Design Science

Inclusive mindset in design: Unpacking concepts and implications

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Abstract

An inclusive mindset is essential for designing for inclusion. However, without a clear understanding of what an inclusive mindset entails, design educators and practitioners may find it difficult to cultivate. This study clarifies what constitutes an inclusive mindset and how it can be fostered in the design field. Through a scoping review of 47 studies, we systematically analysed research domains, types of inclusivity, definitions, associated attributes and factors influencing an inclusive mindset. The outcome is the development of an inclusive mindset model that outlines the core constructs of an inclusive mindset, its determinants and its translation into inclusive behaviour. The model was further refined and validated through interviews with 23 stakeholders in design and engineering education. Together, these insights provide a nuanced understanding of inclusivity and offer an empirically informed framework for advancing inclusion in design research, education and practice.

Keywords: Conceptual framework, Design justice, Inclusive mindset model, Inclusive design, Scoping review

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1. Introduction

Design educators and practitioners play an essential role in fostering an inclusive society, as design solutions can either advance or hinder inclusivity. Inclusive innovations create products, services and built environments accessible to all, enhancing social participation and equity. They can also enable organisations to reach a broader range of users and foster long-term relationships (Dong *et al.* 2004). In contrast, biased technologies perpetuate inequalities and exacerbate exclusion. (Angwin *et al.* 2016; Hutchison 2019; Taati *et al.* 2019)

Several design principles have been introduced to advance inclusion in design. Inclusive design challenges the notion of designing for an "average" user by proposing that people are often disabled by design and seeks to develop solutions that serve diverse bodies and abilities (Clarkson *et al.* 2003). More recently, design justice has highlighted how design can reproduce inequalities related to race, gender, class and other intersecting identities (Costanza-Chock 2018). Together, these perspectives underscore the responsibility of designers not only to create solutions that serve diverse needs but also to reflect critically on the values and exclusions that design reproduces.

Despite growing awareness, designers still often treat inclusion as an afterthought or limit it to certain project briefs (Holmes 2018; Tatara and Giannoumis 2017).

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They are also frequently unaware of the biases embedded in their designs until issues emerge (Norman 2013). This is partly because, in favouring "solutions that sell" (Penny 2014), the "default" imagined users are often the privileged ones – typically white, male, able-bodied, middle-class and with high technology literacy (Costanza-Chock 2018). As a result, the needs of underrepresented groups are frequently overlooked or deprioritised. Advancing inclusivity in design, therefore, requires not only tools and methods but also a mindset that deliberately considers non-typical users throughout the design process. Several scholars refer to this mindset as an "inclusive mindset" (e.g., Nezafati *et al.* 2022; Valgeirsdottir 2021; Zallio and Clarkson 2021).

In design, mindset refers to the practice-oriented understanding that shapes how designers interpret tasks and contexts to apply design methods appropriately (Andreasen *et al.* 2015). Building on this, Lavrsen *et al.* (2024) define a design mindset as the beliefs and attitudes that guide how designers understand design situations, make sense of challenges and select suitable activities. Similarly, Gaim and Wåhlin (2016) describe a design thinking mindset as a habitual outlook that determines how one interprets and responds to situations. Taken together, these perspectives suggest that mindsets are central to how designers frame problems, engage with contexts and enact design practices.

Nevertheless, the notion of an inclusive mindset – an orientation that prioritises inclusivity throughout the design process – remains underexplored and insufficiently defined. This lack of conceptual clarity presents a challenge for design practitioners and educators seeking to advance inclusion. While several design tools and methods have been developed to support inclusive practices, they do not necessarily shape the underlying attitudes or motivations that guide designers' decisions. Furthermore, most tools, such as the inclusive design cube (Clarkson and Coleman 2015), the ability prompt card (Valgeirsdottir 2021) and the value-sensitive design (Nezafati *et al.* 2022), primarily focus on assessing inclusion and exclusion in design. Because inclusive design involves not only analytical evaluation but also user involvement and stakeholder management (Clarkson and Coleman 2015), an inclusive mindset is essential for both the analytical design process and interpersonal interactions.

To address the gap, this study examines what constitutes an inclusive mindset and how it can support inclusion in design. We begin with a scoping review of existing literature to explore how an *inclusive mindset* has been addressed across disciplines. The concept of mindset originates in psychology, where it has been described as a sum of cognitive processes, cognitive filters or beliefs (French II 2016). Meanwhile, an inclusive mindset has been widely discussed in fields such as inclusive education and leadership studies. Drawing on these broader perspectives enriches our understanding of an inclusive mindset in the context of design.

Insights from the review informed the development of the inclusive mindset model, which explains its key constructs and underlying mechanisms. The model was subsequently validated through stakeholder interviews in design and engineering education to ensure its relevance and applicability. Ultimately, this study provides a framework that supports the enhancement of interventions, tools and methods for promoting inclusivity within design research, education and practice.

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2. Methods

This study follows the design research methodology as outlined by Blessing and Chakrabarti (2009). Specifically, it serves as a review-based study of the existing situation, aiming to gain a deeper understanding of what constitutes an inclusive mindset. A scoping review is an appropriate approach for clarifying concepts within the literature (Munn *et al.* 2018). Therefore, we conducted a scoping review following Arksey and O'Malley's (2005) five-stage framework, as refined by Levac *et al.* (2010).

First, we identified the primary research questions guiding this scoping review: *What constitutes an inclusive mindset?* To answer this question, we defined the scope of inquiry to ensure sufficient direction and focus throughout the review process. This scope explores different aspects of how the inclusive mindset is discussed in the literature, namely (1) the research areas in which it appears, (2) the types of diversity it addresses, (3) its definitions, (4) its related attributes and (5) its influencing factors.

Second, recognising that societal context influences designers' attitudes (Kille-Speckter and Nickpour 2022), we expanded our search beyond design literature. We conducted a systematic search across Scopus, Web of Science and Google Scholar on 19 January 2024 to ensure comprehensive coverage across disciplines. Scopus and Web of Science were chosen for their extensive indexing of international, peer-reviewed publications, while Google Scholar was included to capture theses and other scholarly works not indexed in traditional databases. The search strategy focused on identifying studies that explicitly discussed the terms "inclusive mindset" or "inclusive mind-set" in titles, abstracts or keywords. Table 1 presents the databases, search strings and applied filters.

Both published and unpublished literature were considered. Unpublished literature refers to scholarly work not formally published in peer-reviewed outlets, such as theses identified through Google Scholar. The search yielded 65 results (38 from Scopus, 12 from Web of Science and 15 from Google Scholar). After removing duplicates, 47 unique records were retained.

Third, we adopted an inclusive approach to our study selection and included all studies found in the previous stage. Unlike typical scoping reviews, where additional relevance criteria are applied, this review retained all records that met the initial inclusion criteria – namely, studies written in English that explicitly discussed the term "inclusive mindset" or "inclusive mind-set." All results retrieved were scholarly works, comprising 35 peer-reviewed papers, eight book chapters and four theses (three master's and one bachelor's). This approach ensured a comprehensive overview of how the concept of an inclusive mindset has been addressed across different contexts.

Fourth, we extracted the data from the reviewed studies to gather bibliographic details, such as authors, title and year of publication, alongside responses to the five scoping areas. We manually coded the extracted data and organised it using Microsoft Excel. The coding process followed an inductive approach, where key information from the studies was systematically categorised to facilitate further analysis. As part of this iterative approach, the coding categories were continuously developed, revised and refined over time to accommodate new insights emerging from the data. This iterative process ensured a thorough exploration of coding categories and a comprehensive understanding of the reviewed literature (Thomas 2006).

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Table 1. Databases and search strings used to locate literature

Database name	Search string	Note
Scopus	"inclusive mindset" OR "inclusive mind-set"	Search filter: Articles, Abstract, Keywords
Web of Science	"inclusive mindset" OR "inclusive mind-set"	Search filter: Topics
Google Scholar	"inclusive mindset" OR "inclusive mind-set"	Search filter: Title

To ensure reliability and validity, a subset of the literature was independently coded by the second author, who conducted the coding process without access to the initial codes generated by the first author to minimise potential bias. Following the completion of coding, the resulting codes were compared, and discrepancies were resolved through collaborative discussion and consensus building. This process aimed to enhance the consistency and accuracy of the coding and to validate the reliability of the findings.

Fifth, we conducted a numerical and thematic analysis of the coded data in Microsoft Excel. The numerical analysis involved frequency counts to quantify the occurrence of different categories and concepts within the data (Arksey and O'Malley 2005). The thematic analysis qualitatively identified themes or patterns within the dataset in relation to the research questions (Braun and Clarke 2006). Based on these analyses, we developed an inclusive mindset model to conceptualise the findings of the scoping review.

We then conducted consultations to validate and refine the model. Levac *et al.* (2010) suggest that consultation should be considered an essential component of scoping reviews to enhance methodological rigour. They recommend that researchers use preliminary findings from the analytical stage to inform the consultation. Accordingly, we conducted semi-structured interviews with 23 stakeholders across three groups: eight engineering educators, eight inclusivity advocates in inclusive design and engineering education and seven engineering students.

As the scoping review findings were from broad multidisciplinary literature, the purpose of these interviews was to assess the model's relevance and applicability within design and engineering education. During the interviews, participants were first asked how they define an inclusive mindset, followed by a presentation of the preliminary inclusive mindset model for their feedback and suggestions. The interview data were analysed thematically in Microsoft Excel to identify patterns across participant groups (Braun and Clarke 2006). The resulting insights were used to refine the inclusive mindset model. The findings of the scoping review and the final model are presented in the following sections.

3. Findings

The scoping review evaluated 47 sources (see overview in Appendix A) from diverse geographical regions, demonstrating a global engagement with the inclusive mindset concept. Our temporal analysis reveals an increasing trend in scholarly engagement

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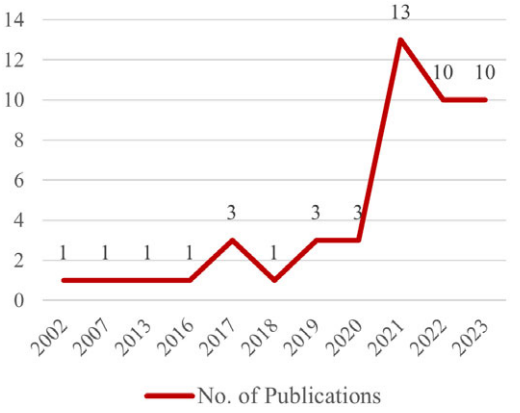


Figure 1. Publications per year (n = 47).

with the concept, with the earliest work dating to 2002, and major contributions appearing post-2020 (see Figure 1).

The key findings of each scope of inquiry are presented below.

3.1. Research areas or disciplines

The concept of an inclusive mindset appears across various research areas and disciplines, with a predominant focus on educational and organisational contexts.

Most of the evaluated works (n = 32) examine the role of an inclusive mindset within educational contexts. They cover topics such as inclusive pedagogy, educational policy and curriculum development. Within this category, higher education emerges as the most prominent sub-discipline, comprising 20 publications. These studies address an inclusive mindset in multiple disciplines, including engineering education (n = 7), teacher education (n = 4) and management education (n = 2). Additionally, other education levels (e.g., primary and secondary education) and areas (e.g., special and music education) are also represented.

Organisational contexts account for a notable portion of the literature (n = 11). Among these publications, four address the role of inclusive mindsets in fostering diverse and inclusive workplace environments. An additional four works focus on inclusive leadership, highlighting the significance of leaders' attitudes and behaviours in shaping inclusive organisational cultures. The remaining studies discuss inclusive mindsets within the context of recruitment processes, emphasising the necessity for unbiased hiring approaches.

A small subset of the literature (n = 3) discusses the concept of an inclusive mindset within the realm of accessibility, addressing issues related to web, museum and architectural accessibility.

Lastly, a few works (n = 3) explore an inclusive mindset within other domains: Artificial Intelligence (AI), tourism and social quality. Furthermore, three studies address two research areas – specifically, combinations of accessibility and education, education and organisation and organisation and AI. This overlap highlights the cross-disciplinary relevance of the inclusive mindset concept.

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3.2. Types of inclusivity

An analysis of the reviewed literature uncovers various types of inclusivity and beneficiary groups when discussing an inclusive mindset.

Slightly more than half of the sources (n = 25) focus on a specific dimension of inclusivity or targeted groups. Disabilities emerge as the most prevalent theme in these works, with 14 studies centring their discussions on individuals with disabilities (e.g., physical impairments, learning disparities and neurodiversity). The remaining 11 studies in this category address various diversity dimensions, including gender, sexual orientations, races, cultural and sociological backgrounds, opinions and individuals with criminal records. While these works emphasise specific forms of inclusivity, many also acknowledge other dimensions of inclusivity in their publications.

Conversely, the other half of the literature (n = 22) adopts a broader perspective. They address multiple types of inclusivity or the general concept of inclusion. These types of inclusivity include gender, disabilities, race, ethnicity, culture, religion, physiological differences (e.g., left-handed, obese), socioeconomic status, sexuality, age, language and immigration status. Some studies explore general inclusion principles, referring to terms such as "under-represented groups," "different social identities," "team inclusivity" and "diverse learners." Additionally, two publications do not explicitly state the types of inclusivity they address. Instead, they refer to an "inclusive mindset" as part of an essential skill (Chan *et al.* 2023) and a trait of Generation Z (Seibert 2021).

3.3. Inclusive mindset definition

Among the 47 works reviewed, only one study provides an explicit definition of an inclusive mindset. Forsberg (2022) develops an inclusive mindset situational judgment test within a workplace context. Therefore, she defines an inclusive mindset as "the degree to which an individual builds and maintains supportive and caring relationships that facilitate others' perceptions that different perspectives are valued and respected" (p.8). This definition derives from the concept of workgroup inclusion, with additional behavioural aspects.

An additional 10 publications imply that an inclusive mindset involves learning and embracing differences (Eadens and Eadens 2016), providing flexibility (Jones Young 2022; Wiebusch 2013), embracing social justice (Cherrez *et al.* 2023), respecting diversity (Cohen Carrus 2017; Purwanto *et al.* 2019), designing with accessibility in mind (Altinier *et al.* 2022), serving all stakeholders (Prasad *et al.* 2019), pursuing diversity and equity (Bosio 2023) and thinking inclusively (Valgeirsdottir 2021).

Nevertheless, most literature does not offer explicit definitions of an inclusive mindset. This absence may stem from an assumption that the term is widely understood. However, our review demonstrates a diverse range of interpretations among scholars. This variation underscores the complexity of the concept and the necessity for further clarification and exploration of its related attributes.

3.4. Related attributes of an inclusive mindset

The thematic analysis of the 47 reviewed sources reveals a wide range of attributes associated with an inclusive mindset. These attributes can be classified into two intertwined categories: invisible and visible.

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3.4.1. Invisible attributes

Invisible attributes represent the internal cognitive and affective qualities associated with an inclusive mindset. Open-mindedness and awareness are the most frequently discussed fundamental elements of an inclusive mindset. *Open-mindedness* refers to being open to acknowledging one's own biases (Japar *et al.* 2023; Wagemans 2022), valuing different perspectives (Culp and Jones 2023; Purwanto *et al.* 2019; Weaver 2002; Wu 2021) and having a genuine interest in learning about differences (Bosio 2023; Forsberg 2022). It also entails tolerance towards people from diverse backgrounds (Brooks and Strunc 2022; Japar *et al.* 2023) and a willingness to adapt one's approach (Moriarty 2007; Weaver 2002).

Awareness encompasses both self and social awareness. Self-awareness involves recognising one's own biases (Jones Young 2022; Owen 2021), prejudice (Eadens and Eadens 2016) and privileges (Malhotra and Pingali 2020). Meanwhile, social awareness relates to understanding diverse social identities (Cherrez *et al.* 2023), the challenges faced by different populations (Bandyopadhyay *et al.* 2021; Blaskova and Gibson 2023) and the impact of non-inclusive products (Nezafati *et al.* 2022). Bridging these two dimensions is awareness of how biases and assumptions influence decision-making, design artefacts and the built environment (Cherrez *et al.* 2023; Jones Young 2022; Nezafati *et al.* 2022). Active *self-reflection* on these aspects is frequently described as a means of cultivating such awareness (e.g., Blake-Beard *et al.* 2021; Cherrez *et al.* 2023; Nezafati *et al.* 2020)

A significant number of studies list *empathy* for individuals with different backgrounds and circumstances as an important aspect of an inclusive mindset. For example, Altinier *et al.* (2022) and Nezafati *et al.* (2021) argue that empathy can serve as an emotional reason to change towards inclusion. Moreover, several works discuss that an inclusive mindset is associated with certain knowledge and skills. This *inclusive competence* includes bias regulation (Wiebusch 2013), interpersonal skills (Forsberg 2022; Japar *et al.* 2023) and knowledge regarding various diversity dimensions and intersectionality (Blake-Beard *et al.* 2021; Dodge 2017; Emmers *et al.* 2021). For designers, an understanding of users, tasks and inclusive design is also relevant (Altinier *et al.* 2022).

Literature further suggests that individuals with an inclusive mindset hold *inclusive values*. They see differences as valuable (Cherrez *et al.* 2023; Cohen Carrus 2017) and focus on individuals' strengths rather than their limitations or impairments (Culp and Jones 2023; Eadens and Eadens 2016; Thomas *et al.* 2021). Several studies also highlight *positive attitudes* and feelings towards diversity and inclusion as part of an inclusive mindset (Bandyopadhyay *et al.* 2021; Bradford *et al.* 2021). *Respect* is equally discussed. It involves seeing everyone as equal (Cohen Carrus 2017; Purwanto *et al.* 2019) and not regarding disability as a pathological deficit (Kopmann and Zeinz 2018).

Finally, sensitivity and compassion are identified as attributes of an inclusive mindset. *Sensitivity* relates to being responsive to how biases, contexts and individual differences affect others' experiences (La Fors 2022; Wiebusch 2013). *Compassion*, on the other hand, involves care and acceptance towards others and oneself. It includes embracing diversity (Japar *et al.* 2023; Wagemans 2022) and being mindful of one's own biases and assumptions (Owen 2021).

Table 2 summarises invisible attributes identified from the thematic analysis. It should be noted that the frequencies reported in the table(s) indicate how often

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Table 2. Invisible attributes of an inclusive mindset identified in the reviewed literature

Invisible attribute	Description/example	Sources (*n*)
Open-mindedness	Being open to differences and willing to adjust one's approaches	17
Awareness	Being aware of one's biases, privileges and systemic inequities	16
Self-reflection	Reviewing one's context, biases and exclusions	11
Empathy	Understanding individuals with different circumstances	10
Inclusive competence	Having knowledge and skills of inclusive practices and contexts	9
Inclusive values	Seeing diversity and inclusion as valuable	8
Positive attitude	Having positive attitudes/feelings towards diversity and inclusion	7
Respect	Treating others equally and respectfully	7
Sensitivity	Being responsive to others' feelings and circumstances	6
Compassion	Having compassion and acceptance towards oneself and others	5

each attribute appeared across the reviewed sources and are not intended to reflect their relative importance or weight.

3.4.2. Visible attributes

Visible attributes are observable actions or behaviours that demonstrate inclusivity. They serve as tangible indicators of an inclusive mindset. *Designing with inclusion in mind* is the most frequently identified visible attribute. Often referred to as inclusive design, universal design or design for all, these approaches share the same goal of making designs and environments benefit as many diverse individuals as possible (Nezafati *et al.* 2022; Valgeirsdottir 2021; Zallio and Clarkson 2021). It includes considering users who are typically overlooked or excluded, such as people with disabilities. In education, this principle is reflected in universal design for learning, in which educators design classroom environments and learning materials that support learners with diverse abilities and social identities (Cherrez *et al.* 2023). Similarly, researchers can make their work accessible and understandable to non-scientists (Wiebusch 2013).

Providing flexibility is another recurring behaviour associated with an inclusive mindset, most prominently discussed in educational literature. It involves adapting and modifying approaches as needed to accommodate diverse needs (Cohen Carrus 2017; Malhotra and Pingali 2020). Examples include allowing children with lower levels of competence or confidence to learn at their own pace and offering different methods to enhance successful learning (Jefferson-Buchanan 2022),

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adapting learning instruments to meet varied needs (Culp and Jones 2023) and using the greatest number of instructional approaches (Moriarty 2007).

A further expression of an inclusive mindset is *involving diverse individuals.* Such involvement entails considering diverse users and teammates beyond particular contexts (Nezafati *et al.* 2021) and allowing underrepresented groups or those affected by the outcomes to inform key decisions (Ashton-Hay and Williams 2023; Weaver 2002). Another expression is *challenging current approaches*, which involves questioning existing norms and practices to assess their inclusivity. For example, leaders are encouraged to review organisational policies, such as recruitment procedures, to identify potential biases (Blake-Beard *et al.* 2021; Jones Young 2022). Similarly, designers should challenge how current designs and solutions can be scaled up for broader users (Valgeirsdottir 2021).

Moreover, *building supportive relationships* is also an attribute of an inclusive mindset. This includes valuing different perspectives (Forsberg 2022), making people feel heard and valued (Brooks and Strunc 2022) and developing meaningful relationships with diverse individuals (Eadens and Eadens 2016). At the same time, *using inclusive language* serves as a means of expressing inclusivity. Inclusive language involves choosing words and actions that invite participation and acknowledge others' contributions (Forsberg 2022), focusing on their abilities rather than limitations. For instance, Thomas *et al.* (2021) suggest avoiding the term "disability," while Eadens and Eadens (2016) recommend using people-first language, such as "child with autism" instead of "autistic child."

Having an inclusive mindset also means *going beyond minimum requirements.* For example, companies with a disability-inclusive mindset strive to cultivate a disability-inclusive culture beyond the requirements of anti-discrimination laws (Ochrach *et al.* 2022). Meanwhile, teachers with an inclusive mindset may proactively learn the social contexts of their diverse learners (Dodge 2017). Finally, an inclusive mindset involves *treating others respectfully.* This entails not bullying, blaming, ignoring, discriminating against or physically attacking people with different backgrounds, identities or beliefs (Massouti 2021; Wagemans 2022).

Table 3 summarises visible attributes identified from the thematic analysis.

3.5. Factors influencing an inclusive mindset

A thematic analysis of the literature reveals that several factors influence an inclusive mindset. These factors are often interconnected but can be categorised into internal and external factors.

3.5.1. Internal factors

Internal factors encompass individuals' attributes and characteristics that shape an inclusive mindset. A significant body of literature highlights *awareness and self-reflection* as fundamental to developing an inclusive mindset. This awareness includes acknowledging one's own biases and understanding how they influence design decisions (e.g., Jones Young 2022; Nezafati *et al.* 2022; Owen 2021). It also encompasses recognising the challenges faced by different populations (e.g., Blaskova and Gibson 2023; Eadens and Eadens 2016). This awareness often results from active self-reflection around these topics (Blake-Beard *et al.* 2021; Cherrez *et al.* 2023; Massouti 2021).

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Table 3. Visible attributes of an inclusive mindset identified in the reviewed literature

Visible attribute	Description/example	Sources (*n*)
Designing with inclusion in mind	Making designs and environments benefit as many people as possible	10
Providing flexibility	Adapting approaches to accommodate diverse needs	9
Involving diverse individuals	Engaging diverse or underrepresented groups in decision-making	7
Challenging current approaches	Examining norms and biases embedded in current practices	6
Building supportive relationships	Making people feel heard and valued	3
Using inclusive language	Using language that acknowledges others' contributions and strengths	3
Going beyond minimum requirements	Proactively advancing inclusion beyond compliance or legal standards	2
Treating others with respect	Acting respectfully towards diverse individuals	2

Attitudes, beliefs and perceptions also influence an inclusive mindset. Individuals' attitudes towards certain populations determine their willingness to act inclusively (e.g., Bradford *et al.* 2021; Culp and Jones 2023; Ochrach *et al.* 2022). Beliefs about human ability and resource availability affect inclusion-related behaviour. For example, educators who believe intelligence can be developed are more likely to adopt inclusive teaching practices (Kopmann and Zeinz 2018). Similarly, self-related perceptions, such as self-concept (Cohen Carrus 2017), self-efficacy (Bosio 2023; Kopmann and Zeinz 2018), perceived behavioural control (Forsberg 2022) and social identity (Forsberg 2022; Steinthorsson 2021; Vignola *et al.* 2019), also shape individuals' inclusive orientations.

Understanding is another key factor, encompassing both affective and cognitive dimensions. Empathy is frequently highlighted as a catalyst for inclusion (e.g., Altinier *et al.* 2022; *Bandyopadhyay et al. 2021*; Jones Young 2022). Meanwhile, possessing knowledge about diversity, social identities and inclusive practices enhances individuals' ability to engage in inclusive behaviours (e.g., Cohen Carrus 2017; Dodge 2017; Lowy *et al.* 2023).

Furthermore, *intention and motivation* guide the development of an inclusive mindset. Personal values (Bosio 2023), interests (Massouti 2021) and intrinsic motivation (Altinier *et al.* 2022; Nezafati *et al.* 2022; Zallio and Clarkson 2021) all play significant roles. These factors influence how people prioritise things (Brooks and Strunc 2022) and their willingness to learn about differences and engage in inclusive behaviour. For instance, recognising the benefits of diversity and inclusion helps foster an inclusive mindset (e.g., Bandyopadhyay *et al.* 2021; Steinthorsson 2021).

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Certain skills and *competencies* also support an inclusive mindset. These competencies include perspective-taking (Cohen Carrus 2017; Lowy *et al.* 2023), critical thinking (Nezafati *et al.* 2020), autonomy (Nezafati *et al.* 2022), inclusive pedagogy (Massouti 2021; Moriarty 2007) and inclusive design (e.g., Altinier *et al.* 2022; Valgeirsdottir 2021; Zallio and Clarkson 2021).

Moreover, some *personality traits* are associated with an inclusive mindset. Forsberg (2022) found that ambition, sensitivity and humility can significantly predict an inclusive mindset. Meanwhile, other relevant traits include positive leadership (Altinier *et al.* 2022) and openness (Ashton-Hay and Williams 2023; Bradford *et al.* 2021).

Biases and assumptions can also influence an inclusive mindset. Particularly, biases and assumptions towards certain populations may hinder the development of an inclusive mindset (Nezafati *et al.* 2022; Vignola *et al.* 2019; Zallio and Clarkson 2021). Additionally, self-serving bias (Jones Young 2022), social desirability bias (Blaskova and Gibson 2023) and representation bias can also play a role (Jones Young 2022).

Another influencing factor concerns *feelings*. For example, psychological safety – feeling comfortable expressing oneself without fear of judgment – encourages individuals to engage in open dialogue, share diverse perspectives and challenge non-inclusive practices (Forsberg 2022; Wagemans 2022). Simultaneously, learning about one's biases and social issues can induce cognitive dissonance (Emmers *et al.* 2021) and disoriented dilemmas (Owen 2021). These processes may elicit negative feelings such as discomfort, but they present opportunities for personal growth and reflection.

Moreover, *learning and sense-making* play a pivotal role in developing an inclusive mindset. Transformative learning can be used to facilitate critical reflection and perspective shifts towards inclusion (Owen 2021). Meanwhile, individuals' interpretations of situations, others' behaviour and the world around them further shape their inclusive orientation (Forsberg 2022; Jones Young 2022).

Relationships with diverse individuals also affect an inclusive mindset. Close relationships with people who have been affected by biases can strengthen empathy and awareness on this topic (Nezafati *et al.* 2022; Zallio and Clarkson 2021). Similarly, previous *experiences* with certain populations or exposure to design bias can influence one's perspectives. For example, educators with more experience working with individuals with disabilities may exhibit a greater inclusive mindset (Emmers *et al.* 2021).

Table 4 summarises the internal factors identified from the thematic analysis.

3.5.2. External factors

External factors encompass broader societal influences that shape an individual's mindset and behaviour towards inclusivity. A substantial body of literature promotes *Learning interventions* as mechanisms to cultivate an inclusive mindset. Training programmes, such as implicit bias training, are commonly used to increase awareness of biases and inclusivity issues (Owen 2021). Various educational courses are designed to foster an inclusive mindset. Examples include an inclusive pedagogy course for pre-service teachers (Massouti 2021), a rural immersion programme for management students (Malhotra and Pingali 2020) and an inclusive design course for engineering students (Nezafati *et al.* 2022). Learning

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Table 4. Internal influencing factors identified in the reviewed literature

Internal factor	Description/example	Sources (*n*)
Awareness and self-reflection	Recognising one's biases and reflecting on their effects on decisions	24
Attitudes, beliefs and perceptions	Views about others and oneself	18
Understanding	Empathy towards others and knowledge of inclusivity	15
Intention and motivation	Values, goals and intrinsic drive to prioritise inclusion	14
Competencies	Skills such as perspective-taking, critical thinking and inclusive design	11
Personality traits	Dispositions such as openness, humility and sensitivity	7
Biases and assumptions	Stereotypes, self-serving, or social biases	6
Feelings	Emotional responses to addressing and confronting bias	6
Learning and sense making	learning and interpretation of social contexts	6
Relationships	Close connections that enhance empathy and challenge stereotypes	4
Experience	Prior exposure to diverse individuals or contexts	3

materials, such as guidebooks (Cherrez *et al.* 2023; Thomas *et al.* 2021; Valgeirsdottir 2021), writing prompts (Nezafati *et al.* 2020) and virtual reality tools (Lowy *et al.* 2023; Vignola *et al.* 2019), can be utilised to develop awareness and knowledge on inclusivity.

Many studies also emphasise the role of the *social and work environment* in shaping an inclusive mindset. This environment comprises the surrounding people, the socialisation processes they create and the broader societal structures. Key figures include role models (Emmers *et al.* 2021), leaders (e.g., Forsberg 2022), colleagues (e.g., Ochrach *et al.* 2022) and stakeholders (Zallio and Clarkson 2021). These people form a socialisation process (e.g., organisational culture) that either supports or hinders inclusivity. A supportive environment that encourages curiosity and friendship can enhance an inclusive mindset (Chitra and Mohan 2017; Eadens and Eadens 2016; Prasad *et al.* 2019). On the other hand, a heteronormative environment can hinder it (Brooks and Strunc 2022). Broader societal structures, such as dominant practices (e.g., Vignola *et al.* 2019), discourse (Chng *et al.* 2020; Emmers *et al.* 2021) and technological systems (Lowy *et al.* 2023) also play a critical role.

Furthermore, *social norms* determine what behaviours are considered acceptable within society and influence attitudes towards various groups. Cultural

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expectations can limit inclusion by suppressing the rights or opportunities of specific populations, such as girls (Arinaitwe and Ahumuza 2023) and those who do not conform to heteronormative standards (Dodge 2017). In the past, those who did not fit in were often seen as a problem, whereas today, they can be recognised as accessibility or inclusion experts (Altinier *et al.* 2022). Accordingly, social norms can either promote or hinder an inclusive mindset and behaviour because people tend to conform to prevailing expectations through social desirability bias (e.g., Blaskova and Gibson 2023).

In addition, *regulatory frameworks* can impact an inclusive mindset. These frameworks include professional guidelines, standardised assessments, curricula, policies and regulations. For instance, the European Standard for Digital Accessibility and the IEEE Standard for Algorithmic Bias Considerations encourage developers to address inclusivity issues (Altinier *et al.* 2022; Weber-Lewerenz and Vasiliu-Feltes 2022). Furthermore, integrating inclusive value into conventional teaching requirements is crucial for fostering an inclusive mindset (Nezafati *et al.* 2022).

Another influencing factor is *resources and barriers.* The availability of sufficient resources, including company support and access to relevant information, helps promote an inclusive mindset (Thomas *et al.* 2021; Valgeirsdottir 2021; Wagemans 2022). Conversely, concerns about the costs or time needed to implement inclusive practices can limit engagement (Zallio and Clarkson 2021). Other common barriers involve the pressure to perform and busyness (Brooks and Strunc 2022), together with practical challenges such as class size and conventional teaching requirements (Moriarty 2007; Nezafati *et al.* 2022).

Interactions with diverse individuals also contribute to an inclusive mindset. Engaging with people from different backgrounds, abilities and perspectives broadens empathy and reduces bias. Particularly, intergroup contact, where individuals interact with others who are different from themselves, has been shown to promote inclusivity (Cohen Carrus 2017; Kopmann and Zeinz 2018; Wagemans 2022). Educational strategies such as incorporating student voices (Ashton-Hay and Williams 2023; Blake-Beard *et al.* 2021) and co-creating solutions with target populations (La Fors 2022; Valgeirsdottir 2021) exemplify practices that enhance mutual understanding and empathy.

Moreover, *global trends* and movements towards greater diversity and inclusion influence the development of an inclusive mindset. These trends result from a shift in the mental framework of how people view diversity and are supported by research demonstrating the benefits of inclusion and diversity for organisations (Ochrach *et al.* 2022). For instance, society has begun to view disability from a social perspective rather than a medical one, recognising that people are disabled by design and environment. This shift encourages a social responsibility framework and a more proactive approach to support people with disabilities (Moriarty 2007).

Finally, *communication* plays a key role in framing how inclusivity is perceived and enacted. The discourse surrounding inclusivity – how it is framed and presented – plays a crucial role in influencing societal views (Chng *et al.* 2020; Emmers *et al.* 2021). For instance, framing activities involving people with disabilities as volunteer opportunities may inadvertently reinforce power imbalances, hindering the development of reciprocal relationships (Cohen Carrus 2017). In contrast, communication that involves both top-down and bottom-up approaches

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Table 5. External influencing factors identified in the reviewed literature

External factor	Description/example	Sources (*n*)
Learning interventions	Educational programmes, trainings and learning tools	24
Social/work Environments	Influence of leaders, colleagues and organisational culture	22
Social norms	Cultural expectations and views towards a certain population	14
Regulatory frameworks	Professional guidelines, curricula, policies and regulations	13
Resources & barriers	Institutional supports and practical challenges	7
Interactions with diverse individuals	Engagement and collaboration with people from different backgrounds, identities and abilities	7
Global trends	Broader societal trends and movements	5
Communication	How inclusivity and diversity are framed in public discourse	4

can ensure that all voices are heard and valued (Ochrach *et al.* 2022). Additionally, persuasive communication – rooted in credibility, likability and power – is essential for inducing attitudinal change (Emmers *et al.* 2021).

Table 5 summarises the external factors identified from the thematic analysis.

4. An inclusive mindset model

4.1. Model development

A preliminary inclusive mindset model (see Appendix B) was developed to conceptualise the findings of the scoping review. The model is structured into three main sections: what influences an inclusive mindset, what constitutes it and its resulting behaviours. This structure follows a cause-and-effect logic, where individual cognition is shaped by the contextual environment and subsequently results in behaviour. It aligns with psychology frameworks such as Bandura's (1986) Social Cognitive Theory and Ajzen's (1991) Theory of Planned Behaviour.

The influencing factors of an inclusive mindset were derived from the findings in Section 3.5. In particular, external factors, including *social norms, environment, learning interventions* and *interactions with diverse individuals*, play a crucial role in shaping an inclusive mindset through continuous *learning*. Meanwhile, most internal factors, such as beliefs, motivation, and understanding, are embedded within the core constructs of an inclusive mindset.

The inclusive mindset itself comprises four key constructs: *awareness*, *motivation*, *attitude* and *understanding*, each informed by the invisible attributes identified in Section 3.4.1. Awareness encompasses both self and social awareness. Motivation reflects inclusive values. Attitude captures openness, acceptance and

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positive attitudes towards diversity and inclusion. Understanding integrates both cognitive inclusive competence and affective empathy.

An inclusive mindset subsequently translates into inclusive behaviours. However, this translation is influenced by contextual enablers or barriers. This non-guaranteed transition is represented by a dotted line, with arrows representing contextual factors pointing to it. Based on the visible attributes discussed in Section 3.4.2, we categorised inclusive behaviours into two domains: *social interactions* and *design solutions*. This distinction highlights multiple ways inclusivity can be enacted in practice. Finally, feedback from engaging in inclusive behaviours contributes to the ongoing learning process, further shaping one's inclusive mindset.

4.2. Model validation and refinement

To validate the preliminary inclusive mindset model and assess its relevance and applicability to design science, we conducted semi-structured interviews with 23 stakeholders in design and engineering education. Participants generally agreed with the overall logic and completeness of the model while suggesting several refinements to enhance clarity, applicability and readability.

One key concern was the antecedents of an inclusive mindset. While the preliminary model presented only external influencing factors, several participants emphasised the importance of personal influences. Thus, personal factors were added to the model to include one's personality, cognition and lived experience. Regarding the external factors, we renamed "learning interventions" to "education," as many participants asked for clarification on the initial term. Additionally, "media" and "regulation" were added to emphasise their crucial role in shaping the mindset (Appel and Weber 2021; Zallio and Clarkson 2021).

The interview also prompted a reorganisation of the core constructs of the inclusive mindset. When asked to describe an inclusive mindset before viewing the model, participants mostly mentioned open-mindedness, awareness and empathy. This aligns with the scoping review findings, where these attributes were also the most frequently discussed. Accordingly, open-mindedness and empathy were elevated from being sub-constructs to core constructs of an inclusive mindset.

Additionally, before seeing the model, participants rarely mentioned knowledge and competence as part of an inclusive mindset. One even noted that, with an inclusive mindset, "*they may even do it wrong, but they want or try to be inclusive.*" As such, knowledge and competence were repositioned from a sub-construct of the mindset to a key enabler bridging the mindset and behaviour. This change aligns with the Knowledge–Attitude–Behaviour model of assessment, which distinguishes between knowledge, attitude and behaviour (Schrader and Lawless 2004). It is also consistent with the design thinking mindset conceptualisation that separates mindset from cognitive competence (Gaim and Wåhlin 2016).

Moreover, participants appreciated that the model clearly distinguishes between mindset and behaviour, as well as the two domains of inclusive behaviour – social interaction and design. The list of inclusive behaviours underwent minor wording adjustments for clarity. However, many participants found the dotted line connecting the inclusive mindset to behaviour unclear. To address this, we replaced it with explicit text indicating that the translation from mindset to behaviour is supported or hindered by norms, regulations, resources and barriers.

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Participants further agreed on the feedback learning loop, but some suggested that it should extend beyond the mindset itself. As one participant noted, "*feedback process also gives you more information. That interaction with diverse individuals gives you more experience about how to be inclusive.*" Reflecting this, the feedback loop was expanded to cover all elements, reinforcing the model's dynamic and cyclical nature.

Furthermore, to raise awareness of various diversity dimensions, the preliminary model included the phrase "inclusive mindset towards…" with examples referring to specific populations such as people with disabilities, women and ethnic minorities. However, several participants found this wording unclear and cautioned that it could unintentionally reinforce an "us–them" distinction or power imbalance. As it is impossible to list every diversity dimension, keeping the phasing general enables readers to interpret and apply the model within their own context. Accordingly, we removed the phrase and designated populations from the final model. The overall model visual was also redesigned, from a horizontal to a vertical layout, to enhance readability.

Collectively, these refinements led to the inclusive mindset model (Figure 2), which integrates insights from both the scoping review and stakeholder validation. This integrative process ensured that the model was grounded in both empirical findings and theoretical reasoning to provide a robust framework for understanding and fostering inclusivity in design.

4.3. The inclusive mindset model

The inclusive mindset model (Figure 2) conceptualises an inclusive mindset as comprising five constructs: openness, awareness, empathy, attitude and motivation. These elements are shaped by both personal and contextual factors and together form the foundation for inclusive behaviour.

Regarding the core elements of an inclusive mindset, *openness* (i.e., open-mindedness) refers to a willingness to consider perspectives, values and beliefs that may challenge one's own (Price *et al.* 2015). It also involves curiosity about differences (Bosio 2023; Forsberg 2022) and a readiness to explore alternatives (Weaver 2002). At the same time, *awareness* enables individuals to recognise how their perspectives and actions influence inclusion. Self-awareness involves examining one's biases, privileges and assumptions, while social awareness entails recognising systemic barriers that contribute to exclusion and how they affect different groups in society (Nezafati *et al.* 2022).

Empathy refers to the ability to recognise others' emotions, perspectives and lived experiences (Rogers 1959). It also encompasses empathic concern, which motivates care and efforts to improve others' well-being (Batson 2011). Meanwhile, *attitude* is a personal evaluation of someone or something and consists of three components: cognitive, affective and behavioural (Eagly and Chaiken 1998). Within an inclusive mindset, attitude encompasses positive beliefs, feelings and behavioural intentions towards diverse individuals.

Motivation determines whether intentions turn into action. Drawing on self-determination theory (Ryan and Deci 2000), intrinsic motivation arises from personal values on inclusion and diversity, fostering openness to learning and embracing differences. Extrinsic motivation, on the other hand, is shaped by external influences such as organisational incentives, regulatory frameworks or

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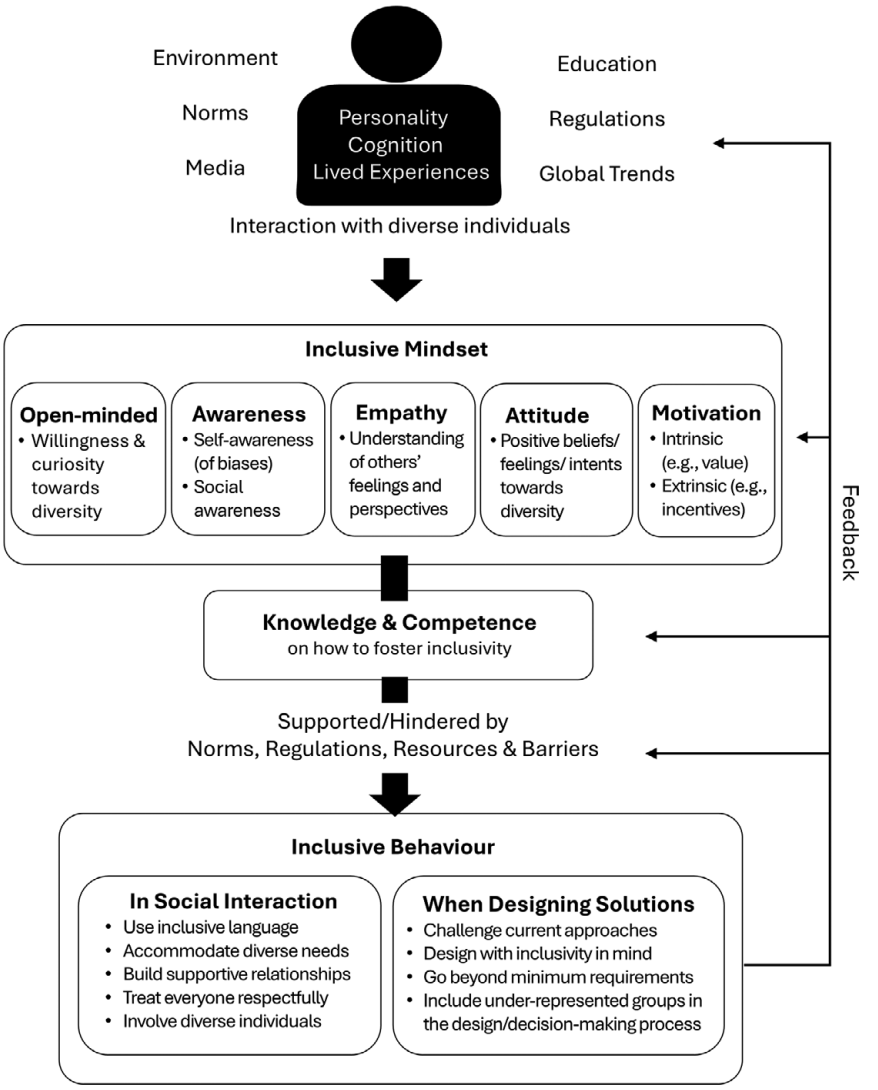


Figure 2. The inclusive mindset model.

social expectations. An inclusive mindset often integrates both, where personal commitment aligns with external reinforcement.

These five constructs of an inclusive mindset are shaped by both internal and external factors. Internal factors include one's *personality*, *cognition* and *lived experience*. Meanwhile, external factors encompass *environment, norms, media, education, regulations, global trends* and *interactions with diverse individuals*. Together, these factors interact to either support or hinder the development of an inclusive mindset.

The translation from an inclusive mindset to behaviour is then influenced by multiple factors. *Knowledge and competence* are key enablers in this process. Although a mindset determines one's orientation towards inclusion, practical

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knowledge and relevant skills facilitate inclusive action. In addition, broader contextual conditions, such *as social norms, regulations, resources* and *barriers*, can support or hinder this translation.

Once enacted, inclusive behaviours manifest both *in social interactions* and *when designing solutions.* Examples of inclusive behaviour in social interactions include *using inclusive language, accommodating diverse needs, building supportive relationships, treating others respectfully* and *involving diverse individuals.* Meanwhile, inclusive behaviour when designing solutions involves *challenging current approaches, designing with inclusivity in mind, going beyond minimum requirements* and *including underrepresented groups in the design/decision-making process.* These behaviours often lead to a broader societal impact.

Finally, feedback from engaging in inclusive behaviours – whether positive or negative – influences an inclusive mindset and its surrounding factors. Positive experiences, such as successful collaboration or recognition, can strengthen motivation and thereby reinforce inclusive behaviours. Conversely, negative experiences, such as resistance or lack of support, may discourage inclusive action. However, challenges create opportunities for learning, helping individuals refine their understanding, build competence and deepen awareness. Through this iterative process, inclusive action not only strengthens one's mindset and capacity but also contributes to shaping a more inclusive environment through evolving social norms or improved practices.

5. Discussion

This study developed and validated the *inclusive mindset model*, a conceptual framework that explains what constitutes an inclusive mindset and how it contributes to inclusion in design. The model was derived from a scoping review of existing literature and subsequently refined through stakeholder interviews in design and engineering education. To our knowledge, this is the first study to propose an empirically informed framework for studying and fostering an inclusive mindset.

In this section, we interpret the findings in relation to existing design literature and discuss how the inclusive mindset model contributes to advancing design for inclusion.

5.1. What constitutes an inclusive mindset

5.1.1. Inclusive mindset definition

As our literature search did not focus exclusively on design literature, it provides broader insights into the concept of an inclusive mindset. We found discrepancies in the meaning of an inclusive mindset even within design and engineering literature. Therefore, we adopted a broader definition of an inclusive mindset, grounded in the principles of social inclusion. The United Nations Department of Economic and Social Affairs (2016) defined social inclusion as:

> the process of improving the terms of participation in society for people who are disadvantaged on the basis of age, sex, disability, race, ethnicity, origin, religion, or economic or other status, through enhanced opportunities, access to resources, voice, and respect for rights (p.20).

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However, we argue that an inclusive mindset should address not only those considered disadvantaged but all individuals. First, due to intersectionality, defining who belongs to a disadvantaged group can be difficult. A person may experience privilege in some aspects of life (e.g., socioeconomic status) while facing disadvantages in others (e.g., disability or racial discrimination). Second, viewing individuals through the lens of disadvantage can hinder reciprocal relationships, where the strengths of those labelled as disadvantaged are overlooked or undervalued. Importantly, an inclusive mindset should be nurtured by all populations towards all populations, regardless of their demographics, ability or identity.

Therefore, we define an inclusive mindset as:

> A psychological orientation that supports the process of improving the quality of participation for diverse populations, characterised by openness, awareness, empathy, positive attitudes towards diversity, and motivation that values inclusion.

This definition broadens the scope of inclusivity by recognising that while certain populations face systemic disadvantages, the goal of inclusivity is to foster environments where all diverse individuals can participate, contribute and thrive. It also clarifies that an inclusive mindset is not simply a belief or attitude towards inclusion but encompasses openness, awareness, empathy, and motivation necessary to create an inclusive society.

Moreover, this definition differs from Forsberg's (2022) definition of an inclusive mindset in two ways. First, it does not incorporate the behavioural aspects. Separating a mindset from behaviour aligns with the conceptualisation of the design mindset (Lavrsen *et al.* 2024) and design thinking mindset (Gaim and Wåhlin 2016). Second, it covers contexts beyond workplace interpersonal relationships. In engineering design, an inclusive mindset is needed in both interpersonal interactions and design practices (Nezafati *et al.* 2022).

5.1.2. An inclusive mindset for designers

Our definition of an inclusive mindset can be applied directly to the design context. The five constructs of an inclusive mindset – openness, awareness, empathy, attitude and motivation – clarify the qualities designers need to facilitate inclusive solutions.

First, *openness* reflects a designer's willingness to consider diverse perspectives, challenge assumptions and explore alternative possibilities. It enables designers to see beyond their own experiences and question dominant norms that may shape design decisions. Openness is not limited to designing for inclusion. It is, in fact, recognised as a fundamental quality of good designers. For instance, openness is a key component of both the design mindset and the design thinking mindset (Gaim and Wåhlin 2016; Lavrsen *et al.* 2024).

Second, *awareness* is crucial in driving inclusivity in design. Designers are inclined to design for themselves (Clarkson *et al.* 2003). Since most design engineers are predominantly white, male and able-bodied (Design Engineer Demographics 2024), they may unintentionally overlook the needs or adverse effects on underrepresented populations. For instance, software used to predict criminal behaviour in the United States was found to reproduce racial bias (Angwin *et al.* 2016), whereas medical and facial-recognition technologies fail to accommodate gender and age diversity (Hutchison 2019; Taati *et al.* 2019).

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Awareness of exclusion is therefore the first step towards inclusive design (Clarkson *et al.* 2003) and design justice (Costanza-Chock 2020), as it guides designers to question potential biases embedded in their work.

Third, *empathy* enables designers to see and experience through another person's eyes and understand the reasons behind their actions (Kelley and Kelley 2013). Similar to openness, empathy is not unique to design for inclusion. Rather, it is a general capacity that helps designers understand users and bridge the different gaps (Jiancaro 2018). It is a core element of the design thinking mindset and human-centred design (Schweitzer *et al.* 2016; Vignoli *et al.* 2023). Overall, empathy is considered a key to successful design and can be fostered through design approaches that emphasise interaction, reflection and ethical thinking (Chang-Arana *et al.* 2022).

Fourth, a positive *attitude*, including beliefs and feelings, towards diversity and inclusion encourages designers to adopt inclusive design practices. Such an attitude involves viewing disability as a result of societal or design failures rather than individual impairment. Recognising that anyone, including themselves, can experience disability at different stages of life further emphasises the need for inclusive design (Clarkson *et al.* 2003).

Fifth, *motivation* drives designers to act on inclusivity issues and can be both intrinsic and extrinsic. Schweitzer *et al.* (2016) identified the "desire and determination to make a difference" as part of the design thinking mindset. This desire reflects a form of intrinsic motivation that inspires designers to create value through design. In an inclusive mindset, this motivation is further directed towards fostering a more inclusive society. Such inclusive motivation may stem from personal values or be reinforced by external influences such as organisational incentives, policies and social norms.

All in all, an inclusive mindset integrates qualities fundamental to good design (i.e., openness and empathy) with additional dimensions that deliberately address inclusion, awareness of bias and value-driven motivation. It complements existing design mindsets by placing inclusivity not merely as a design outcome but as an underlying orientation guiding how designers think, act and make decisions. By identifying these core components, this study clarifies the qualities that need to be nurtured to advance design for inclusion.

5.2. Using the inclusive mindset model to advance design for inclusion

5.2.1. A framework to develop or assess learning interventions

The core constructs of an inclusive mindset (i.e., openness, awareness, empathy, attitude and motivation), together with its key enabler (i.e., knowledge and competence), can guide the development of learning interventions aimed at fostering design for inclusion. When developing a course, workshop or learning material, educators should consider both the knowledge and skills they want students to gain and the mindset elements they aim to cultivate. Since these components are interlinked and mutually reinforcing (Batson 2011; Schrader and Lawless 2004), effective learning interventions should target multiple elements of an inclusive mindset.

The value-sensitive design intervention by Nezafati *et al.* (2022) provides a good example. Their approach begins with a reflective exercise asking students to

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reflect on the impact of non-inclusive products on themselves or people they care about. They are then invited to identify biases and assumptions underlying those designs. This reflection enhances students' inclusive motivation by deepening their awareness and empathy. Students then learn technical knowledge and skills related to inclusive design through a subsequent redesign exercise. Together, these steps illustrate how multiple elements of an inclusive mindset can be integrated into learning experiences.

Furthermore, the inclusive mindset model outlines inclusive behaviours that educators can expect from students. It also underscores that inclusion in design extends beyond the final product to involve how designers collaborate within teams and engage with diverse stakeholders. The behavioural examples in the model make the concept of inclusion more concrete and actionable. Educators may explicitly communicate these expected behaviours to students or set them as learning outcomes.

The three-dimensional flow between inclusive mindset, knowledge and behaviour can also serve as a framework for learning evaluation. Assessing these three dimensions separately enables educators to identify areas for improvement. For example, if students show growth in the mindset but not in behaviour, this may suggest the need to further develop their knowledge and skills. Conversely, if knowledge improves but behavioural change does not follow, it may indicate a lack of motivation to apply that knowledge. If both mindset and knowledge are enhanced, but no inclusive behaviour is observed, this might suggest that the limiting factors lie beyond the effectiveness of the learning intervention. Such insights help educators understand whether the challenges lie in learning design, student engagement or the translation of mindset into action.

5.2.2. Beyond learning interventions

Learning interventions are not the only way to foster an inclusive mindset. Our model highlights that factors such as social norms, environment, regulations and interaction with diverse individuals also play a crucial role.

Societal norms set expectations around inclusion and shape how design decisions are made. Particularly, Kille-Speckter and Nickpour (2022) reviewed how societal attitudes towards people with disabilities have shaped design practices. During the industrial revolution, disability was predominantly viewed as a physical impairment that required correction, leading to the development of assistive devices. However, societal views shifted in the post-war era, as the influx of disabled veterans pushed disability into the realms of social welfare and civil rights. This change led to the implementation of accessibility standards and design practices aimed at creating a more inclusive environment. The rise in design for inclusivity since the mid-1990s reflects a shift in thinking towards framing disability as shaped by design and environment and is supported by the global ageing population trend.

Yet, despite emerging inclusive norms, exclusionary norms remain deeply embedded in many aspects of society, often unquestioned. Therefore, as design justice emphasises, designers must be norm-critical: actively examining the norms embedded in their environments, communications and, most importantly, their design solutions (Costanza-Chock 2018). This involves questioning who the designers and users are; who holds power and who is marginalised; and what values are being reproduced through design.

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At the same time, designers should take an active role in establishing new inclusive norms both through design solutions and within professional cultures. For instance, the shift in terminology – from "impairment and treatment" to "accessibility and diversity" – has reframed conversations about inclusion, emphasising empowerment rather than limitation (Kille-Speckter and Nickpour 2022). To foster inclusion in design, we must continually assess whether the narrative embedded in our communication, design processes and environments supports the norms we seek to promote.

In addition to the norms, organisational policies and market dynamics strongly influence whether inclusive intentions translate into action. Much design work takes place within consultancy or client-based settings, where priorities, such as budget constraints, client expectations and time pressure, can limit designers' autonomy. Even when designers possess an inclusive mindset and competencies, their decisions may be overridden by leaders or stakeholders who prioritise efficiency or profit over inclusivity. As Lebbon and Morrow (2002) note, cost is one of the biggest perceived barriers to implementing inclusive design. One way to counter this is to persuade decision-makers through successful business cases of inclusive solutions, highlighting their potential for market expansion as a strong commercial incentive (Clarkson *et al.* 2003).

Another approach is to strengthen regulatory frameworks and design standards that make inclusion a requirement rather than a choice. While persuading decision-makers with business cases can be effective, it may not be enough. Inclusion should not rely solely on individuals' goodwill but be embedded within systems and institutional practices. Laws, standards and policies can ensure that inclusivity is not overlooked. For example, accessibility regulations in both physical and digital design have played a major role in mainstreaming inclusive practices (Altinier *et al.* 2022). Although inclusive designers should go beyond those standards, such regulatory requirements can make inclusion a baseline expectation rather than an optional ideal.

Furthermore, meaningful intergroup contact is effective at reducing intergroup prejudice, especially under Allport's optimal contact conditions (Pettigrew and Tropp 2006). These conditions encompass equal status, common goals, cooperation and institutional support (Allport 1954). Thus, a promising strategy to promote inclusion in design is to engage underrepresented populations in the design process through diverse team formation, stakeholder engagement and co-creation. Such engagement can enable individuals from different backgrounds and abilities to work together, exchange perspectives and jointly shape design solutions.

Research also shows that diverse teams tend to achieve better outcomes and foster innovation (Horwitz and Horwitz 2007; Trischler *et al.* 2018). Engaging those who reflect a range of abilities, genders, ethnicities and experiences can help mitigate the risk of unintentional bias and improve the inclusivity of the solutions. However, these benefits are realised only when team members and stakeholders feel psychologically safe to contribute (Cole *et al.* 2022). Designers should thereby be aware of existing power imbalances, treat everyone with respect and use language that values diverse perspectives and experiences. When intergroup collaboration is safe, equal and purposeful, it not only empowers underrepresented voices but also enriches the design process by revealing the genuine needs and preferences of diverse user groups (Sarmiento Pelayo 2015)

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5.2.3. Towards design for intersectionality

While disabilities have traditionally been the central focus of inclusive design tools and methods, our findings reveal that inclusion extends beyond this dimension. As highlighted in Section 3.2, inclusivity encompasses a wide range of underrepresented groups, including but not limited to gender, race, sexuality, age, culture, socioeconomic status and physiological differences. Additionally, these dimensions often intersect. Following a feminist scholar Kimberlé Crenshaw, Costanza-Chock (2020) describes *intersectionality* as the way overlapping systems of oppression – such as racism, sexism, ableism and classism – shape people's lived experiences across multiple identities.

Despite being aware of intersectionality, design practitioners often find designing for various diversity dimensions abstract and challenging (Lamirande 2022). Costanza-Chock (2018) criticises that most design principles and practices, even when trying to address inequality in design, are single-axis frameworks. This one-dimensional focus limits designers' ability to recognise, engage with or remedy the unequal distribution of benefits and burdens that design processes reproduce.

Design justice addresses this issue and challenges the matrix of domination by examining how design contributes to domination and resistance across personal, community and institutional levels (Costanza-Chock 2018). It encourages designers to question who benefits from design, who participates in it, whose knowledge is valued and how design can be used as a tool for collective liberation rather than exclusion. Design justice also promotes the full involvement of people who are most directly affected by the issue in the design process, whether through participatory design or user-led innovation (Costanza-Chock 2018). This involvement is not only an ethical imperative but also a practical one, as those with lived experience bring experiential insights that others are unlikely to identify.

Nevertheless, many design research methods, even those participatory in nature, can paradoxically reinforce existing power imbalances (Udoewa 2022) or fail to address the challenges experienced by communities facing long-term discrimination (Erete *et al.* 2018). To address these limitations, Udoewa (2022) proposes radical participatory design as a meta-methodology in which community members not only participate but also lead and drive the design process. Complementing this, Erete *et al.* (2018) identify three principles to support an inclusive approach to design. First, researchers must understand and attend to the lived contexts of marginalised communities to adapt design activities in ways that foster meaningful engagement. Second, they should actively reflect on how their identities, values and assumptions shape interactions and influence the design research experience. Third, they should document and disclose conflicts, as well as strategies for resolving them, to support future researchers facing similar challenges.

Together, these principles highlight the importance of critical self-reflection, questioning existing norms, and engaging communities in meaningful ways. Such practices can help foster both self- and social-awareness dimensions of an inclusive mindset. However, challenges remain in sustaining motivation and developing the necessary knowledge to design across multiple axes of diversity. As design practice is inherently method-driven (Lavrsen *et al.* 2024), advancing inclusion requires methods and tools to tackle intersectionality. The prominence of inclusive design stems from its ability to translate abstract ideals into structured methods. Extending such methodological development to additional diversity dimensions is therefore critical for advancing more equitable design practice.

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5.3. Limitations and future research

While this study provides an important first step in conceptualising an inclusive mindset and examining its relevance for design and engineering education, it has some limitations.

First, the scoping review primarily focused on literature that explicitly mentioned the term "inclusive mindset." As a result, relevant studies that explore similar concepts under different terms, such as accessibility-, diversity- or equity-related mindsets, may have been excluded. Future research should broaden the scope of inquiry to include these related terms to ensure a more comprehensive understanding of inclusivity in design and innovation.

Second, although the inclusive mindset model has been refined through stakeholder interviews, it remains in an early stage of empirical validation. Further research should examine the model's robustness across different educational and professional contexts through survey-based validation, intervention studies or longitudinal research. These efforts would help assess how the relationship between mindset, knowledge and behaviour operates in practice and whether it leads to measurable changes in inclusive design outcomes.

Third, while this study establishes links between the inclusive mindset model, design justice, and intersectionality, further work is needed to translate these principles into tangible design tools and educational methods. Doing so would help bridge the gap between abstract ideals of inclusivity and the method-driven nature of design practice.

By addressing these limitations, future research can strengthen the empirical foundation of the inclusive mindset model, enhance its practical application and advance the broader goal of fostering design for inclusion.

6. Conclusion

This study offers both theoretical and practical contributions to advancing design for inclusion. Through a scoping review and stakeholder interviews, we clarified the multifaceted nature of an inclusive mindset and identified the internal and external factors that shape its development. By synthesising these insights into the inclusive mindset model, we provide a conceptual and empirically informed framework for understanding and fostering inclusivity in design research, education and practice. This study also lays the foundation for future research to validate the model empirically, investigate interventions that cultivate inclusive mindsets and develop tangible methods and tools that enable designers and educators to embed inclusion in their practices.

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A. Appendix A

Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Altinier A.; Oncins E.; Sauberer G.; Mehigan T.	Demystifying Digital Accessibility and Fostering Inclusive Mindsets. Compliance with the European Standard for Digital Accessibility EN 301 549	2022	Conference paper	Switzerland	Accessibility	Disabilities	Invisible: open-mindedness, awareness, empathy, inclusive competencies Visible: designing with accessibility in mind	Internal: self-reflection and awareness, understanding, intention and motivation, competencies, personality traits, feelings, relationship External: learning intervention, social norms, regulatory framework
Arinaitwe J.; Ahumuza A.;	Girl-Child Inclusive Mindset Change Education in Uganda	2023	Article	Uganda	Education	Gender (girl-child)	Invisible: awareness	External: social norms, global trend
Ashton-Hay S.; Williams D.	What Student Voice is and is Not: Connecting Dialogue to Evidence-Based Practice and Inclusive Mindsets	2023	Article	Australia, UK	Education	Under-represented, minority groups	Visible: designing with accessibility in mind, involving others	Internal: personality traits External: interaction with diverse individuals
Bandyopadhyay K.R.; Das K.; Mahajan R.	Addressing Diversity, Equity and Inclusion (DEI) Through Service Learning in Management Education: Insights from India	2021	Article	India	Education	Race, ethnicity, gender, sexual orientation, language, culture, religion, mental and physical ability, class, immigration status	Invisible: awareness, self-reflection, empathy, attitude and feelings	Internal: self-reflection and awareness, attitude, belief and perception, understanding, intention and motivation, competencies, personality traits External: learning intervention, environment, global trend
Blake-Beard S.; Shapiro M.; Ingols C.	A Model for Strengthening Mentors: Frames and Practices	2021	Article	USA	Organisation	Different social identities (e.g., culture, religion, different holidays)	Invisible: self-reflection, inclusive competencies Visible: challenging current approaches	External: learning intervention, environment, regulatory framework, interaction with diverse individuals
Blaskova L.J.; Gibson J.L.	Children with Language Disorder as Friends: Interviews with Classroom Peers to Gather Their Perspectives	2023	Article	UK	Education	Neurodiverse (language disorder)	Invisible: awareness Visible: involving others	Internal: self-reflection and awareness, bias and assumption External: learning intervention

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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Bosio E.	Leveraging Online Teaching and Learning to Foster Critical Global Citizenship Education: Higher Education Faculty's Perceptions and Practices from Japan	2023	Article	Japan	Education	Culture (beliefs), nations, background	Invisible: open-mindedness, value, respect, sensitivity	Internal: attitude, belief and perception, intention and motivation
Bradford L.; Diaz A.; Schilling R.	Expanding Museum Communities: International Perspectives on Access in Exhibition Design and Public Programmes	2021	Article	USA, Germany	Accessibility, Education	Disabilities	Invisible: open-mindedness, self-reflection, attitude and feelings	Internal: attitude, belief and perception, personality traits External: regulatory framework
Brooks B.R.; Strunc A.	Do I Lead with an Inclusive Mindset?: Higher Education Department Chairs Reflect on Their Leadership	2022	Book chapter	USA	Organisation	Team inclusivity	Visible: building supportive relationships	Internal: self-reflection and awareness, intention and motivation External: learning intervention, environment, social norms, resources and barriers
Chan D.Y.; Dorata N.T.; Ulrich M.M.	The Essential Skills for Candidates Entering the Accountancy Profession	2023	Book chapter	USA	Education	Not identify		Internal: self-reflection and awareness External: learning intervention, regulatory framework
Cherrez N. J.; McBrien E. B.; Scott C.	Cultivating a Mindset for Inclusive Learning Design	2023	Book chapter	USA	Education	Various identities (e.g., gender, linguistic, culture, traits, assets)	Invisible: open-mindedness, awareness, self-reflection, value Visible: designing with accessibility in mind, challenging current approaches	Internal: self-reflection and awareness External: learning intervention, social norms
Chitra K.N.; Chandra M.A.	Organisational Culture and Its Influence on Workplace Diversity and Inclusion	2017	Article	India	Organisation	Gender, age, generation, sexuality, race, ethnicity, socio-economic status	Invisible: value	Internal: intention and motivation External: environment
Chng H.H.; Leibowitz B.; Mårtensson K.	Leading Change from Different Shores: The Challenges of Contextualising the Scholarship of Teaching and Learning	2020	Article	Singapore, South Africa, Sweden	Education	Different institutional, geographical, sociocultural, political context, ideological level	Invisible: self-reflection Visible: involving others	External: environment, communication

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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Cohen Carrus T.	Cultivating an Inclusive Mindset in Your Jewish Community: Turning Good Intentions into Tangible Outcomes	2017	Master's thesis	USA	Education	Neurodiverse (development & learning disabilities)	Invisible: open-mindedness, empathy, value, respect, sensitivity Visible: providing flexibility, involving others	Internal: self-reflection and awareness, attitude, belief, and perception, understanding, competencies External: learning intervention, environment, social norms, regulatory framework, interaction with diverse individuals
Culp M.E.; Jones S.K.	Creativity Is Instrumental: Instrument-Specific Strategies and Suggestions for Assisting Learners with Physical Disabilities and Differences in General and Instrumental Music	2023	Article	USA	Education	Disabilities (physical & mental differences and disabilities)	Invisible: open-mindedness, awareness, inclusive competencies, value Visible: providing flexibility	Internal: attitude, belief and perception External: social norms
Dodge A.M.	Reading Towards Equity: Creating LGBTQ + Inclusive Classrooms Through Literary and Literacy Practices	2017	Book Chapter	USA	Education	Gender (LGBTQ+, sexual orientation) *The author also acknowledges other forms of inclusivity: culture, race, ethnicity, language, socioeconomic status, nationality, disability, cognitive ability, religion	Invisible: self-reflection, inclusive competencies Visible: designing with accessibility in mind, challenging current approaches, going beyond legal requirements	Internal: understanding External: social norms, regulatory framework
Eadens D.M.; Eadens D.W.	(Dis)Ability in the Elementary School Classroom: Embracing an Inclusive Mindset	2016	Book chapter	USA	Education	Disability	Invisible: awareness, empathy, value Visible: providing flexibility, building supportive relationships, using inclusive language	Internal: relationship External: environment
Emmers E.; Baeyens D.; Petry K.	The Subjective Norm and Attitudes of Preservice Teachers Towards Pupils with a Disability: An Experiment Based on the Cognitive Dissonance Theory	2021	Article	Belgium	Education	Disability	Invisible: inclusive competencies, attitude and feelings	Internal: attitude, belief, and perception, feelings, experience External: environment, social norms, communication
Forsberg E.	Assessing Inclusive Mindset: The Development and Initial Validation of the Inclusive Mindset Situational Judgement Test	2022	Master's thesis	Sweden	Organisation	Visible & invisible diversity (e.g., race, gender, age, religion, education, organisational tenure, ethnicity, social and cultural background, physical ability, sexual orientation)	Invisible: open-mindedness, empathy, inclusive competencies, attitude and feelings, sensitivity Visible: building supportive relationships, using inclusive language	Internal: attitude, belief, and perception, intention and motivation, personality traits, feelings, sense-making External: environment

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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Israel M.; Huang R.; Mak J.; Bennett A.B.; Bex R.T.	A Community of Practice for Elementary Teachers Promoting Inclusion of Students with Disabilities in CS Instruction	2023	Conference paper	USA	Education	Disabilities		Internal: self-reflection and awareness External: learning intervention
Japar M.; Hermanto; Muyaroah S.; Susila H.R.; Alfani H.	Digital Literacy-Based Multicultural Education through Civic Education in Indonesian Junior High Schools	2023	Article	Indonesia	Education	Cultures (customs), religion, race (region, tribes, ethic), gender, disabilities (special needs), ages	Invisible: open-mindedness, awareness, inclusive competencies, value, attitude and feelings, compassion and acceptance	Internal: self-reflection and awareness External: learning intervention, environment
Jefferson-Buchanan R.	Teaching Fundamental Movement Skills Through Play-Based Pedagogy	2022	Article	Australia	Education	General (e.g., competence and competence level)	Invisible: value Visible: providing flexibility	
Jones Young N.C.	Adapting a New Inclusive Mindset in the Hiring Process	2022	Book chapter	USA	Organisation	Applicants with a criminal history *The author also acknowledges other forms of inclusivity: disadvantaged individuals (e.g., women, non-white)	Invisible: open-mindedness, awareness, self-reflection, empathy, respect Visible: providing flexibility, challenging current approaches	Internal: understanding, bias and assumption, feelings, sense-making External: environment, social norms
Kopmann H.; Zeinz H.	Special Needs and Inclusive Education from the Perspective of Teachers: What Attitudinal Factors Make Up an Inclusive Mindset?	2018	Book chapter	Germany	Education	Disabilities	Invisible: value, respect	Internal: self-reflection and awareness, attitude, belief and perception, experience External: learning intervention, environment, social norms, regulatory framework, interaction with diverse individuals
La Fors K	Towards Children-Centric AI: A Case for a Growth Model in Children-AI Interactions	2022	Article	Netherlands	AI	race, gender, religion, political orientation, ethnicity	Invisible: sensitivity	External: interaction with diverse individuals
Lowy R.; Gao L.; Hall K.; Kim J.G.	Towards Inclusive Mindsets: Design Opportunities to Represent Neurodivergent Work Experiences to Neurotypical Co-Workers in Virtual Reality	2023	Conference paper	USA	Organisation	neurodiverse	Invisible: empathy	Internal: self-reflection and awareness, attitude, belief and perception, understanding, competencies External: learning intervention, environment, social norms

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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Malhotra S.; Pingali V.	Rural Immersion Programme in India: Integrating Management Education with Community	2020	Article	India	Education	Socioeconomic status (i.e., rural folks)	Invisible: awareness Visible: providing flexibility, challenging current approaches	Internal: self-reflection and awareness External: learning intervention
Massouti A.	A New-Institutional Analysis of Inclusion Policy Enactment in Teacher Education: A Case from Ontario	2021	Article	Canada	Education	Race, ability, religion, gender and sexual identities	Invisible: attitude and feelings, sensitivity, compassion and acceptance, treating others with respect	Internal: self-reflection and awareness, attitude, belief and perception, understanding, intention and motivation, competencies External: learning intervention, environment, social norms, regulatory framework
Moriarty M.A.	Inclusive Pedagogy: Teaching Methodologies to Reach Diverse Learners in Science Instruction	2007	Article	USA	Education	diverse learner (e.g., women, minorities, people with disabilities)	Invisible: open-mindedness Visible: providing flexibility	Internal: attitude, belief and perception, understanding, intention and motivation, competencies, bias and assumption External: environment, social norms, resources and barriers, global trend
Nezafati M.; Chua M.; LeDoux J.M.	WIP: A Case Study of Integrating Inclusive Engineering Skills into a Middle-Years Biomedical Engineering Course via Model-Based Reasoning	2020	Conference paper	USA	Education	Gender, race, disabilities, physiological differences (e.g., left-handed, sickness, dementia)	Invisible: awareness, self-reflection Visible: designing with accessibility in mind	Internal: self-reflection and awareness, competencies External: learning intervention
Nezafati M.; LeDoux J.M.; Pierre K.D; Shook K.T.	WIP: Integration of Inclusive Mindset in a Middle-Year Biomedical Engineering Course: A Study over Healthcare Disparities via Story-Driven Learning	2021	Conference paper	USA	Education	Gender, race, age, disabilities, physiological difference (left-handed, dementia), socio-economic status	Invisible: awareness, self-reflection, empathy Visible: designing with accessibility in mind, involving others	Internal: self-reflection and awareness, competencies External: learning intervention
Nezafati M.; Schley S.; Le Doux J.M.	Responsible Innovation in Biomedical Engineering: A Value Sensitive Design Intervention	2022	Conference paper	USA	Education	Sex, gender, ethnicity, race, age, physiological/social differences (e.g., left-handed, dementia, obesity, etc.)	Invisible: awareness, self-reflection Visible: designing with accessibility in mind	Internal: self-reflection and awareness, understanding, intention and motivation, competencies, bias and assumption, relationship, experience External: learning intervention, resources and barriers

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Ochrach C.; Thomas K.; Phillips B.; Mpofu N.; Tansey T.; Castillo S.	Case Study on the Effects of a Disability Inclusive Mindset in a Large Biotechnology Company	2022	Article	USA	Organisation	Disabilities	Invisible: open-mindedness, awareness, attitude and feelings Visible: providing flexibility, going beyond legal requirements	Internal: attitude, belief, and perception, intention and motivation External: environment, regulatory framework, communication, global trend
Owen R.	Using Mindfulness to Promote Transformative Learning in Implicit Racial Bias Training	2021	Article	USA	Education, Organisation	Race	Invisible: open-mindedness, awareness, empathy, compassion and acceptance	Internal: self-reflection and awareness, attitude, belief and perception, understanding, feelings External: learning intervention
Prasad KDV.; Rao M. M.; Vaidya R.	Gamification and Resource Pooling for Improving Operational Efficiency and Effective Management of Human Resources: A Case Study with an Ecommerce Company	2019	Article	India	Organisation	Age, gender, community, region, colour, economic status,		Internal: self-reflection and awareness External: learning intervention, environment
Purwanto M.R.; Mukharrom T.; Yusdani; Nasih A.M.	Inclusivity of Lecturers with Nahdlatul Ulama Background in Political and Religious Views in Indonesia	2019	Article	Indonesia	Education	ethnicity, tribe, religion, culture, race, language	Invisible: open-mindedness, respect, compassion and acceptance Visible: involving others	
Seibert S.A.	Problem-Based Learning: A Strategy to Foster Generation Z's Critical Thinking and Perseverance	2021	Article	USA	Education	Not Identify	Invisible: open-mindedness,	
Steinthorsson R.S.	Reflections on Tourism Business Viability and Competitiveness in Rural Regions	2021	Book Chapter	Iceland	Tourism	Socio-economic status (i.e., rural enterprise)		Internal: attitude, belief and perception, intention and motivation
Thomas K.A.; Ochrach C.M.; Phillips B.N.; Anderson C.A.; Lee B.; Lee D.; Tansey T.N.	Facilitating Disability Inclusive Mindsets in Two Small Businesses: A Case Study	2021	Article	USA	Organisation	Disabilities	Invisible: respect Visible: using inclusive language	Internal: self-reflection and awareness, attitude, belief and perception, understanding, intention and motivation External: learning intervention, environment, resources and barriers

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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
ValgeirsdottirD.	Promoting An Inclusive Mind-Set Through Method Support: Universal Design Playbook	2021	Conference paper	Denmark	Education	Disabilities	Invisible: awareness, self-reflection, empathy Visible: designing with accessibility in mind, challenging current approaches	Internal: understanding External: resources and barriers, interaction with diverse individuals
Vignola C.; Flowers N.; Coley B.C.	Engineering a New Reality: Using Virtual Reality to Cultivate Inclusive Mindsets Among Engineering Faculty	2019	Conference paper	USA	Education	Gender, race, ability, disabilities, age	Invisible: inclusive competencies	Internal: self-reflection and awareness, attitude, belief and perception, understanding, intention and motivation, bias and assumption External: learning intervention, environment
Wagemans M. M.	An Inclusive Mindset Towards Transgender Youth Through Inner Dialogue	2022	Master's thesis	The Netherlands	Education	sexual orientation (LGBT)	Invisible: open-mindedness, respect, compassion and acceptance, treating others with respect	Internal: self-reflection and awareness, feelings, relationship External: learning intervention, environment, regulatory framework, resources and barriers, interaction with diverse individuals
Weaver J.	Implementing Change with Understanding and Respect--Guidelines for a Flexible, Creative, Inclusive Mind-Set.	2002	Article	USA	Education	diversity of viewpoints	Invisible: open-mindedness, Visible: providing flexibility, involving others	
Weber-Lewerenz B.; Vasiliu-Feltes I.	Empowering Digital Innovation by Diverse Leadership in ICT – A Roadmap to a Better Value System in Computer Algorithms	2022	Article	Switzerland	Organisation, AI	gender, race		Internal: self-reflection and awareness, attitude, belief and perception External: learning intervention, environment, regulatory framework
Wiebusch M.	Towards Social Quality in Europe by Integrating Its Central Elements into the Problem Solving Process: Analysing Family Group Conferences with an Inclusive Mindset	2013	Bachelor's thesis	Netherlands & UK	Social quality	Non-scientist (i.e. people with different background knowledge)	Invisible: self-reflection, inclusive competencies, sensitivity Visible: designing with accessibility in mind, providing flexibility	Internal: self-reflection and awareness, understanding, personality traits External: learning intervention, global trend

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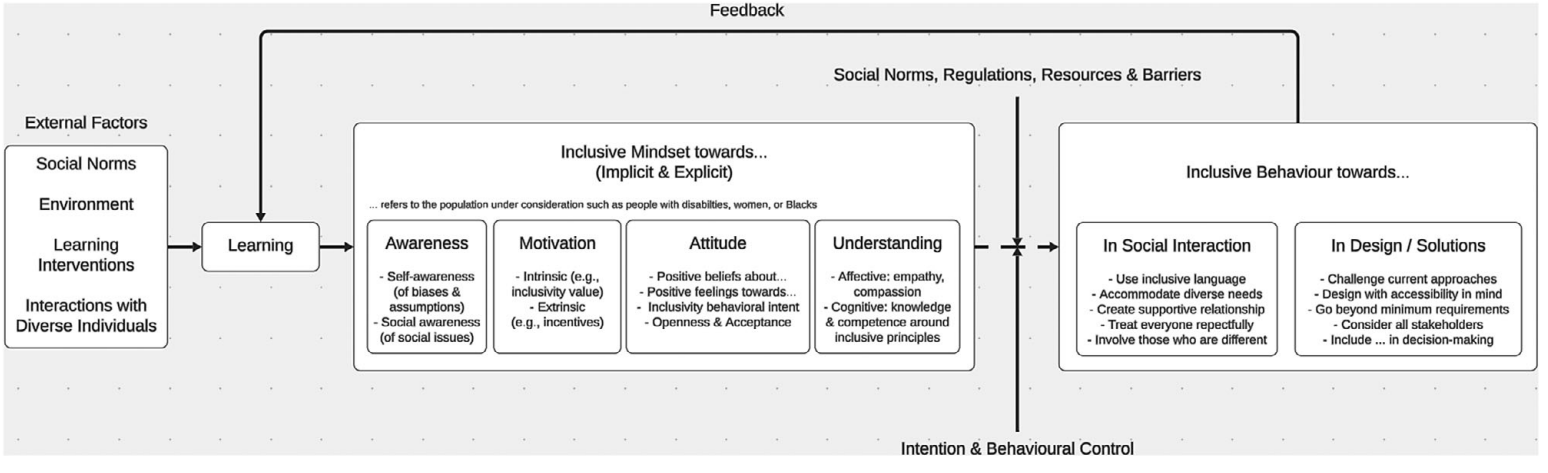
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Authors	Title	Years	Document type	Country	Research area	Types of inclusivity being addressed	Related attributes of an inclusive mindset	Factors influencing an inclusive mindset
Wu J.C.	An Innovative and Inclusive Mindset: Teaching Embodied Sonic Meditation in Higher Education	2021	Conference paper	USA	Education	diverse learners (students from a variety of backgrounds, computer /music abilities and disciplines)	Invisible: open-mindedness,	Internal: self-reflection and awareness, personality traits External: learning intervention
Zallio M.; Clarkson P.J.	Inclusion, Diversity, Equity and Accessibility in The Built Environment: A Study of Architectural Design Practice	2021	Article	UK	Accessibility	Disabilities *The authors also acknowledge other forms of inclusivity: gender, age, skill, knowledge, culture	Visible: designing with accessibility in mind	Internal: attitude, belief and perception, understanding, intention and motivation, competencies, bias and assumption, relationship External: environment, social norms, regulatory framework, resources and barriers, communication

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B. Appendix B



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