events on the narrative timeline (*Figure 2*) was based on examples which supported the evolving narrative patterns.

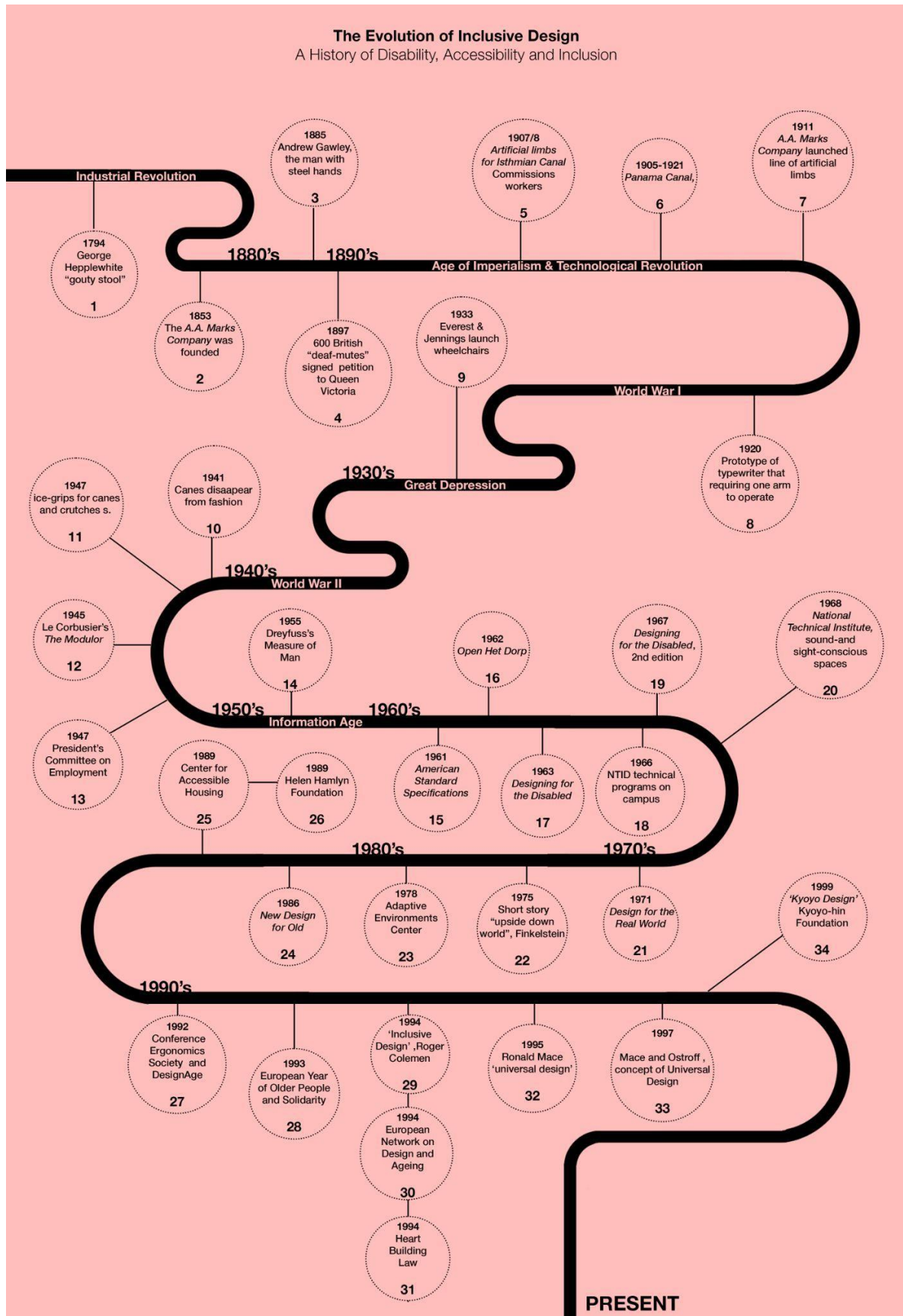
## **4. Findings**

In this section, key findings are presented according to RQ1 and RQ2, i.e. the historical milestone timeline and the narrative timeline.

### ***4.1 Historical milestones timeline of Inclusive Design***

Whilst the milestones prior to No. 29 ('*Inclusive Design*' term, R. Coleman, 1994) are not strictly considered '*Inclusive Design*', they are however milestones which provided the foundations for Inclusive Design and were therefore included in this timeline. In total, 34 milestones were outlined (*Figure 1*). This is a first illustrative list of key milestones based on a scoping review of secondary data within the fields of Inclusive Design, Critical Disability Studies, Disability History and Western History of the Modern Era, and should not be treated as an exhaustive list.

## *The Evolution of Inclusive Design; A First Timeline Review of Narratives and Milestones*



No.	Year	Milestone
1	1794	George Hepplewhite pictured the adjustable “gouty stool” and easy chair designed to “comfort the afflicted” (Belolan, 2020)
2	1853	<i>The A.A. Marks Company</i> was founded by Amasa Abraham Marks, becoming one of the most renowned artificial limb manufacturers in NYC (Liffers, 2020)
3	1885	The story of Andrew Gawley, an example of the merging of users and their ‘ <i>objects of disability</i> ’ (Virdi, 2020)
4	1897	600 British “deaf-mutes” signed a petition to Queen Victoria urging to extend the “blessings of civilization and religion” to them as well (Guffey and Williamson, 2020)
5	1907/8	<i>Isthmian Canal Commissions</i> began providing artificial limbs for those injured in the course of their duties (Liffers, 2020)
6	1905-1921	Panama Canal, America’s imperial imposition did not stop at infrastructure and injury and articles describe its cost “in human legs” (Liffers, 2020)
7	1911	<i>A.A. Marks Company</i> launched a new line of artificial limbs promising adaptability to various amputations and the successful social reintegration of wearers (Ott 2002)
8	1920	Lillian Gilbreath and husband Frank developed a prototype of a typewriter that required only one arm to operate for amputee veterans of the First World War (Gotcher, 1989)
9	1933	<i>Everest &amp; Jennings</i> launched portable, foldable wheelchairs and spearheaded many further wheelchair innovations (Guffey, 2017)
10	1941	Canes were completely absent from the <i>Gorham Company</i> catalogue before filled with 108 pages with different cane designs (Guffey and Williamson, 2020)
11	1947	Patent application for ice-grip of canes and crutches (rubber or similar material covering the lower end of the tips (Guffey and Williamson, 2020)
12	1945	Le Corbusier’s <i>The Modulor</i> as guides for the design of buildings and products (Carpentier and Lambert, 2014)
13	1947	Congress formed the <i>President’s Committee on Employment</i> of the handicapped laying the foundation for radical approach towards disability and design development (Guffey and Williamson, 2020)
14	1955	Henry Dreyfuss’s <i>Measure of Man</i> (Carpentier and Lambert, 2014)
15	1961	<i>American Standard Specifications</i> was an industry-led effort amounting to recommendations for disability (Guffey and Williamson, 2020)
16	1962	<i>Open Het Dorp</i> , mass television round-the-clock broadcast shaped cultural beliefs about disability (Dorp, 2020)
17	1963	<i>Designing for the Disabled</i> by Selwyn Goldsmith (Coleman, 2013)
18	1966	IT the first site for <i>NTID</i> technical programs and a newly built campus (Whitney, 2020)
19	1967	Goldsmith revised the second edition of <i>Designing for the Disabled</i> , rethinking specifications as well as the book’s ethos, criticising the American Standard (Coleman, 2013)
20	1968	<i>National Technical Institute</i> for the Deaf founded under a US government mandate with sound-and sight-conscious spaces represented to its founders (Whitney, 2020)



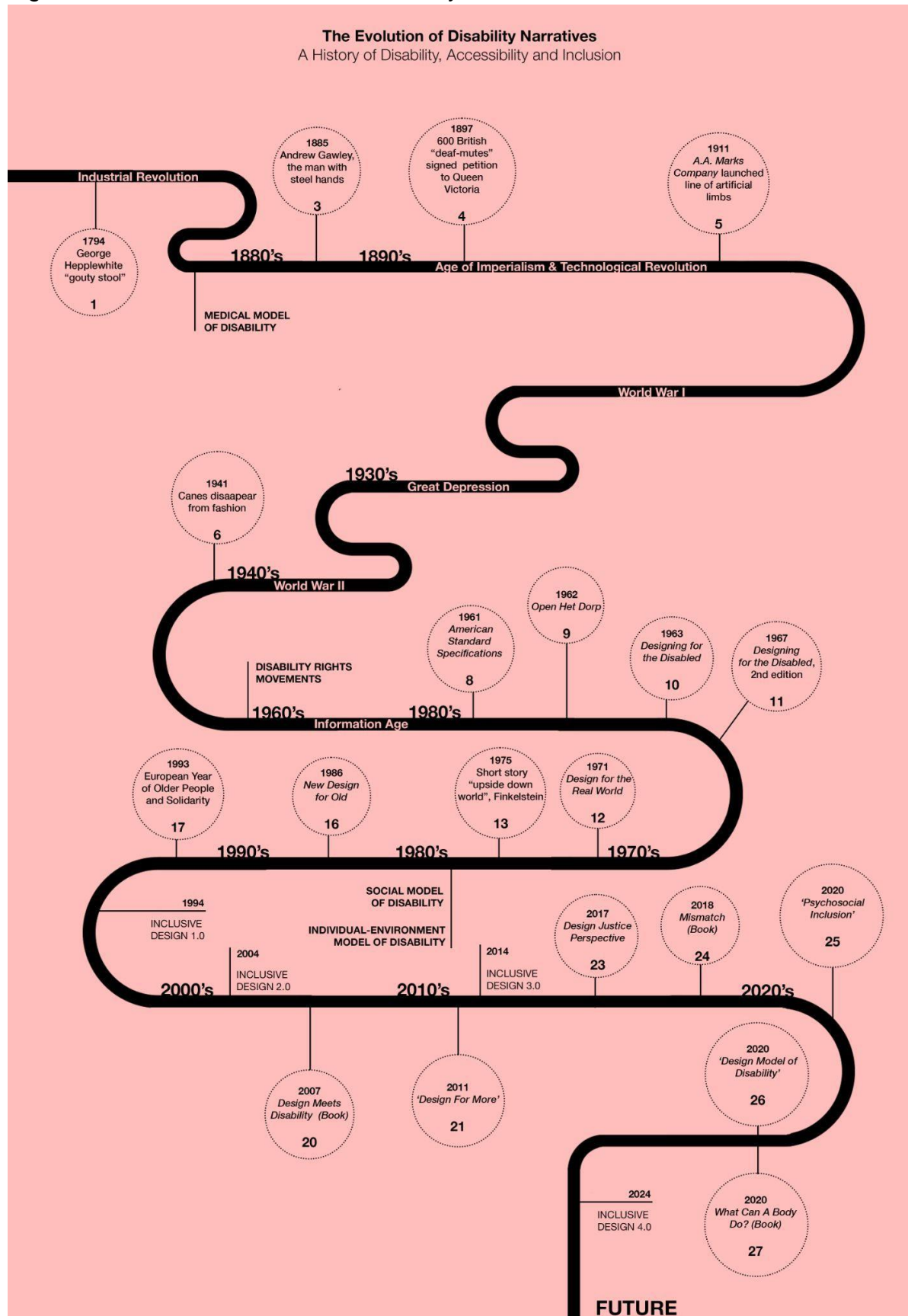
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21	<b>1971</b>	'Design for the Real World: Human Ecology and Social Change' challenging the old approach of design (Papanek, 2011)
22	<b>1975</b>	Short story by Finkelstein depicting an "upside down world", a community organised for and run by wheelchair users (Finkelstein, 1988)
23	<b>1978</b>	<i>The Adaptive Environments Centre</i> at Boston, established by Elaine Ostroff and Cora Beth Abel (Myerson, 2012)
24	<b>1986</b>	<i>New Design for Old</i> , Victoria and Albert Museum by Manley (Coleman, 2013)
25	<b>1989</b>	<i>Centre for Accessible Housing</i> at North Carolina State University established by Mace (Coleman, 2013)
26	<b>1989</b>	<i>Helen Hamlyn Foundation</i> due to implications of population ageing identified by Laslett (Coleman, 2013)
27	<b>1992</b>	Conference organised jointly by the <i>Ergonomics Society</i> and <i>DesignAge</i> (Coleman, 2013)
28	<b>1993</b>	European Year of Older People and Solidarity between Generations by the European Commission (EC) (Coleman, 2013)
29	<b>1994</b>	' <i>Inclusive Design</i> ' was coined by Roger Coleman (Coleman, 2013)
30	<b>1994</b>	<i>European Network on Design and Ageing</i> (DAN), co-ordinated by <i>DesignAge</i> (Coleman, 2013)
31	<b>1994</b>	<i>Heart Building Law</i> recommended accessibility features in public buildings (Guffey and Williamson, 2020)
32	<b>1995</b>	Ronald Mace coined the term 'Universal Design' to represent an entire philosophy of design rather than just government regulations (Coleman, 2013)
33	<b>1997</b>	The work of Mace and Ostroff in the US led directly to the concept of Universal Design (Coleman, 2013)
34	<b>1999</b>	'Kyoyo Design'/ Kyoyo-hin Foundation practising Japanese equivalent of 'Universal Design' (Guffey and Williamson, 2020)

*Figure 1 A milestone timeline of the evolution of Inclusive Design*

## 4.2 Narrative timeline: Objects as agents of disability narratives

Figure 2 outlines a timeline of 28 disability narratives and models and their evolution.



No.	Year	Narrative milestones
1	1794	George Hepplewhite pictured the adjustable “gouty stool” and easy chair designed to “comfort the afflicted” (Belolan, 2020)
2	1870s	<b>Medical Model of Disability</b>
3	1885	The story of Andrew Gawley, an example of the merging of users and their objects of disability (Virdi, 2020)
4	1897	600 British “deaf-mutes” signed a petition to Queen Victoria urging to extend the “blessings of civilization and religion” to them as well (Guffey and Williamson, 2020)
5	1911	<i>A.A. Marks Company</i> launched a new line of artificial limbs promising adaptability to various amputations and the successful social reintegration of wearers (Ott 2002)
6	1941	Canes were completely absent from the <i>Gorham Company</i> catalogue before being filled with 108 pages with different cane designs (Guffey and Williamson, 2020)
7	1960s	<b>Disability Rights Movements (starting point)</b>
8	1961	<i>American Standard Specifications</i> was an industry-led effort amounting to recommendations for disability (Coleman, 2013)
9	1962	<i>Open Het Dorp</i> , mass television round-the-clock broadcast shaped cultural beliefs about disability (Dorp, 2020)
10	1963	<i>Designing for the Disabled</i> by Selwyn Goldsmith (Coleman, 2013)
11	1967	Goldsmith revised the second edition of <i>Designing for the Disabled</i> , rethinking specifications as well as the book’s ethos, criticising the American Standard (Coleman, 2013)
12	1971	‘ <i>Design for the Real World: Human Ecology and Social Change</i> ’ challenging the old approach of design (Papaneck, 2011)
13	1975	Short story by Finkelstein depicting an “upside down world”, a community organised for and run by wheelchair users (Finkelstein, 1988)
14	1980s	<b>Social Model of Disability</b>
15	1980s	<b>Individual-Environment Model of Disability (World Health Organisation/ WHO)</b>
16	1986	<i>New Design for Old</i> , Victoria and Albert Museum by Manley (Coleman, 2013)
17	1993	European Year of Older People and Solidarity between Generations by the European Commission (EC) (Coleman, 2013)
18	1994	<i>Inclusive Design 1.0 Products</i> (Dong, 2020)
19	2004	<i>Inclusive Design 2.0 Interface Interaction</i> (Dong, 2020)
20	2007	<i>Design Meets Disability (book)</i> (Pullin, 2007)
21	2014	<i>Inclusive Design 3.0 Experience Service</i> (Dong, 2020)
22	2011	‘ <i>Design For More</i> ’ (Hendersen, 2011)
23	2017	Design Justice ( <i>Fair by Design, Just Design</i> , etc.) (Heylighen, 2017)

24	2018	<i>Mismatch</i> (book) (Holmes, 2018)
25	2020	' <i>Psychosocial Inclusion</i> ' (Nickpour, 2020)
26	2020	' <b>Design Model of Disability</b> ' (Guffey and Williamson, 2020)
27	2020	<i>What Can a Body Do?</i> (book) (Hendren, 2020)
28	2024	<i>Inclusive Design 4.0 System</i> (Dong, 2020)

Figure 2 A timeline of disability narratives and models of disability

21 Models of Disability including some lesser known models are outlined in Table 2.

Table 2 An overview of Models of Disability (Shades of Noir, 2021)

Disability Model	Language keywords	Details
<b>The Religious Model of Disability</b>	<i>Sin, shame, act of god, divine punishment</i>	Oldest model of disability, punishment by God(s)
<b>The Moral Model of Disability</b>	<i>Sim, moral, spiritual, belief</i>	Morally responsible for their own disability (mid 1800)
<b>The Eugenic Model of Disability</b>	<i>normal/abnormal, fit/unfit, undeserving, inferior</i>	Theory of eugenics, being fit or unfit physically
<b>The Biomedical Model of Disability</b>	<i>Biology, impairment</i>	Dominant in the western World, focus on biological factors only
<b>The Biopsychosocial Model of Disability</b>	<i>Undeserving, unwilling, lazy</i>	Developed by private health insurance in US and UK, responsibility on disabled person
<b>The Medical Model of Disability</b>	<i>Cure, treatment, disease, care</i>	Disease or trauma to be cured
<b>The Professional Model of Disability</b>	<i>Impairment, limitation, improvement, treatment, patient</i>	Related to medical model, perspective of experts
<b>The Charity Model of Disability</b>	<i>Tragedy, itty, shame, victim</i>	Disabled people as victims of circumstance
<b>The Economic Model of Disability</b>	<i>Socio-economic, impairment, assessment, productivity, (un)employment</i>	Personas inability to work/ being a productive member of society
<b>The Identity Model of Disability</b>	<i>Minority, disability as identity, membership</i>	Disability as a positive identity
<b>The Social Model of Disability</b>	<i>Social construct, phenomenon, integration, rehabilitation</i>	Phenomenon which is socially created
<b>The Affirmation Model of Disability</b>	<i>Normalisation, deinstitutionalization, disability pride, social identity, impairment, arts, non-tragic, diversity</i>	Critique of the charity/tragedy model, disability as an everyday occurrence which is neither negative nor positive

<b>The Minority Model of Disability</b>	<i>Experience, normalisation, social barriers, imposed, impaired</i>	Sociopolitical, social barriers and negative attitudes imposed on individuals
<b>The Market Model of Disability</b>	<i>Identity minority, economic, user, market, empower</i>	Minority rights and consumerist model, diasabled people as stakeholders and consumers
<b>The New Radical Model of Disability</b>	<i>Disabled person, rights, disability justice, intersectionality, social justice, crip, mad (reclaimed)</i>	Does Not distinguish between impairment and disability
<b>The Spectrum Model of Disability</b>	<i>Mankind, function, reduction, operation, disability</i>	Disability on a sensory spectrum of humankind
<b>The Relational Model of Disability</b>	<i>Built environment, normalisation, diversity, support, deinstitutionalization</i>	Normalising access and social inclusion
<b>The Socially Adopted Model of Disability</b>	<i>Ableism, environment, limitations, society</i>	Limitations of able-bodied society, social barriers
<b>The Empowering Model of Disability</b>	<i>Empower, individual, choice, treatment</i>	Professionals as service providers
<b>The Legitimacy Model of Disability</b>	<i>Value-based, membership, collaboration</i>	Disability as a value based determination
<b>The Human Rights Model of Disability</b>	<i>Human rights, social justice, independence, voices, discourse, discrimination</i>	Human rights based and anti-discrimination (1980s)

In addition to the 21 Models of Disability outlined in *Table 2* (Shades of Noir Journals, 2021), two additional models of disability are also identified.

1. The *Individual-Environment Model of Disability* outlined by the WHO in 1980, alongside the Social Model of Disability
2. *The Design Model of Disability* (Guffey and Williamson, 2020)

Based on the findings from *Figure 2* and *Table 2*, *Table 3* outlines and summarises dominant narratives and key concepts and voices behind them in a chronological order and in relation to the historic cultural climate of the given time period.

Table 3 Dominant narratives and key concepts and voices behind them in a chronological order

Key Concept	Historical Relevance	Dominant Narrative	Key Voices	Era	Year
<i>Capability &amp; Individualism</i>		Pragmatism, Status, Agency	Designers and Craftsmen, End user	Pre Industrial era	> 1760
<i>Capitalism &amp; Consumerism</i>	WW 1&2, Panama Canal	Pathology, Normativism, Demand	Medicine, Materials & manufacture	Industrial Revolution	1760-1840
<i>Access &amp; Inclusion</i>	Americans With Disabilities Act and UK/ EU equivalent	Accessibility, Independence, Rights, Welfare	Expert users, Policies, Design & Engineering	Technological Revolution	1870-1920/ 1940-1970
<i>Diversity &amp; Personalisation</i>	Social Justice movements e.g. BLM	EDI, Personalisation, Social justice	Government & Corporates, Digital tech, Advanced manufacturing, Disability studies	Information Age	1970< Until today

## 5. Discussion

### 5.1 Reflections on the Historical Timeline of Inclusive Design

A review of key findings from the historical timeline, raises some key questions in regards to the origins, authorship and context of Inclusive Design.

#### The origin and starting point of Inclusive Design?

One major question in the historical timeline of Inclusive Design, is the starting point of the timeline and the origin of it.

Inclusive design came into view in the mid 1990s, as a synergy of design, social integration and equality, which at large could be attributed to social justice movements. These originated in the 1960s, seeking to challenge existing stereotypes about age, disability and equal treatment (Clarkson and Coleman, 2015). Laslett, a predominant scholar in the field of politics and history of social structure, classified a shift towards an ageing population which in turn inspired an exhibition called *New Design for Old*, spearheaded by former Royal College of Art design graduate Helen Hamlyn. The exhibition explored emerging visions of what an age-friendly future may look like, shifting existing perceptions of dependency and assistive aids towards desirable domestic devices (Clarkson and Coleman, 2015).

Whilst this illustrative review on the history of Inclusive Design summarises the events directly related to the field of Inclusive Design as we know it today, it overlooks the complexity of factors which are involved in shaping movements and fields of research and practice such as Inclusive Design. It is not as simple as pinpointing a specific date in which it started; much like historic events and occurrences, it develops over time and its progress is not always one that is linear. As much as there are several Industrial Revolutions according to historians, one might also surmise that there are many periods of time and events that mark the dawn of Inclusive Design and the timeline we have created will only scratch the surface of such events. We should therefore ask, what the evolution of Inclusive Design is, rather than simply its historical milestones.

### **The authorship and voices in Inclusive Design: Tinkerers, hackers and design**

A review of historical timeline of Inclusive Design, raises questions around its authorship and leading voices; who records and therefore owns the history of Inclusive Design and from whose viewpoint/s is this evolution narrated? Does it acknowledge and record the point of view and contributions of lived experience experts and beneficiaries of Inclusive Design - either as individuals or collectives - or is it seen and recorded from a disciplinary expert perspective, and by stakeholders of Inclusive Design?

History will always hold the bias of those who have recorded it. In terms of Inclusive Design, this offers an explanation as to why we consider the timeline of Inclusive Design to start with the coining of the term. Individual people have less influence and means to contribute to written accounts of history and are more likely to be overlooked, no matter what role or impact they may have had. It is therefore important to look for those stories which may have been overlooked and acknowledge that historic accounts will never be able to capture the full complexity of the present.

There is a long history of humans finding inventive ways of designing assistive devices for a variety of disabilities, such as prosthetics and wheelchairs in particular (Coleman *et al.*, 2003; pp. 34). Andrew Gawley is a well-known example of the active role of invention, implementation and identity of a disabled person and their “*object of disability*” (Virdi, 2020). When Gawley lost both upper limbs in 1885 due to an accident at his workplace, the local sawmill, he was confronted with the struggle of prosthetics designed for individuals who still had the use of one hand. This frustration fuelled Gawley’s need to invent a better alternative to enable better functionality and ability for self-sufficiency. In league with his blind father and the local blacksmith he succeeded in creating such a prosthetic (Figure 3); for which he later became famous and was known as ‘The Man with Steel Hands’ (Virdi, 2020). This story provides a rarely well-documented example of how a lack of industry of

assistive devices meant disabled people taking charge of their own needs and designing better alternatives themselves.



*Figure 3 Andrew Gawley's self designed prosthetics*

In the first two decades of the 21st century, due to advances in rapid manufacturing, social product development and demand for customisation of design objects, the phenomena of individuals taking ownership of customising objects for their unique needs and preferences is - interestingly - having another historical resurgence. This is in line with the DIY culture being embraced by individuals as well as also designers, designing for/by/with disability. Utilising this method of DIY inclusive design are products such as the "*D.I.Y Prosthetic Manual*" (Riny, 2019) which aims to provide tools for making prosthetics out of recycled bicycle parts for those without reliable access to healthcare.





*Figure 4 D.I.Y Prosthetic Manual, instructions for DIY prosthetics using bike parts*

Many designers appreciate the creativity of adjustments to mundane objects done out of pure need by individual users. However, the motivations by the users do not always align with those of marketers and decision makers (O'Sullivan and Nickpour, 2020). Furthermore, whether designs have been informed through participatory design methods or not, it is the designers, engineers, marketers and decision makers at large, who finalise the selection of features (O'Sullivan and Nickpour, 2020).

Going forward therefore, it is imperative to search and record accounts from a more diverse range of individuals. While they may not seem significant individually, as a collection they tell a story of our present and our future past.

### **The dynamic societal context of Inclusive Design**

The attitudes towards Inclusive Design, as well as its areas of application, its prominence and its pace of progress throughout different eras, have been significantly influenced if not defined by the dynamic societal context and the overall socio-cultural-economic landscape in which it has existed. Some key historical milestones for Inclusive Design - initiated through major societal shifts and events - are discussed here.

Whilst the preindustrial era ending in 1760 with the Industrial Revolution, embraced the customisation of disability objects for ease of use and often also prestige and status, this significantly changed in the coming centuries (18th century onwards) when disability was seen as a bodily pathology to be reversed or fixed and therefore assistive devices of any kind were portrayed as a way to address disability (Guffey and Williamson, 2020). This shift seems to be parallelly aligned with the perspectives of the medical model of disability and by twentieth century, almost every disability would have been matched with one or more design solutions (Guffey and Williamson, 2020).

Modernism marks a phase within design history, showcasing a strong eugenic agenda to fix anything atypical or “weak” into bodily ideals. Well-known designers such as LeCorbusier in *The Modulor* and Henry Dreyfuss in *The Measure of Man*, designed statistically informed, normative graphs of the human body to base the design of products and environments on (Carpentier and Lambert, 2014). In a sense, this could be viewed as the precursor to modern day design personas, which equally focus on the ‘average’ user, normative bodies and constructed ideas of the end user.

Beyond this, the industrial revolution marks a great cause of disablement due to unsafe working conditions in factories, coal mines and constructions such as the Panama Canal, which is believed to have costed a large amount not just financially but also in human arms and legs (Liffers, 2020). Overall, work injuries were a common occurrence, often due to lack of adequate training, and humans being viewed as replaceable (Guffey and Williamson, 2020).

Similarly, the aftermath of both World War I & II, having produced many disabled veterans, spurred the innovation of assistive devices and design solutions in the West. Henry Dreyfuss, for instance, opened his doors to disabled veterans of the Second World War. Similarly Lillian Gilbreath and her husband Frank, who had previously become well known for time-motion efficiency within factories, had launched a typewriter that required only one arm to be operated (Gotcher, 1989).

The efforts in the post-war era to facilitate more accessible designs to accommodate large numbers of disabled veterans in the West, marks a shift which in some ways continues until this day. This shift emphasised on independence and teaching people to live with their disabilities, in many ways changing the overall narrative of disability itself in the context of Western society, moving towards being more accepting of diversity (Guffey and Williamson, 2020). It was the efforts to support those injured during the war as well as a steadily growing enthusiasm for emerging technologies which led many countries to push for high tech prosthetic limbs. Soon after governments started generating new accessibility standards, like disabled parking spaces and ramps. In the twentieth century, the history of disability is largely made up of policies and regulations addressing rehabilitation, social welfare and civil rights, in which design is seen as an agent and a medium for social change (Williamson, 2017).

A closer look at some selected historical milestones and how they have shaped and evolved Inclusive Design, highlights the importance of societal context and the interconnected nature of evolution of disciplines and the overall socio-economic landscape. For example, how would design for disability have paced and evolved, had there not been two World Wars, a significant rise in number of disabled adults and increased demand for accessible products? Or similarly, would Disability Rights movements in the 60s have occurred if there hadn't been a wider climate leading to a variety of civil rights movements?

## **5.2 Reflections on the Narrative Timeline of Inclusive Design**

### **Tinkerers, hackers and designers; The value of everyday objects**

There is much historical evidence of ostentatious yet highly practical objects in the early modern era (approx. 1450-1800). These demonstrate overlooked crafting techniques and customisations that cater to specific individuals' needs whilst not compromising on style and comfort of use (Guffey and Williamson, 2020). Besides the objects themselves, hand-crafted decorations, such as crochet blankets, embroidered pillows or trinkets on the spokes of the wheels, also suggest a highly personalised relation between the individual and the object, reflecting a sense of acceptance and inclusion of these objects by their users within their environment (Guffey and Williamson, 2020).

On the other hand, someone's ability to look well-groomed and to contribute to their families and communities, and their overall reputation, was regarded as very important within the preindustrial era (ending with the Industrial Revolution in 1760), which is most likely the reason for objects which not only aid or comfort the user but also attempt to conceal a person's disability. As such it was common for sufferers of gout to wear heatones, objects specifically designed for ease of mobility as well as concealment of swollen gouty lower limbs (Klein and Bell, 1986). Other records show wheelchairs completely covered by fabric in order to resemble a library chair and conceal the 'object of disability' (Guffey and Williamson, 2020).

Whilst there are accounts reflecting both - the self-empowered tinkerers and hackers, as well as those aiming to conceal any presence of disability - it is generally understood that most people in the pre-industrialisation period were too occupied living their lives to be concerned with social and cultural stigma (Ott, 2002).

With the Industrial Revolution, attitudes towards disability and objects of disability shifted with the rise of the medical model of disability. The walking cane poses an interesting case study for changing narratives on disability, as their narrative shifts from fashion accessoire and status symbol to mobility support and assistive device (Guffey and Williamson, 2020). Disability was regarded as a physiological malfunction and problem to be addressed by a variety of treatments and objects, incorporating evolving technologies at the time. This enthusiasm for disabilities being fixed - particularly through advanced technology - is still reflected nowadays in phenomena such as techno-ableism.

### **Multiplicity of models and narratives of disability**

The social model of disability suggests that often the social barriers faced by disabled individuals outweigh those caused by their physical limitations (Shakespeare, 2013). This presented a stark contrast to the medical model of disability, which was popularised in the 19th century, regarding disability as an *"individual bodily pathology to be fixed, cured or eliminated"* (Guffey and Williamson,

2020). With the emergence of the Disability Rights movement in the 1960s, the social model of disability grew roots and informed many policies and standards remaining until this day. Examples such as the development of the folding wheelchair as we know it today, was strongly shaped by policies introduced after the Second World War, changing the narrative from 'a tool for client transportation' to 'an object which facilitates individual independence and mobility' (Guffey and Williamson, 2020).

Users who were unsatisfied with products such as wheelchairs not meeting their needs, pushed for more inclusive products or otherwise altered the objects themselves. This led to many innovations such as the "Quickie" wheelchair by Marilyn Hamilton (1979) as well as many other models regarded as excellent examples of user-driven innovation and Inclusive Design (Guffey and Williamson, 2020). Growing numbers of empowered users demand better design solutions and with this, emerges the idea of the design model of disability. Instead of the previous two models of disability, the design model argues that disability only exists within the context of a designed space, which when it fails, leads to an individual being disabled by design.

### **Emerging design philosophies and evolving narratives of 'disability objects'**

As described in Figure 2, narratives of disability directly correlate with the models of disability (medical, social, design, etc.). The notion of disability being a concept only relevant within a given context/environment is gaining traction - explored in works such as 'What Can A Body Do?' (Hendren,2020). This perspective on disability is by no means a new one and has been expressed in "upside down world" by Finkelstein (1988), but seems increasingly relevant in contemporary culture.

In tandem with evolving concepts such as Design for More, some scholars in the Inclusive Design field have aimed to re-evaluate its positioning and the reality of some of its fairly aspirational notions (Herssens, 2011). This is reflected in critical work around *Fair by Design* (Bianchin and Heylighen,2017) and *Just Design* (Bianchin and Heylighen, 2018).

This raises questions around the emerging narratives of Inclusive Design and whether more researchers and practitioners within the field would seek to re-evaluate its principles and premises and critically reflect on its future directions.

## **6. Limitations**

This paper should be considered as a first attempt at outlining historical milestone and narrative timelines for Inclusive Design as a field. As such, the current resulting timelines should be treated as work-in-progress and evolving versions which need improvement in terms of thoroughness, rigour and criticality of scope and analysis, and do not fully represent the field. The first version of timelines aims to initiate conversations within and outside the discipline, and capture critical feedback and input for further iterations.

Given the existing historical accounts of Inclusive Design focus on contemporary history, this review focuses on the events leading up to the dawn of Inclusive Design in 1994 and its early stages. The timeline of Inclusive Design Milestones therefore ends in 1999 with the EDI-centred practice of 'Kyoyo-Hin' Design developing in Japan.

Furthermore, this paper engages with history of Inclusive Design from a predominantly Western and Euro-centric perspective and may therefore miss historical events and narratives in the Global South as well as other countries and regions. One example would be the Vietnam War and its major contribution to disability rights movements, particularly in the US and hence Universal Design history.

Due to the limited amount of written work dedicated to the history of Inclusive Design, primary data collection assisted by experts in the field of Inclusive Design as well as the history of disability, could considerably enhance the thoroughness and richness of the historical timelines.

Accounts detailing the history of individual design objects as well as their users' experiences is more widely represented. This poses the question around selection of objects to include in the narrative timeline of Inclusive Design. In this paper, examples were selected which best informed the narrative timeline of Inclusive Design, however this might not be considered extensive enough to reflect the full spectrum of disability narratives at a given time.

## **7. Conclusion & Recommendations**

This paper set out to critically review the history of Inclusive Design on two distinct levels, i.e. the narratives that shape it and the historical milestones which contribute to its evolution. Through an illustrative review of literature and object ethnography, two sets of timelines were outlined. First, a milestone timeline helped establish the chronological evolution of Inclusive Design based on historical milestones and sociocultural perspectives. Second, a narrative timeline helped uncover the

underlying narratives around matters of disability, design, and inclusivity, and how they evolved.

This first timeline review of narratives and milestones; a) identifies and contextualises historical and emerging shifts in the direction and mentality; b) offers granular as well as holistic views over the field; and c) poses major questions onto Inclusive Design as a field in need of more critically reflective approaches.

The timeline of the evolution of Inclusive Design in Figure 1 highlights the complexity and interconnectedness of historical contexts and events and that consequently there is not one fixed 'starting point' to the history and evolution of Inclusive Design. Instead, it is a process still ongoing in the present day.

The dominant narratives and key concepts and voices in Table 2, highlight major shifts in mentality and approach to Inclusive Design and design and disability in a chorological order. Seen both as potential progresses and regresses, these could provide much needed context on how our ways of approaching disability and design have changed. And that there is not one right or wrong approach. Models of Disability - as direct reflections of narratives of disability - further demonstrate how capturing and conceptualising our past, present and emerging approaches might aid critical reflection and natural progression of Inclusive Design.

Looking at emerging themes and the potential futures for Inclusive Design, some shifts towards less idealistic frameworks and interrogations of core dilemmas - such as design justice and fairness by design - are noted in the field. Such critically reflective approach to Inclusive Design, both in theory and practice, is much needed and should be increased, rather than existing sporadically and in silos.

More interdisciplinary and critically reflective research – informed by multiple disciplines such as design, disability studies, social justice and anthropology - is recommended around historical timelines of Inclusive Design. Such work should specifically consider incorporating 'lived experience designers' and their contributions to the field, as well as 'object ethnography', which historically are prone to be overlooked.

Going forward, paradoxes and dilemmas in Inclusive Design need to be further investigated and more thoroughly outlined. This will provide a more critical and realistic picture of the field and its existing narratives and practices, and help transition it to its next level. It is important to critique the field – both conceptually and in practice - rather than putting it on a pedestal, and to learn from key historical moments and narratives from the past, to shape and inform the future.

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