A Review of Universal Design in Professional Architectural Education: Recommendations and Guidelines

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Abstract. There is a growing understanding of the widespread societal benefits of a universal design (UD). To achieve these benefits, architectural professionals must have the knowledge and skills to implement UD in practice. This paper investigates UD in the context of recent architectural education. It traces changing attitudes in the culture of architectural education, and the evolving perception of UD as an important aspect of architectural practice. Specifically, continuous professional development (CPD) can advance knowledge of UD within a human-centred design paradigm. An overview of courses and resources available to architectural professionals in a number of countries in Europe and the USA is provided. Specific recommendations and guidelines are presented that were derived from a process of engagement with Irish and international architectural professionals, architectural educators and client bodies through online survey, workshops, interviews and CPD prototypes. The research described was commissioned by the Centre for Excellence in Universal Design at the National Disability Authority, working in partnership with the Royal Institute of the Architects of Ireland (RIAI).

Keywords. Universal design, continuing professional development, architecture

1. Introduction

The recognition of ageing national populations across Europe and in Ireland is well documented, which will lead to a higher prevalence of people living with disability, injury and chronic disease [1][2]. In particular, ageing is related to a reduction in general mobility, cognitive ability, and a reduced acuity of the senses [3][4]. The 2011 Irish census indicated that 38% of the older population self-reported as having a disability [5] compared to 13% of the total Irish population. At the same time, the rate of conditions such as obesity and diabetes in Ireland is currently on an upward trend [6], which is linked to increasingly sedentary lifestyles and changing diets [7]. The design of the built environment is thought to contribute to this by encouraging reduced activity and restricting the availability of healthy food. Regardless of cause, these demographic trends

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result in a built environment that may be challenging, and no longer affording of a good “fit” for an ever-increasing portion of Irish society.

The practice of Universal Design (UD) underpins architectural design with humanistic principles that can reach the broader goal of social participation through the articulation of our environment. UD can be conceived of as the design and composition of an environment so that it can be accessed, understood, and used to the greatest extent possible by all people regardless of their age, size, ability or disability [8]. By drawing the attention of Architects and Architectural Technologists to broader range of societal issues, the resultant UD approach can encourage friendship formation, reduce stigma, and increase participation in social roles, such as work, education and leisure.

This paper traces sketch the influence of UD in informing the education of architectural professionals in Ireland. Drawing on the findings from a research project carried out involving architects architectural technologists, client bodies and architectural educators, the paper concludes by summarising recommendation for the future development of UD in educating Architects and Architectural Technologists.

2. Universal Design in Architectural Education

To address gaps in education for architectural professionals requires an articulation of the gaps that exist. This paper details aspects of an investigation into the core areas of knowledge, skill and competence in UD held by Architects and Architectural Technologists, including those areas required to enhance skills, and the perceptions and preferences of architectural professionals. The investigation also addressed current understanding of UD and the experience of clients and their needs in relation to UD. It involved six stages:

1. Review of literature: See Section 3 for an overview of the UD CPD resources surveyed

2. Online Survey: 382 participants responded, including 315 Architects and/or Architectural Technologists, 23 architectural educators, and 42 clients. The results of this survey have are outlined elsewhere [9].

3. Stakeholder Workshops: 4 iterations in Dublin and Limerick were hosted. Attendance included architects, architectural technologists, architectural educators and health professionals

4. Expert Interviews: 10 interviewees, from Ireland, Norway & Belgium

5. Prototype CPD: 3 iterations carried out in Irish architectural offices

6. Recommendations and Findings: these are outlined in Section 3.3 - 3.4 and Figure 1

2.1. Themes to be challenged in Architectural Education

The research confirmed that there is still a lack of understanding of the role of the body in architecture. The concept of body that filters through the design studio has been framed as being static and docile [10], and not as a dynamic, ever-changing and highly diverse set of experiences.

The fundamental role of people in the making and evaluation of architecture may still not fully appreciated – merely hinted at in the photographs stripped of everyday life in architectural publications [11(p40)] – and it is rare to find comprehensive post
occupancy evaluations that engages building users. Despite this there has been a modest counter-trend of UD thinking permeating architectural education.

2.2. Universal Design in Architectural Education

The history of UD related education in the USA, where early design standards on accessible design emerged, is over 60 years old. In the 1960’s the Andrus Gerontology Center and the University of Michigan Institute of Gerontology were the first to offer graduate programs in gerontology and architecture. A third program followed at Syracuse University in the early ‘70’s. In 1975, the All University Gerontology Center at Syracuse University [12] developed a self-directed learning program that focused on communicating the social significance of barriers, an understanding of human factors issues in accessibility, and strategies for addressing them. The University of Wisconsin subsequently saw the emergence of a research group on ageing and architecture. At the University of California, Berkeley, Ray Liñchez began integrating design for disability as part of basic architectural curriculum. The new approach emerged from the premise that developing empathy with building inhabitants and designing for diversity was a useful strategy to infuse a person-centred design consciousness into architectural curricula[13].

Later multi-university initiatives in architectural education included the 1986 Architectural Design with the Physically Disabled User in Mind project [14] and, from 1993 onward, the UD Education Project (UDEP). UDEP was carried out in two waves (1993-1996) involving 30 universities within the U.S. A later related project in Sweden involved 9 universities. The UDEP initiatives reinforced the importance of infusing UD content throughout the curriculum, previously noted by Liñchez [14][15]. An analysis of UDEP also concluded that a mixture of delivery and content strategies was more effective that any single incorporation strategy.

Moving toward an Irish context, the European Community DraWare Project (1998-2000) was organised by Ruth Morrow, Fionnuala Rogerson, and John Olley in conjunction with design tutors at the School of Architecture at the University College Dublin. The project experimented “… with teaching methods that would lead to the creation of a more universally usable environment” [16], and like many the American programmes, it involved collaboration with users in the design process. DraWare also engaged with the Irish architectural profession through lectures at venues throughout Ireland. While it achieved its aims of raising awareness and levels of understanding both within the student body and amongst architectural professionals of issues related to designing for needs of people of diverse abilities, it proved, like its American precursors, to be short-lived. There are contemporary programmes with reasonable longevity on offer in the USA, such as at the IDeA Center at the SUNY University at Buffalo (http://udeworld.com/training/continuing-education.html).

These programmes did, however, collectively introduce a broad range of teaching approaches designed to engage the empathy of designers toward building users. This legacy is evident in the growing range of UD educational opportunities currently on offer for architectural professionals. This growth of UD educational offerings is related to an increased awareness of its societal benefits.
2.3. Universal Design in Irish Architectural Education

Both social policy and educational policy aimed at creating more socially inclusive built environments now inform European and Irish government policy documents. This in turn has informed undergraduate education and Continuing Professional Development (CPD) requirements for Architects and Architectural Technologists. Echoing international documents such as the United Nations Convention on the Rights of People with Disabilities, UD is underlined in a number of Irish policy documents as a means to address the needs of entire population in an inclusive way, including the “2011-2016 Programme for Government” [17], as well as the “National Housing Strategy for People with a Disability 2011-2016” [18], and the “National Positive Ageing Strategy” [19]. The Disability Act 2005 enshrined a definition of UD in an Irish statutory setting, the Building Regulations have reiterated the UD approach as a means to broadening access to and use of non-dwellings and dwellings [20]. The Disability Act also led to the formation of the Centre for Excellence in Universal Design which its statutory role in promoting the benefits of UD through education, research, the formulation of design standard and provision of design guidance. Other important developments that have supported UD education include the UNESCO/UIA 21 Charter for Architectural Education, the RIAI Statement of Policy on Education and education standards, and Quality and Qualifications Ireland’s standards for university level courses [21][22][23][24][25][26][27][28].

3. Continuing Professional Development in Universal Design

CPD is a mandatory requirement to maintain membership of the RIAI. CPD is defined as:

‘The systematic maintenance, improvement and broadening of knowledge and skill and the development of personal qualities necessary for the execution of professional and technical duties throughout the practitioner’s working life’ [29]

The RIAI defines two distinct forms of CPD activity:

*Structured CPD* is “… a learning activity for which the learning outcomes are identified in advance” [29]. In the course of each cycle, each Registrant/member must accumulate a total of 40 points (hours) of CPD activity, at least 20 of which must be structured. The remainder can comprise structured or unstructured CPD points.

*Unstructured CPD* can include any number of activities relevant to furthering the knowledge skill and competence of architectural professionals [29]. CPD logged by members is required to cross a range of competence areas with relevance to UD including “protecting the interests of clients, consumers, building users, the public interest, and the quality of the built environment” [26].

3.1. Perceptions of Universal Design

According to Schafer and Tait, practitioners' attitudes have a determining influence on how they behave [30], and in particular how they prioritise different elements throughout
the design process. Heylighen surmises that values and attitudes inculcated in a university education can predispose practitioners to value or devalue a new field of knowledge and practice such as UD, depending on how it aligns with previous conceptions of “good design” (Heylighen, 2008).

In the online survey, most architectural practitioners regarded themselves as having at least a good understanding of UD. “Good design” was one of the terms most associated with UD by Architects, Architectural Technologists and clients who responded. Other terms associated with UD included ‘Design for All’, ‘Equality’, ‘Adaptability’, and ‘Usability’. Respondents also associated ‘Accessibility’ with Universal Design, a perception later apparent in the workshops, where UD was closely paired with disability or viewed within a narrow regulatory context. There was, however, a perceived appetite for a CPD approach which would expand understanding and technical knowledge beyond the basic tenets of accessibility.

The main sources of pre-existing UD highlighted by research participants included direct past experience with design and construction projects. Publications such as “Building for Everyone: A Universal Design Approach” and “Universal Design Guidelines for Homes in Ireland” served as important sources of knowledge accessed regularly by practitioners.

Existing CPD proved only to be a moderately valuable source for just over half of Architects and Architectural Technologists who responded, hinting at either a lack of availability or a lack of applicability and/or attractiveness of existing CPD in UD.

Third level education was the second least influential source of UD knowledge for Architects and Architectural Technologists responding to the survey. A number of expert interviewees with a role in architectural education reflected that current architectural education still does not emphasise the importance of meeting the needs of building users. This suggested a need for CPD to provide for basic theoretical knowledge of UD.

Respondents indicated the importance of understanding the needs of different populations. The literature review and interviews identified personal lived experience as a possible factor influencing perceptions. According to experts interviewed with a role in education, older professionals recognise the importance and relevance of UD to their own lives due to their own personal life experiences. This did not discount their feeling that younger professionals can develop an empathy for user needs when provided with proper support and training.

3.2. Universal Design CPD Opportunities

The research project involved collating data for existing courses and CPD material in Ireland and from 9 other countries listed in Table 1. 60 structured and 66 unstructured CPD opportunities were examined in total. The overview cannot claim to be comprehensive due to a number of limitations including language, a reliance on internet-based searches, and a concentration on countries with which the research team had some pre-existing familiarity or access to information.
Table 1. Overview of Universal Design CPD analysed in the international review.

<table>
<thead>
<tr>
<th>Country</th>
<th>Structured CPD</th>
<th>Unstructured CPD</th>
<th>Less than Half Day</th>
<th>Half Day &amp; more</th>
<th>Defined Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>UK/NI</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>USA</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Norway</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Denmark</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Germany</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>Austria</td>
<td>Y</td>
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<tr>
<td>Switzerland</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>Spain</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Italy</td>
<td>Y</td>
<td>N</td>
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<td>Y</td>
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<tr>
<td>Singapore</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Finland</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
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<tr>
<td>EU</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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</tbody>
</table>

Of the CPD material examined the most prevalent topic for both unstructured and structured sources was a focus on specific building types (see Table 2): and housing was by far the most common building typology references. The theory of user-centred design also featured highly, followed by specific building elements and wayfinding.

Table 2. Most prevalent Topics and User groups addressed in Universal Design CPD (In order).

<table>
<thead>
<tr>
<th>UD Topic</th>
<th>Population Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Building Types</td>
</tr>
<tr>
<td>2</td>
<td>User-centred design</td>
</tr>
<tr>
<td>3</td>
<td>Building elements</td>
</tr>
<tr>
<td>4</td>
<td>Wayfinding</td>
</tr>
<tr>
<td>5</td>
<td>Building systems</td>
</tr>
<tr>
<td>6</td>
<td>Urban design</td>
</tr>
<tr>
<td>7</td>
<td>Conservation</td>
</tr>
<tr>
<td>8</td>
<td>Site design</td>
</tr>
<tr>
<td>9</td>
<td>Transport</td>
</tr>
<tr>
<td>10</td>
<td>Landscape</td>
</tr>
<tr>
<td>11</td>
<td>Natural heritage</td>
</tr>
<tr>
<td>12</td>
<td>Usability</td>
</tr>
<tr>
<td>13</td>
<td>Signage</td>
</tr>
</tbody>
</table>

Of the population groups that featured in reviewed CPD material, “older people” was the most frequent group to be addressed, followed by people with cognitive difficulties, people with visual difficulties and people with mobility difficulties.

A substantial quantity of accessible literature in book form, on websites and on video was available in all countries investigated, not surprisingly outnumbering the number of lectures, courses, workshops or conferences available. Of the CPD events and training, the majority were delivered in person rather than remotely, with the use of case studies a common tool for conveying UD content.
3.3. Preferred Universal Design CPD Topics

**Needs of different populations:** Stakeholders participating in the research project generally indicated a desire for better access to information regarding the needs of different populations. The survey findings and expert interviews, suggested particular knowledge gaps of populations with non-mobility related and hidden disabilities, particularly amongst older adults. These include but are not limited to seeing difficulties, hearing difficulties, mental health conditions, cognitive difficulties, and bladder related issues.

Courses focused on one population group were not recommended by workshop participants due to the risk of encouraging design for a single population and the impossibility of being able to silo users into one population group. Stakeholders clearly emphasised an approach that focused on the whole person, avoiding any perception that all people with one type of condition or limitation have the same needs.

**Client Communication:** “Client requirement” was identified as the most significant motivating factor for Architects and Architectural Technologists to undertake UD CPD. Study participants also expressed an interest in CPD content that provides guidance on communicating the benefits of UD to clients, as well as colleagues in their practices.

Suggestions from the interviews, online survey, and workshops for knowledge that would be helpful for Architects and Architectural Technologists to communicate to clients included:

- How to demonstrate the “value” of investment in UD versus “cost”
- Tools to demonstrate that a universally designed building is a quality building
- Examples demonstrating market advantage for corporate, public, and private clients
- Facts and figures demonstrating the long-term advantage of UD e.g. life cycle costs, business case, etc.
- Examples explicitly showing the difference between UD and design for disability

**Theoretical content:** The theoretical backdrop to UD (e.g. the Principles, Goals, frameworks, historical evolution) was considered vital by interview subjects, and a desire for a basic understanding of UD principles and ideas emerged from the workshops.

**Specific building types and elements:** Online survey responses identified the application of UD to building types and elements as two of the more desirable topics and themes for new UD CPD. These respondents specifically identified the topic of Lifetime/UD Homes as highly desirable as a more in-depth course. This was reinforced by in workshop discussions. Additional typologies recommended for pursuit after housing included other salient topics such as healthcare, public buildings, and conservation/heritage.

3.4. Preferred Universal Design CPD Topics

**Delivery of UD knowledge: foundations, building blocks, and applications:** Stakeholders in the research identified a need and desire for UD information at different levels or streams. Three levels emerged, which are outlined in Figure 1.
Figure 1. Diagram outlining recommendations for Universal Design CPD courses.
Foundations courses would provide a general introduction into UD that presents its origins, central features, its emphasis on user needs, and its benefits for the public and client organisations.

Building blocks course address the application of UD to common building elements, applicable across multiple project types, such as entries, acoustics, lighting, etc.

Applications courses aim would apply UD thinking and strategies to more specific and specialist areas.

Use of exemplars: The research identified the need to disseminate good examples of UD implementation in order to encourage widespread adoption of UD practice. The big challenge is configuring a mechanism for gathering and communicating good examples which can explicitly reinforce UD as a fundamental of any good design approach. One workshop suggestion was to use social media tools to “crowd source” projects and to have designers and users contribute suggestions for exemplar projects. The international CPD review showed that crowdsourcing was used in Norway (http://www.tenkuniverselt.no/) to help collect best-practice examples, while similar methods are currently in use to gather bad examples of accessible design through the use of the Twitter handle #accessfail. More conventional archiving of examples is also due to be implemented in Norway, where award-winning projects with UD features are to be collected for educational purposes (https://www.arkitektur.no/prosjekttilskudd-til-universell-utforming). Using methods such as these could allow CPD developers to take advantage of the experience and expertise of those practicing in the field and those experiencing the buildings and spaces first hand.

Experiential learning opportunities: A desire emerged throughout the research project for learning based on the direct experience of users and experienced designers to endow a practical understanding of the application of UD knowledge. A number of formats that applied this type of knowledge included

- Guided tours of buildings and spaces (in-person or documented, e.g. video, voice recorded, etc.)
- Direct testimony (in-person or documented, e.g. video, voice recorded, etc.) – examples of this approach were presented in chapter 2 and both CPD 75 and CPD 125 offer compelling examples of its efficacy
- First person narratives presented in reference materials – existing examples include Cheryl Davis’s accounts in Lifchez’s “Rethinking Architecture”[32,33].
- Site visits at places where people are living, and interaction with residents.

Simulation exercises, where course attendees simulate physical and sensory impairments, were discussed by study participants as a valuable learning tool – although this view of simulation exercises was not shared by all interviewees, and has been questioned in the literature 34.

Hybrid approach to delivery: A hybrid approach to content delivery emerged as a means to bridge the gap between practitioners’ need for immediate access to project-specific information and an expressed preference for in-person instruction. This type of course could utilise the rich availability of self-directed learning in combination with in-
person educational experiences. It could also provide “primer” materials (e.g. introduction to UD, needs of different populations, etc.) to course attendees online to be absorbed prior to attending the actual course in person.

This strategy was also proposed as a means to deliver follow-up materials, with the potential establishment and use of a repository of online resources such as the that created by Design Council CABE in the UK (https://www.designcouncil.org.uk/what-we-do/built-environment/inclusive-environments) and to build on the materials available through the Irish CEUD website (www.universaldesign.ie).

4. Conclusion – Universal Design CPD Recommendations

This paper provided a brief overview of UD in architectural education in Ireland, within an international context, and provided a framework for developing CPD in UD for Irish Architects and Architectural Technologists. The recommendations are summarised in Figure 1. One of the most important findings of the research is a demonstrated need for new CPD in UD that moves beyond a focus on interpreting regulation and accessibility. It was found that CPD in UD can have a broader value than just helping professionals meet regulatory requirements - it can also provide information and resources that increase design agency, or the intervention in wider societal structures with the aim of benefitting others. This can empower Architects and Architectural Technologists to creatively approach designing for an increasingly diverse population.

5. Acknowledgements

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