Universal Design in Design Education: Developing a Framework of Cross-Continental Perspectives.

P.J. White[1], Juan Carlos Briede-Westermeyer [2], Hilary Dempsey[1], Gabriela López [2].

[1] South East Technological University, Carlow, pj.white@setu.ie

[2] Universidad Técnica Federico Santa Maria, Valparaíso, Chile.

Abstract.

Since the 1990s, the principles of Universal Design have offered design educators overarching guidelines to ensure the greatest extent of users are included in the design process. Universal Design education has grown widely, in turn inspiring the development of Universal Design for Learning. Universal Design education for design programmes at university level is evolving with an emphasis on addressing global challenges in inclusion. As a result of this change, the conditions in which we embed Universal Design in programmes and curricula need to be understood in greater detail. In this short paper, we initiate research on embedding Universal Design in design education at university level in a global context. We have developed a draft framework by gaining the cross-continental perspectives and reflections of senior design educators working in South America and Europe. The framework shows that the conditions for embedding Universal Design in design education rely on the application of real-world research overlapping with the creation of suitable learning environments for Universal Design. The findings of this draft framework will be leveraged to develop a deeper understanding of Universal Design across continents. The next stage of this research will be to expand the study with design educators in Asia, North America, Australia/Oceania and Africa.

Keywords: Design education; Global education; Universal design; Universal design for learning; University.

1. Introduction.

The original concept of Universal Design emerged in the 1970s through Ronald Mace and a working group of architects, product designers, engineers and environmental design researchers (McNutt and Craddock, 2021). The creation of the seven principles of Universal Design in the 1990s has since offered design educators and learners overarching guidelines to ensure the greatest extent of users in the design process (Centre for Excellence in Universal Design, 2024; Mace, 1997). The original purpose of the principles was to guide the design of environments, products, services and communications. The Centre for Universal Design (2024) defines the seven principles of Universal Design as:

1. Equitable Use
2. Flexibility in Use
3. Simple and Intuitive Use
4. Perceptible Information
5. Tolerance for Error
6. Low Physical Effort
7. Size and Space for Approach and Use.

In the 2000s, the work of Mace and his colleagues inspired the application of Universal Design in learning environments, emerging as what we now know as Universal Design for Learning (UDL) (Rose, Meyer and Hitchcock, 2005; McNutt and Craddock, 2021). Padden (2023, p.100) defines Universal Design for Learning as "*an approach that seeks to offer flexibility to remove barriers which disadvantage learners in an educational setting through multiples means of engagement, representation and expression…* (CAST, 2018)." Whilst the primary focus of this paper is on Universal Design, overlap with Universal Design for Learning was captured and analysed if raised by study participants.

Broadly, Meyer and Norman (2020) state that design education has not kept up with the new demands of the 21st century. Complex real-world human needs and global challenges need to be further understood. In this regard, the United Nations recommends that academic institutions provide training programmes in Universal Design to address global challenges pertaining to inclusion (Harrison, Busby and O'Shaughnessy, 2018). Consequently, the real-life application of the seven principles is becoming more important and involving users a core

requirement, particularly when designing products and services (NSAI, 2019). Using Universal Design principles in isolation in a design curriculum is insufficient. Instead, Universal Design principles need to be coupled with real-life, end-user understanding. In this regard, Finn (2015) states: *"…It's one thing to have Universal Design embedded within a curriculum, at least on paper, as part of various course modules.* This priority is articulated in standards development with the publication of the European standard I.S. EN 17161:2019: *'Design for All - Accessibility following a Design for All approach in products, goods and services - Extending the range of users*' (NSAI, 2019).

Design educators are responding to this challenge by addressing real-world problems in design education curricula. Universal Design principles are now used less as '*prescriptive guidelines*' and are usually coupled with other user-centred design methodologies (Dempsey & White, 2015). As a result of this change, the conditions in which we embed Universal Design in our programmes and curricula are evolving, requiring deeper understanding. In this study, we investigate and document the cross-continental perspectives and reflections shared by experienced design educators. From these insights, we have developed a draft framework to scale and iterate further global understanding.

2. Methodology.

In this paper, we explore a cross-continental understanding of Universal Design in university education. We employ a qualitative approach to report on embedding Universal Design in design education, gaining the perspectives of four senior design educators/researchers (with a total of 70 years of experience) working on two different continents. Two participants work at a European (Irish) university and two at a South American university. Design education in this study refers to creative design programmes, e.g. Product, Fashion, Visual Communication Design. As described by Meyer and Norman (2020), design is a complex field, being both a practice and academic discipline with each category encompassing numerous specialised disciplines. Design disciplines also continually evolve, emerging from interdisciplinary composites (White and Deevy, 2020).

The participants in this study are from product/industrial design disciplines and programmes. We use an open-ended list of questions to collect insights and perspectives. Data was collected in two formats, 1. Via email, where participants were sent a list of open-ended questions and asked to provide written responses which they then returned. 2. An in-person

semi-structured interview using open-ended questions. All procedures performed in this study were aligned to the ethical standards of the universities involved. The list of questions did not involve the collection of sensitive or confidential data. Equally, personally identifying information was not collected. Study participants consented to be involved in the study and responses were anonymised. Participants also reviewed the sample responses published in this paper, providing their consent for these responses to be used. All data were stored on secure university servers. As outlined in the analysis section, participant responses were coded into emerging themes to inform the development of a draft framework.

2.1 Questions.

The guiding research question in this study is: What are the required conditions to successfully embed Universal Design in design programmes and curricula?

The following is a list of open-ended questions that were posed to participants:

1. What are the challenges of embedding Universal Design methods and approaches?
2. What are the enablers of embedding these methods and approaches?
3. What is required in curriculum design and development?
4. What learning environments/conditions or supports are required? (this can be anything from digital/physical learning environments to management supports etc.)
5. From your experience what are the overarching factors needed to embed Universal Design in university level design education and learning particularly when addressing '*real world*' problems?

2.2 Sample responses.

The following is a range of sample responses concerning each question:

Question 1. Sample Responses:

What are the challenges of embedding Universal Design methods and approaches?

> "*Ensuring that research is a part of undergraduate level teaching*."
>
> "*Ensuring that the deep and detailed investigation of humans translates into proposals with high value in design.*"

"*Ensuring research ethics guidelines are in place for undergraduate learners.*"

Question 2. Sample Responses:

What are the enablers of embedding these methods and approaches?

"*Interaction with end users and insights are required regularly.*"

"*Working with people and for people- this generates bonds of commitment and trust that result in empowerment and greater motivation.*"

"*Achieving motivation through raising awareness of people's real needs by highlighting realities outside the university classroom.*"

"*I would suggest two things 1. That studio-based environments are created for learners, and 2. Staff work together collectively to embed approaches.*"

Question 3. Sample Responses:

What is required in curriculum design and development?

"*Flexibility, well-defined briefs with room to move; feedback; time to conduct research and analyse it*."

"*Establish prior competencies for handling and communicating with third parties, gradually and constantly making an effective connection with the environment in various subjects. In this way, the student will be able to observe, evaluate and propose improvements through real interaction with people*."

"*If you want Universal Design to be part of your programme, it has to be embedded across the programme*."

Question 4. Sample Responses:

What learning environments/conditions or supports are required? (This can be anything from digital/physical learning environments to management supports etc.).

"*We need studio-based spaces for making and doing, and iteration*."

"*Spaces that help a disconnection from screens (technology) and help to promote a deep reflection.*"

"*We require multidisciplinary teams to be involved: consolidating professionals from the health, social and engineering fields.*"

> "*I think you need a strong management support structure that understands the importance of what you're doing from an educational point of view and which allows flexibility.*"

Question 5. Sample Responses:

From your experience what are the overarching factors needed to embed Universal Design in university-level education particularly when addressing '*real world*' problems?

> "*We need real-world application and problem-solving, Universal Design principles and user research*."

> "*Developing solutions based on the relationship with people generates empowerment, motivation and a higher level of commitment and trust, which is fundamental to achieve a positive reception by society and communities.*"

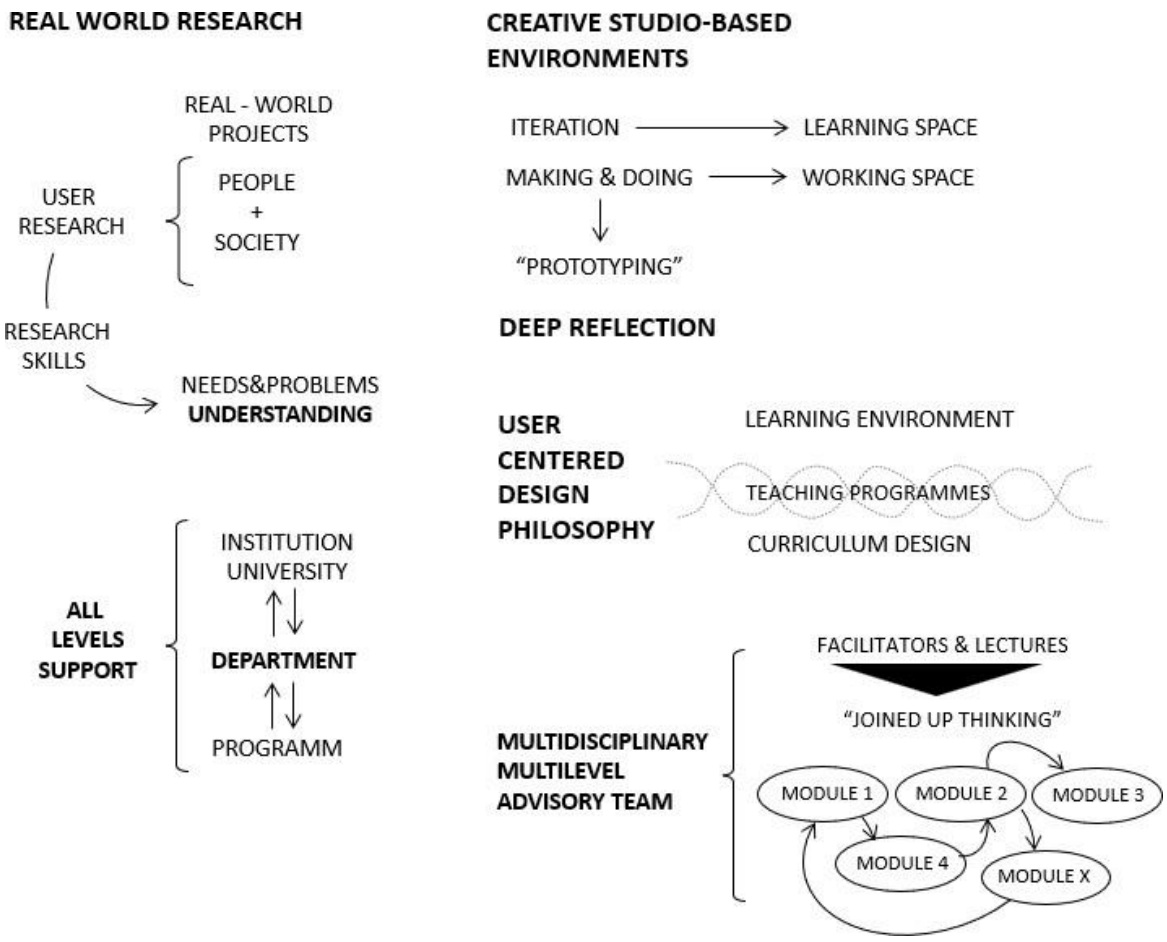
> "*Support from the institution and the department in the management of the environment.*"

> "*User-centred design philosophy throughout the programme; studio-based education with real-life projects looking at real user needs; joined up thinking; communication from lecturers.*"

3. Analysis.

Analysis was achieved by a process of manual open coding in two phases. In the first phase of coding, data was collated by categorising all responses into main themes (White et al., 2023). Firstly, participants' responses were compiled under the corresponding question headings (1 to 5). Following this, detailed coding was achieved by reading and re-reading responses and manually moving text in Word documents to create subthemes (White, 2022). This process was augmented with the use of handwritten descriptive memos. Responses were also colour-coded to help organise them into themes digitally (White & Devitt, 2021 and 2011; White & Kennedy, 2021) (Figure 1.)

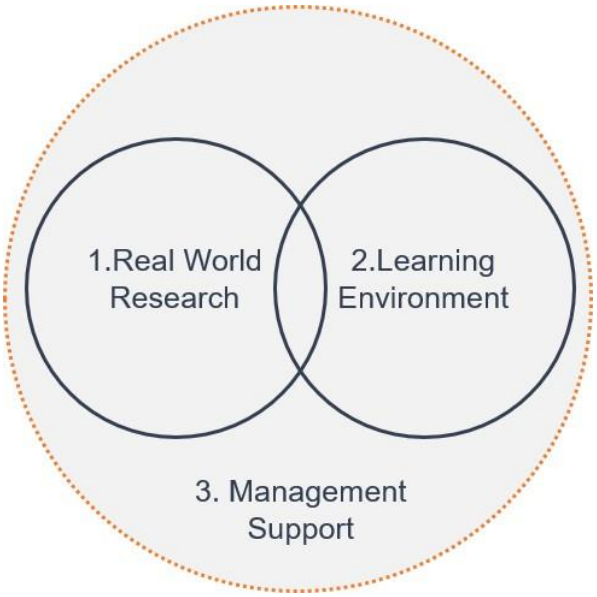
Figure 1. Descriptive memos in the process of analysis.



4. Findings.

Three key themes emerged from the analysis, informing the creation of a draft framework. The framework demonstrates that the conditions for embedding Universal Design in design education rely on 1. The application of Real-World Research which overlaps with 2. The creation of suitable Learning Environments for Universal Design. 3. Managerial Support transcending these themes (Figure 2.). Participant feedback also pertains to UDL.

Figure 2. Draft Framework Conditions for Embedding Universal Design in Design Education: 1. Real World Research and 2. Learning Environment with 3. Management Support.



4.1 Real world research.

There was a strong participant response advocating the application of user research to transform Universal Design Principles from theory into practice through real-world projects. To strengthen this process, detailed research on people and society by students outside the university classroom is required to understand needs and problems first-hand. Participant feedback highlighted the importance of research skills to ascertain and understand user needs. Feedback also identified two important factors: 1) developing competencies in communicating with and listening to end users in context, and 2) building trust and relationships to make this research more empowering, particularly for underserved segments of society. This finding correlates with Meyer and Norman's view on the need for design education to evolve, addressing complex real-world human needs (2020). In line with UDL, engaging in real world research offers learners another means of learning outside of a traditional classroom setting; in this case, understanding and learning directly about societal challenges (University of Limerick 2024).

4.2 Learning environment.

The learning environment that is created and provided to learners is paramount in embedding Universal Design in programmes. Creative studio-based environments are seen as key to this, including learning spaces for iteration and a '*making and doing*' workshop space for prototyping. Learning environments should promote deep reflection and facilitate periodic disconnection from technology. This approach can help mitigate unnecessary distractions that may interrupt the creative flow. There was a strong theme of embedding a user-centred design philosophy, not just in individual modules but across whole teaching programmes. For this to occur, the learning environment and curriculum design require a built-in balance of both structure and flexibility. In terms of UDL, this flexibility is important, flexibility in changing the design of the environment rather than changing the learner (University of Limerick 2024).

Supporting the '*Real World Research*' space of the framework requires environments that promote research within teaching. However, this cannot be achieved without research ethics at an undergraduate level to ensure safety and consent for all parties involved.

4.3 Management support.

Study findings indicate that support from management is a crucial factor in the successful integration of Universal Design within design education programmes. For the aforementioned themes of learning environments and real-world research to flourish, culture-building from management is required. Management support, or what was referred to in feedback as '*buy-in,*' is important at all levels, whether at the overall institution/university level or department/programme level.

Management support provides educators the structure and flexibility to work as a group, and to achieve 'joined-up thinking' and connections between modules on a programme. Participant feedback suggested that the establishment of multidisciplinary/multilevel advisory teams would also be useful in this context.

5. Limitations.

This preliminary study is exploratory in nature utilising a small sample size. Additionally, learner input has not been gathered at this juncture. These factors will be explored in future studies. Future studies will also review and refine interview questions and tools to ensure that

information about ongoing and up to date national imperatives pertaining to Universal Design and UDL within respective geographic territories is gathered and understood.

As discussed earlier, design education in this study refers to creative design programmes, the participants in this study are from product/industrial design disciplines and programmes. In future research, we will widen this to other disciplines that use Universal Design principles in their curricula, and learners.

Despite these limitations, conducting this research offered us an invaluable opportunity to commence a process of understanding the perspectives of design educators globally in relation to the embedding of Universal Design in design education.

6. Conclusions and future research.

The conclusion of this short paper is not the end but the commencement of a process to gain a global understanding of Universal Design in design education. To support this understanding, we present a draft framework developed from the perspectives of cross-continental design educators. In this framework, the conditions for embedding Universal Design in design education begin to emerge.

The findings and takeaways from this paper demonstrate that:

1. The application of real-world research is a strong requirement for Universal Design education.
2. The creation of suitable learning environments for Universal Design is required. These environments should promote deep reflection through iterative phases of '*making and doing*'
3. There is a critical need for management support to create the conditions outlined in the two previous points.

The findings of this draft framework will underpin further cross-continental understanding. The next stage of this paper will be to scale and expand the study with design educators in Asia, North America, Australia/Oceania and Africa ensuring that diverse design educator voices are included. Incorporating gender diversity and interviewees at a range of career stages is also important. Future studies will include learner, alumni and industry views on Universal Design education, to gain rich and holistic global perspectives.

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