

# ***Designing for Disabled People: Exploring inclusive design in architectural education***

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## **ABSTRACT**

*Architects usually design for normative bodies, thus shaping an exclusive environment for many users. This article explores the gap in architectural education that leads to a lack of knowledge in the architectural profession about the various accessibility needs of the wide spectrum of disabled people. It reports on a pilot study, involving architectural educators, to suggest a threshold of integrating a critical awareness of diverse accessibility needs. We found that adopting the social model of disability in the architecture design studio has the potential to serve as a threshold to reach a holistic inclusive design curriculum.*

## **KEYWORDS**

*inclusive design, universal design, ethical practice, disability*

## Introduction

Architects have the responsibility to remove the physical barriers that prevent people from participating equally in any activity within the built environment.<sup>1</sup> This responsibility needs to be understood by architectural students as emerging professionals.<sup>2</sup> Architectural curricula, therefore need to prepare students for the ethical challenges beyond university, as diverse groups of disabled people face exclusive environments daily due to ill-informed design decisions made by architects and co-professionals. This article explores the current situation of inclusive design within architectural education to gather pedagogical perspectives on teaching inclusive design and suggestions around better integration of the diverse accessibility needs in the studios.

With the growing focus on ethical practices, the Royal Institute of British Architects (RIBA) produced a knowledge schedule to serve as a framework for the *exploration* of ethical thinking within the architectural profession.<sup>3</sup> This schedule includes reference to a 'Duty to Society and the End User', with specific reference to equity, diversity and inclusion (including bias and discrimination). However, there is no mention of inclusivity in the RIBA Graduate Attributes for Part I and Part II.<sup>4</sup> This creates a gap between education and practice, which later leads architects to create exclusive designs related to 'normative bodies', and psychologies.<sup>5</sup> According to Jean and Sarah Sherman, the built environment lacks consideration of the wide spectrum of disabled people.<sup>6</sup> This article will use the term disabled people as it uses the social model of disability in contrast to the body of the *Vitruvian Man*, upheld as the classical ideal and often as the typical *user* of built environments, a white, healthy, adult man.<sup>7</sup> As a result, built environment professionals create unintentional and non-visible barriers that impede full community inclusion.<sup>8</sup>

Even when architects apply building codes, they often apply them solely to avoid legal consequences for themselves and/or their clients. For example, designing ramps to comply with accessibility regulations.<sup>9</sup> These regulations rarely mention features for disabled people who do not have a physical impairment.<sup>10</sup> This leads to a non-critical shorthand of disability into a single identity associated with physical impairment. Nonetheless, disability is an umbrella term for a range of impairments, activity limitations and participation restrictions.<sup>11</sup> This definition refers to two aspects: (i) the interaction between an individual and (ii) the individual's contextual factors.<sup>12</sup> According to the World Health Organization's (WHO's) *World Report on Disability*, there are more than one billion disabled people around the world which accounts for 15% of the global population, of which only 10% need a wheelchair.<sup>13</sup>

Disability does not lie inside a person, but in the environment, which fails to fully respond to the users' needs. The concept of disability, therefore, needs to be considered through the relationship between the individual and the environment rather than the disability as a condition. This is known as the social model of disability within disability literature.<sup>14</sup> While architecture deals with the manipulation of the physical environment, it can facilitate

certain functions and stimulate certain behaviours for disabled people.<sup>15</sup> This highlights the importance of interaction with the built environment, as it is responsible for making the disability visible.<sup>16</sup>

### Inclusive design

Inclusive design, universal design, accessible design, and barrier-free design are terms that provide guidelines to promote a design that considers the needs of everyone, regardless of their ability. They enrich the principles applied in the design process, especially for disabled users.<sup>17</sup> The British Standards Institute defines inclusive design as

The design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible on a global basis, in a wide variety of situations and to the greatest extent possible without the need for special adaptation or specialised design.<sup>18</sup>

The main principle of inclusive design is to dissolve the boundaries between disabled and non-disabled people.<sup>19</sup> By using these principles, access can be provided in a holistic way that addresses not just the minimum access needs of disabled people, but considers all users' needs and puts the user at the heart of the design process from the beginning.<sup>20</sup> As the user should be consulted — or better — involved in the major design decisions as the primary stakeholder, rather than design being led by the designers' subjective preferences or economic priorities. This will lead to an *intuitive* environment that can support the needs of all users equally.<sup>21</sup> However, this inclusive approach is still not the norm; some built environments still exclude people with physical or visual impairments, and the needs of people with hidden disabilities are even less well catered for. Yet when they are addressed, everyone benefits, this supports the concept that universal design is *good design*.<sup>22</sup>

### Architectural education

İlayda Soyupak sees architecture as a matter of inclusion, and architectural education has the potential to spread the seeds of inclusion, as it plays a vital role in determining the quality of our built environment.<sup>23</sup> Architectural education provides an excellent medium to build disability awareness and to help students understand the power of their design decisions.<sup>24</sup> To address accessibility issues efficiently, attention to experiences of disability should start during education.<sup>25</sup> As it can help change attitudes, challenge perceptions, and deliver behavioural change.<sup>26</sup> In the UK regulatory arrangements were established through the 'Disability Discrimination Act' which was later superseded by the 'Equality Act'.<sup>27</sup> The principles of these acts, also underlie building regulations in the devolved nations, for example, 'Approved Document Part M' in England, relating to access to, egress from and circulation within buildings.<sup>28</sup> Consequently, the incorporation of inclusive

design in architectural education has become essential.<sup>29</sup> It has been recognised as a crucial step in facilitating and improving the understanding of inclusivity during the design process.<sup>30</sup> Nevertheless, Iain Scott, Fiona McLachlan, and Katherine Brookfield see that these changes are taking place slowly, as architectural education in the United Kingdom (UK) does not even mention inclusive design specifically, nor make any requirement for students to deeply engage with this issue.<sup>31</sup>

Inclusive design is rarely seen as an essential element of architectural education, so students often spend very little time studying it.<sup>32</sup> In some cases studying inclusive design is optional, as some architectural curricula include it only as an elective module.<sup>33</sup> In other cases it is non-existent.<sup>34</sup> Moreover, where inclusive design is taught, the time taken to teach it is considerably less than other topics such as environmental design.<sup>35</sup> Besides, inclusive design is rarely a part of the assessment criteria.<sup>36</sup> Students are not given enough opportunity to engage with issues of diversity and equality within the curriculum nor being challenged to design inclusively within the studio, especially regarding the diversity of the eventual inhabitants.<sup>37</sup> While they should understand that people are the heart of their designs, effective inclusive design education must contribute to the formation of future architects' ethical values with a holistic and sustainable perception of the architect.<sup>38</sup> It needs to provide an interdisciplinary approach and modules should provide a learning environment that is both inside and outside the studio, this could be done by direct engagement with real people and projects.<sup>39</sup> Inclusive design education should be a mixture of both passive and active methods of learning, for example, searching through the related resources, applying questionnaires, and making observations, because data analysis helps the students to adopt the issue and turn it into their own issue.<sup>40</sup>

## **M e t h o d o l o g y**

This article reports from a pilot study involving architectural educators from the UK and Egypt, gathering pedagogical insights/perspectives on teaching inclusive design, and suggestions for a more inclusive curriculum. The reason for choosing both the UK and Egypt is the first author's personal experience in living and teaching in both contexts, where observations were made on the cultural distinctions on the concept of disability, and some commonalities in teaching inclusive design. The data were collected using semi-structured interviews as a reflective practitioner discussion, conducted through a mix of online and in-person modes. Before starting the interviews, ethical approval was acquired by the Welsh School of Architecture's Research Ethics Committee at Cardiff University.

The interview questions can be divided into three sections. The sample size was 14, comprising seven educators in the UK and seven in Egypt. The qualitative data from the interviews were analysed thematically to understand

<b>1- General and personal background questions</b>	<ol style="list-style-type: none"> <li>1. How long have you been teaching architecture?</li> <li>2. What levels do you teach?</li> <li>3. What modules do you teach?</li> <li>4. What do you think inclusive/universal design is?</li> <li>5. How do you understand disability?</li> </ol>
<b>2- Questions on the current situation in education</b>	<ol style="list-style-type: none"> <li>1. Do the modules you teach include topics about inclusive design?</li> <li>2. Is inclusivity being interpreted in architectural education following only the accessibility standards and building regulations? If the answer is no, then how is it being interpreted?</li> <li>3. Is disability part of the assessment criteria?</li> <li>4. What does disability mean in this context (educational context/student perspective)?</li> <li>5. In your opinion do students consider disability needs while designing/researching? How?</li> <li>6. What level of exposure do the students have towards the disabled community?</li> </ol>
<b>3- Suggestions and recommendations for a more inclusive curriculum</b>	<ol style="list-style-type: none"> <li>1. Do you think that architecture design curriculum should include the needs of different disabilities? Why?</li> <li>2. In your opinion what are the suitable level/s to introduce these needs?</li> <li>3. What are your suggestions to introduce these needs (e.g., special projects and/or a holistic concept in various projects)?</li> <li>4. Do you think other modules can support this concept? How and what are these modules?</li> </ol>

Table 1:  
Interview questions  
(Menatalla Kasem 2022).

the general themes in both countries. The interviews were analysed for each country separately for the first two sections and joined for the last section, allowing for different cultural norms in the two contexts, while bringing forward recommendations that can be more universal (Table 1).

### Context and findings

In the UK it currently takes seven years to become a fully qualified architect, combining five years of study with two years of professional training and practical work. While in Egypt it takes four to five years of undergraduate study to be qualified. The means of teaching architecture design studio is broadly the same in both countries for the undergraduate years. However, in the UK architectural design forms the main focus of undergraduate studies with a small number of modules alongside it, while in Egypt undergraduate students engage in architecture design studio alongside an average of ten modules and electives. In both instances, architecture design studio and associated design modules occupy proportionally more hours and the highest assessment weighting.

#### *British sample and the current situation in the UK*

The sample consists of seven educators with various experiences in teaching architecture with an average of thirteen years in teaching. Their activities included teaching various levels from undergraduate to postgraduate and research students. The modules they taught on the undergraduate degree ranged from architectural design, environmental design, architectural technology, to history and theory. The Masters programmes/modules ranged from sustainable building conservation, environmental design, through

urban design and the diploma in professional practice. For the sample understanding of inclusive design and disability, all respondents understood the meaning of inclusive design. Only one interpreted disability by its social and medical models, while the rest interpreted it from the medical perspective only, noting that two of the participants have a personal experience with disability.

Although Scott et al. see that architectural education does not mention inclusive design specifically, nor requires the students to deeply engage with it, the results were different.<sup>41</sup> In relation to the question asking if inclusive design is present in the curriculum, five educators — the sample majority — answered that inclusive design is addressed in teaching, especially in the architectural design studio. One of them noted that it is more of ad-hoc insertion rather than a systematic approach, which may agree with Scott et al. to an extent.<sup>42</sup> Then the educators were asked if inclusive design is interpreted following the building codes, three of them mentioned that it is a combination between a user-led approach and following the building codes, while four said that it is only a user-led approach (albeit not necessarily user engagement). This agrees with Asli Sungur Ergenoğlu who stated that students should understand that future inhabitants should be at the heart of their designs, not the codes.<sup>43</sup> Julie Fleck indicated that inclusive design is rarely a part of the assessment criteria, but the findings disagreed with that as four of the respondents said inclusive design is part of their assessment criteria.<sup>44</sup> One said that it depends on the project being assessed, and two respondents said that inclusive design is not part of the assessment criteria, one of them elaborated:

I think there is a generic marking assessment criterion around conventions of architectural representation, robust architectural performance, or something like that, but not really explicit assessment criteria around inclusive design for differently able people [UK1].<sup>45</sup>

The following section included a discussion around the interpretation of inclusivity in the curriculum, and whether it is only around a specific disability or targets a wider spectrum. Three answered that physical disability is the only disability that is considered in the context of teaching, two answered that most of the time physical disability is dominant in the architectural design studio, and two said that a wider range of disabilities is discussed. Different reasons were given for that, for example:

[...] there is a lot more known about how a non-inclusive environment will affect somebody in a wheelchair or somebody with crutches. But there isn't enough knowledge — I think — out there, not in our medical fields to explain exactly what the sensory needs of individuals who don't have physical disabilities, who have other mental health or neurological conditions or syndromes [UK5].<sup>46</sup>

The reason behind that could be the legislative orientation towards people with physical impairments, which has brought a heightened awareness of

certain disabilities and impressed upon professionals a need/duty to act following the law.<sup>47</sup>

The following questions were about students; the first asked whether the student considered accessibility needs while designing and researching. Four respondents said that some students design from a perspective of self-awareness, and they noted that those students usually have relevant personal experiences, for example having a family member/friend with a disability. Two educators said that students do not consider disability needs while designing. Only one said that students do not consider it unless told by the tutor: '[t]hey just do it because I ask for it. If I didn't mention it, it wouldn't even cross their minds' [UK2].<sup>48</sup> This agrees to an extent with Fleck's suggestion, that the time taken to teach inclusive design is considerably less than other topics, so, students may not allocate much time to study/practice it because they do not consider it as an essential element of architectural education.<sup>49</sup>

The last question of this section asked about the level of exposure the students have towards people with disabilities in their community. Four of the respondents answered that the students do not have enough exposure, two said that the student might have some exposure, but they noted that it is hard to judge because the students come from very diverse backgrounds.

#### *Egyptian sample and the current situation in Egypt*

The sample consists of seven educators with various experiences in teaching architecture with an average of twenty years in teaching. Their activities included teaching various levels from undergraduate to postgraduate. The modules they taught on the undergraduate degree ranged from, architectural design, architectural technology, building construction, urban design, city planning, history and conservation, scientific methods, computer-aided design, housing, environmental control, and architectural representation — the range of taught modules in Egypt are more than the UK as mentioned earlier. For the sample understanding of inclusive design and disability, four educators understood the meaning of inclusive design. Two respondents interpreted disability by its social and medical models, while the rest interpreted it from the medical perspective only, noting that one of the participants has a personal experience with disability.

Six educators stated that inclusive design is interpreted in their teaching, especially in the architectural design module. One of them noted that it is also integrated within urban design, another noted that it is also clear in architectural theories. This result also disagrees with Scott et al. suggestion — similar to the UK — that inclusive design is not mentioned in the architectural curriculum.<sup>50</sup> One of the educators mentioned that although inclusive design is interpreted in the studio, the term itself is not being used. The following questions asked if teaching inclusive design followed building codes, four mentioned that it is a combination between a *user-led* ethical approach and

following the code, while two said that it is only a user-led approach, and only one mentioned that the approach is only following the code. This also agrees with Ergenoğlu's statements mentioned earlier that the students should be encouraged to prioritise the user needs.<sup>51</sup>

In contrast with the British results, the Egyptian results agreed with Fleck's suggestion that inclusive design is rarely part of the assessment criteria. Four said it is not part of the assessment criteria, and one of them noted that neither the students nor the tutors have enough knowledge for this. Two respondents said that it depends on the project being assessed, and only one said yes, it is part of the assessment criteria. The following section included a discussion around the inclusivity interpretation in the curriculum, and whether it is only around one disability or targets a wider spectrum. All respondents agreed that physical impairment is the only disability that is considered in the context of teaching, they mentioned several reasons for that:

Maybe we only mention people with physical impairment because it is the most common disability, those are the people we see in our daily life, or maybe because their problems are easier to solve. We can also see and feel that disability [EG1].<sup>52</sup>

Another reason which was mentioned on various occasions by many users is the Egyptian legislative approach, as 'The Egyptian Code for the Design of Outdoor Spaces and Buildings for the Disabled' hardly mentions any disability other than physical impairment — similar to the aforementioned English equivalent 'Building Regulations Approved Document Part M'.<sup>53</sup> This legislation led the architectural community to focus on certain disabilities and limited thinking beyond that. Moreover, the aforementioned Egyptian code for accessibility is not fully enforced, so most of the public buildings in Egypt are not built for inclusion — irrespective of design intent.<sup>54</sup>

The following questions were about students; the first asked whether the student considered the accessibility needs while designing. Three respondents said that some students have self-awareness (thought to be around 10% of the cohort), those usually have personal experience with disability, vicarious for example, through/with a family member. Three respondents said that students do not consider it unless told by the tutor, which is similar to the UK sample, which is in agreement with Fleck's suggestion mentioned earlier that students often spend very little time studying inclusive design.<sup>55</sup> Participants were then asked about their level of exposure to the disabled community. All the respondents answered that students do not have sufficient exposure to the disabled communities, citing a range of reasons. For example, the built environment around them in Egypt is not accessible, in addition the cultural ideas around disability lack proper awareness.



Curriculum areas suggested to support ID teaching

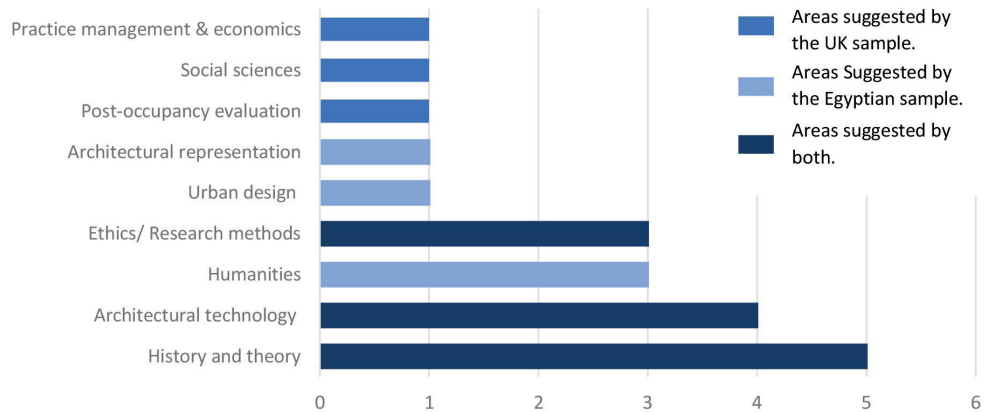


Figure 1: Curriculum areas to support the holistic idea of teaching inclusive design (Menatalla Kasem 2022).

*Recommendations for more inclusive curricula*

The discussion around recommendations consisted of three parts: a) participants' perspectives on whether the needs of various disabilities should be introduced in the curriculum and why; b) ways to include these needs into the curriculum; and c) a discussion on specific support modules. For the first part, all fourteen respondents agreed that the curriculum should target more than the needs of those with physical impairments. They gave a range of reasons largely based on a humane ethical approach, for example, the architect's role being to design for everyone without exclusion, reasoning that disabled people are part of the community. Another respondent, reflecting on the code of conduct for architects, noted:

The architect and the researcher's role is to provide a humane environment for the disabled not only a functional environment that does its function, but also a humane one that cares for different types of people [EG6].<sup>56</sup>

The suggestions on how to implement inclusive design in the curriculum were mostly based on architecture design studio with different modes, except for two respondents who answered that inclusivity needs to be a standalone module, so that the students can have a space for various activities dedicated only to inclusive design. The modes of integrating inclusive design into the architecture design studio can be divided into three themes (Fig.1). First, integrating inclusive design in architecture design studio cumulatively throughout all years, this theme accorded with most respondents (eight). Second, introducing the idea of inclusive design in the last one or two years only was suggested by two of the respondents, both from the Egyptian sample, as they thought that the concept of inclusive design can be difficult to understand for first-year students. Third, including a specific module on inclusive design with integrating the idea of inclusivity in the architecture design studio, was suggested by two respondents.

Ergenoğlu stated that effective inclusive design education needs to provide an interdisciplinary approach.<sup>57</sup> The respondents agreed, with the majority suggesting that curriculum areas can support the holistic teaching and learning

Theme	UK	Egypt
<b>Vitality of designing for real users</b>	'I would recommend that students go and listen to these people, not just about reading books and learning about the knowledge, but actually listen to their lived experience' [UK3]	'What makes the students understand more is that they see this in real life, I think there are certain organisations for disabled people these organisations can visit architecture schools and discuss the spaces needed, the specific material, and orientation, because of their experience in working with them, they know their needs the best.' [EG4]
<b>Ethical and professional duties of care</b>	'Inclusivity should be something that they always consider because it's part of ethics, right? So, it's part of the ethics of being an architect, the professional value that we want students to have, to be either a practitioner or a researcher, it doesn't matter.' [UK3]	'We need our educators to have ethics, which is not only theoretical text, but it needs to be a holistic idea. We need to show the students a role model that when they comply with the ethical procedure it is a win-win situation. And that complying with ethics is beneficial for their projects.' [EG6]
<b>Lack of awareness among educators</b>	'It should be like a speciality, there should be training offered, delivered to all architecture educators. That then would be able to consider all those different ranges of alternative abilities in their architecture education in more detail, and in a more sensitive manner.' [UK4]	'Neither the student nor we as instructors have that level of awareness, to add it to the curriculum, or to spread awareness about it.' [EG5]
<b>Cultural awareness/perspectives on disability</b>	'...there's a lack of understanding of what exactly would these people feel, and what can we do to make those environments better? So, I think it isn't bias or ignorance, it's because we as designers and as architects, we find a lot less in the literature about it' [UK5]	'There is no awareness or a level of accepting others in the students since their early years. In school a student with a mental disability or any other problem, you will find that other students will stay away from him, which leads the school to separate them into specific schools.' [EG7]

Table 2: Issues related to inclusive design teaching (Menatalla Kasem 2022).

of inclusive design. These modules are presented according to frequency of mention.

Furthermore, (Table 2) presents qualitative data was captured through the reflective practice discussions with educators, collated under the following themes: (i) vitality of designing for real users, (ii) ethical and professional duties of care, (iii) lack of awareness among educators, and (iv) cultural awareness/perspectives on disability.

## Conclusion

Although the results of this pilot study showed that architecture design studios include topics related to inclusive design, they also indicated that stakeholder experiences within these two cultural contexts were far from reaching an effective inclusive design curriculum. It suggests that architectural educators need to embrace radical change to their conceptions of disability. The threshold of that change is understanding the social model of disability and acknowledging that the built environment disables many individuals in their

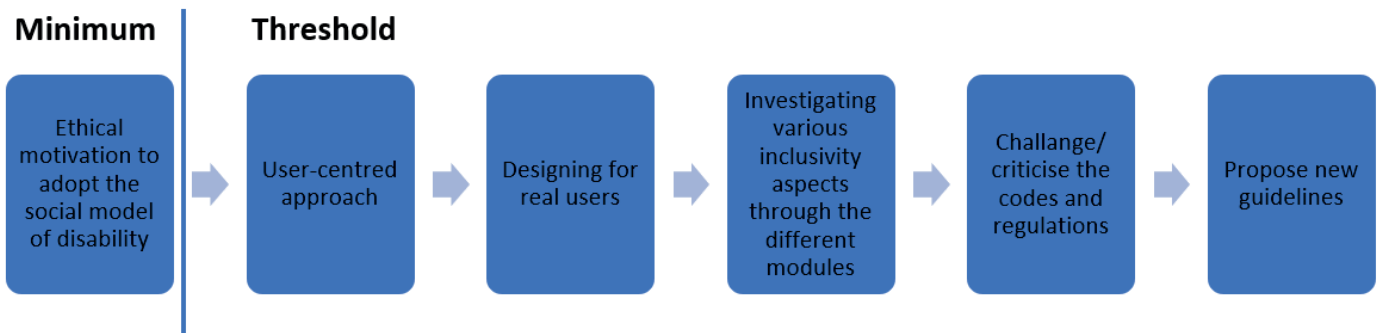


Figure 2:  
Conceptual proposal for  
incorporating inclusive design  
into an architectural curriculum  
(Menatalla Kasem 2022).

everyday lives. Thus, the interpretation of disability in architectural education needs to be thought of in terms of the relationship between the individual and the environment, rather than disability as a condition.

Our conceptual proposal for incorporating inclusive design into the architectural curriculum begins with students who need to be motivated to take up an ethical practice — connected to the architect’s duty to provide a humane environment for everyone — by adopting the social model of disability and, in doing so, meeting minimum inclusive design standards (Fig.2). Going beyond this, students need to be challenged to explore critical user-centred approaches, for example, through stakeholder interviews or live projects. It could be said that we are at an early stage in transformational understanding in the sector, and unless we support it with concrete conceptions of ethical practice, students are less likely to interact deeply with so-called users. Crossing this educational threshold would likely result in students being motivated to design for *real users* instead of relying on normative conceptions/images of users without disabilities, including abstract substitutions based on limited knowledge and/or cultural stereotypes.

To reach a holistic approach for teaching/learning of inclusive design we need to look beyond the environment of design studio and consider other curriculum areas and contexts for exploring inclusivity and relevant challenges from different perspectives. For example, history and theory modules/ electives could explore the roots of the inclusivity paradigm and its evolving terms of reference. This holistic approach could help prepare students for challenging existing building codes limitations, rather than maintaining the status quo and perpetuating designs framed by established precedents and practices. Furthermore, students as emerging professionals could begin to propose new inclusive guidelines and thus affect real change in user experiences of built environments.

A key obstacle to crossing the threshold identified in (Fig. 2) might be time limitations of the curriculum, given the range of teaching/learning activities encapsulated within architecture university programmes that are generally known to be intensive for both students and staff. Another likely obstacle identified by this research could be a narrow legislative sphere with pre-existing building codes that focus on physical and visual impairments, without due consideration of the wide spectrum of disabilities. Nonetheless, students

should be further encouraged to critically reflect on professional ethics, to design beyond building codes, and to explore how we collectively work toward a higher standard. For instance, as outlined in the the United Nations Sustainable Development Goals, particularly Goal 11, to make cities and human settlements inclusive, safe, and sustainable.<sup>58</sup>

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## REFERENCES

- 1 Asli Sungur Ergenoğlu, and Begüm Bayraktaroğlu, 'Integrating Inclusive Design' Awareness into Architecture Education', in *EDULEARN16 Proceedings* (Barcelona, IATED: 2016), 3789-3794p. 3792.
- 2 Kerry Mulligan, Allyson Calder, and Hilda Mulligan, 'Inclusive Design in Architectural Practice: Experiential Learning of Disability in Architectural Education', *Disability and Health Journal*, 11 (2018), 237-242 (p. 238).
- 3 Royal Institute of British Architects, 'Riba Knowledge Schedule Ethical Practice', *Royal Institute of British Architects* (2021) <<https://www.architecture.com/-/media/GatherContent/Mandatory-competences/Additional-documents/RIBA-Knowledge-Schedule-Ethical-Practice-March-2021.pdf>> [accessed 28 April 2022].
- 4 Royal Institute of British Architects Education Department, 'RIBA Procedures for Validation and Validation Criteria for UK and International Courses and Examinations in Architecture', *Royal Institute of British Architects* (2014), 1-72.
- 5 Mais M. Aljunaidy, and Mohamad Nadim Adi, 'Architecture and Mental Disorders: A Systematic Study of Peer-Reviewed Literature', *Health Environments Research and Design Journal* (2021), 1-11, p. 2.
- 6 Jean Sherman, and Sarah Sherman, 'Preventing Mobility Barriers to Inclusion for People with Intellectual Disabilities', *Journal of Policy and Practice in Intellectual Disabilities*, 10 (2013), 271-276, p. 271.
- 7 Sariye Selhan Yalçın Usal, and A. Nilay Evcil, 'Universal Design in Interior Architecture Education: The Case of Store Design', *International Journal of Architecture & Planning*, 7 (2019), 410-427, p. 412.
- 8 Sherman and Sherman, p. 275.
- 9 Ibid, p. 275.
- 10 HM Government, 'Access to and Use of Buildings: Approved Document M\_2015 Edition Incorporating 2020 Amendments', *The Building Regulations* (Online version: 2020), pp. 1-69.
- 11 World Health Organization, *World Report on Disability* (Geneva: WHO Press, 2011), p. 4.
- 12 Ibid, p. 4.
- 13 Ibid, p. 261; World Health Organization, *Fact Sheet on Wheelchairs* (New Delhi: WHO Press, 2010), p. 1.

- 14 Asli Sungur Ergenoğlu, 'Universal Design Teaching in Architectural Education', *Procedia - Social and Behavioral Sciences*, 174 (2015), 1397-1303 (p. 1403).
- 15 Magda Mostafa, 'Let Them Be Heard: Appropriate Acoustics for Autism- Special Needs School Design', in *ARCHCAIRO* (Cairo, Egypt: 2006), 1-16 (p.2).
- 16 Herbert Spencer González, Vanessa Vega Córdova, Katherine Exss Cid, Marcela Jarpa Azagra, and Izaskun Álvarez-Aguado, 'Including Intellectual Disability in Participatory Design Processes: Methodological Adaptations and Supports', in *Participatory Design Conference* (Manizales, Colombia: ACM, 2020), pp. 55-63 (p. 55).
- 17 Anna Szewczenko, and Sylwia Widzisz-Pronobis, 'Implementing Inclusive Design in Architectural Education and Design Practice', in *IOP Conference Series: Materials Science and Engineering* (Prague, Czech Republic: IOP Publishing Ltd, 2020), pp. 1-11 (p.1).
- 18 British Standards Institution, *Design Management Systems- Part 6: Managing Inclusive Design- Guide* (London: British Standards Institution, 2005), p. 4.
- 19 Burçak Altay, Gülnur Ballice, Ebru Bengisu, Sevinç Alkan-Korkmaz, and Eda Paykoç, 'Embracing Student Experience in Inclusive Design Education through Learner-Centred Instruction', *International Journal of Inclusive Education*, 20 (2016), 1123-1141 (p.1126).
- 20 Julie Fleck, 'Inclusive Design-a Lasting Paralympic Legacy? Embedding Inclusive Design Knowledge and Skills into Architectural Education', *Charrette*, 2 (2015), 92-105 (p.97).
- 21 Altay et al., p.1124.
- 22 Fleck, p.98; Aimi Hamraie, *Building Access: Universal Design and the Politics of Disability* (Minneapolis: University of Minnesota Press, 2017), p. 7.
- 23 İlayda Soyupak, 'Architecture as a Matter of Inclusion: Constructing Disability Awareness in Architectural Education', *Periodica Polytechnica Architecture*, 52 (2021), 182-91 (p. 189); Anthony K. Danso, Eric P. Tudzi, and Kofi Agyekum, 'Promoting Education on Inclusive Design of the Built Environment at Knust', *Modern Management Science & Engineering*, 5 (2017), 11-25 (p. 13).
- 24 Soyupak, p. 189.
- 25 Ergenoğlu and Bayraktaroğlu, p. 3789.
- 26 Fleck, p.98.

27 HM Government, 'Disability Discrimination Act', *UK Public General Acts* (Online version: 1995), pp. 1-16; HM Government, 'Equality Act', *UK Public General Acts* (Online version: 2010), pp. 1-33.

28 HM Government, 'Access to and Use of Buildings: Approved Document M\_2015 Edition Incorporating 2020 Amendments'.

29 Burçak Altay and Halime Demirkan, 'Inclusive Design: Developing Students' Knowledge and Attitude through Empathic Modelling', *International Journal of Inclusive Education*, 18 (2014), 196-217 (p. 196).

30 Helen Larkin, Kelsey Dell, and Danielle Hitch, 'Students' Attitudes to Universal Design in Architecture Education', *Journal of Social Inclusion*, 7 (2016), 18-34 (p. 18).

31 Iain Scott, Fiona McLachlan, and Katherine Brookfield, 'Inclusive Design and Pedagogy: An Outline of Three Innovations', *Built Environment*, 44 (2018), 9-22 (p. 10).

32 Fleck, p.100.

33 Ibid, p.100.

34 Ibid, p.100.

35 Ibid, p.100.

36 Ibid, p.100.

37 Isabel Deakin, 'The Issue with Inclusivity: The Promotion of Inclusive Design within Architectural Education', in *EAAE – ARCC International Conference* (Valencia, Spain: 2020), p. 2.

38 Ergenoğlu, p. 1403.

39 Ibid, p. 1403; Scott et al, p. 20.

40 Ergenoğlu, p. 1403.

41 Scott et al, p. 10.

42 Ibid, p. 10.

43 Ergenoğlu, p. 1399.

44 Fleck, p.100.

- 45 'Quotation from Interview', *UK Practitioner 1*, Cardiff/Online, June 2022.
- 46 'Quotation from Interview', *UK Practitioner 5*, Cardiff/Online, June 2022.
- 47 HM Government, 'Access to and Use of Buildings: Approved Document M\_2015 Edition Incorporating 2020 Amendments'.
- 48 'Quotation from Interview', *UK Practitioner 2*, Cardiff/Online, June 2022.
- 49 Fleck, p.100.
- 50 Scott et al, p. 10.
- 51 Ergenoğlu, p. 1399.
- 52 'Quotation from Interview', *Egyptian Practitioner 1*, Cardiff/Online, June 2022.
- 53 Housing and Building National Research Center, *The Egyptian Code for the Design of Outdoor Spaces and Buildings for the Disabled* (Cairo: Housing and Building National Research Center, 2017).
- 54 Nevine Nizar Zakaria, 'Barriers to Social Inclusion with the Egyptian Museums; New Approach Towards Disability', *Curator: The Museum Journal*, 63 (2020), 115-30 (p. 119).
- 55 Fleck, p.100.
- 56 'Quotation from Interview', *Egyptian Practitioner 6*, Cardiff/Online, June 2022.
- 57 Ergenoğlu, p. 1403.
- 58 United Nations, 'The 17 Goals', *United Nations*, (2023) <<https://sdgs.un.org/goals>> [accessed 03 March 2023].