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Title	The familiar and the strange: the limits of universal design in the European context
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Publication date	2013-11-01
Original Citation	Harrison, J. and Dalton C. (2013) 'The familiar and the strange: the limits of universal design in the European context. 3rd International Conference on Universal Design in the Built Environment, ICUBE2013, 11-12 November. IIUM Malaysia
Type of publication	Conference item
Link to publisher's version	http://kudu2013.blogspot.ie/2013/11/icudbe-2013.html
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Download date	2026-11-07 13:23:40
Item downloaded from	https://hdl.handle.net/10468/2642

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THE FAMILIAR AND THE STRANGE: THE LIMITS OF UNIVERSAL DESIGN IN THE EUROPEAN CONTEXT.

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INTRODUCTION

The great intention of Universal Design is its encompassing nature, to enable a wider cohort of people than before to benefit from accessibility, safety and usability without discriminating against anyone. In the design of the built environment there are inevitable limits, however. The Seven Principles of Universal Design formulated in 1985 by Ron Mace, the instigator of Universal Design, state that facilities should be designed to be usable 'to the greatest possible extent', rather than 'by all', recognising that there are limits to providing this inclusion to everyone in all situations (Preiser 2001). For designers, an understanding of these limitations, especially in respect of legislation, is an important step towards better and more integrated design; furthermore, understanding something about the ways in which we design can actually help us extend our skills and design more creatively.

Universal Design and Inclusive Design have now gained wide acceptance as similar concepts, even where there may be limited evidence of it being put into practice in the built environment. Although building codes require significant elements of construction to be made barrier-free, it is much more difficult to legislate to make a more comprehensive and 'joined-up' environment overall. And yet the very real problem for many people is often that some of the important parts of the accessible environment may not connect at the interfaces; this may be because separate elements are provided by different agencies and are governed by different codes. A clinic, for instance, may have different standards to the dwelling place; public buildings may be accessible and usable by people with a range of disabilities, whereas the road system is the responsibility of another authority, with its own standards, and then the bus service operates in a completely different way. Thus the simple narrative of a person going to a clinic will be subject to standards and constraints that vary quite widely. The roads or footpaths that they walk or drive on are relatively permanent, subject to some degree of maintenance, whereas the public transportation system changes all the time; vehicles have different specifications and the personnel who operate them need to be properly trained to sustain a vital degree of user-friendly service.



Fig 1. Dublin's Luas tramway: the built environment and mobile system interface.

EMPATHY IN DESIGN

"Good design", in the sense traditionally accepted in architecture, interprets "commodity" and "functionality" as usability, which in turn demands an understanding of the users and their limitations. In any design problem the designer should have a fundamental empathy with the people it will serve if the end product is to be 'inclusive'. In the public realm this will include people of widely differing ages and abilities, presenting us with challenges that require observation, imagination and empathy.

"The ability to enter the private world of another person in a non-judgmental way is essential to our use of the concept of empathy." (Beddel 1997)

Through a better understanding of the way in which we design we may be able to improve our approach to those new design situations with which we are faced. The first steps often involve a summation of what we see as the priorities and to research the areas in which we do not have previous experience. This may be described as 'making the strange familiar', a phrase that was coined by William Gordon and others in their original work on design methods, which they named 'Synectics' (Gordon 1966). Their corollary to this first step, 'making the familiar strange' is a more valuable design tool, since it challenges the designer's creativity to reassess the ways in which we carry out all sorts activities on a daily basis,

then allowing us to choose or modify the places and equipment to improve the design outcomes. In Universal Design this is especially useful; no matter how familiar we may be with the regulations and codes on access, it calls for a greater use of our design imagination to understand how these will actually benefit (or possibly hinder) the wider range of people who will eventually use the places we have designed. It is generally acknowledged that many of the designers who will shape our environments, both public and private, will probably be young, fit and possibly male, so that it may take a fairly major extension of their design imagination and ability to empathise with the needs of an eighty year old female with impairments of vision, mobility or incontinence. In order to put the requisite elements in place to make the design not only suitable for this individual but also for a host of other people, in other words to apply the principles of universal or inclusive design, the designer will inevitably go through a process of reappraising the things with which they are familiar by 'making them strange' and so see them in a new light.

Attitudes to people with disabilities have improved in recent years, but there is still some reluctance among architects and building owners to invest in facilities to make the buildings more user-friendly, either for reasons of cost or in the mistaken belief that this will hamper the aesthetic quality of the end product. In all European countries, including the United Kingdom and Republic of Ireland, comprehensive and enforceable access legislation is in place to promote and enable independent living, along with safety and accessibility. In addition, much information on the interpretation and extension of these codes is available for designers; in fact the proliferation of web publications from both government and other institutions can be quite bewildering. Sources for designers that are both comprehensive and comprehensible are valuable, since legislation, defining what must be done, and best practice, demonstrating with examples of how best this can be achieved, are not the same thing.



Fig 2. Many access features are added on to older buildings, which would not be acceptable in new-build

LEGISLATION IN IRELAND

In Ireland, which is a member of the European Union, the general adoption of the principles of universal design was included in the Disability Act of 2005. The definition of UD appears in a more edited form than the original North Carolina version, being aimed largely at the built environment rather than design in general this requires:

"The design and composition of an environment so that it may be accessed, understood and used

i. to the greatest possible extent,
ii. in the most independent and natural manner possible,
iii. in the widest possible range of situations, and
iv. without the need for adaptation, modification, assistive devices or specialised solutions, by any persons of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability."

There is also provision for communication*:* the requirement for usability applies *"In relation to electronic systems, any electronics-based process of creating products, services or systems so that they may be used by any person."* (Disability Act 2005)

In response to the Disability Act 2005, the Centre for Excellence in Universal Design (CEUD) was established in January 2007 under the aegis of the National Disability Authority. The Centre's stated roles are:

a. to contribute to the development and promotion of standards in Universal Design,
b. to ensure education and professional development and
c. to promote public awareness of Universal Design.

The CEUD's publication in 2012 of the comprehensive 940 page "Building for Everyone: a Universal Design Approach" gives guidance on best practice in the design, construction and management of buildings and landscapes (CEUD 2012). The information in these 10 booklets goes well beyond the basics set down in Technical Guidance Document part M 2010) and also shows the reasoning behind the requirements of these Building Regulations. This marks a significant step towards a more integrated built environment in the country.

ACCESS STATEMENTS AND CERTIFICATION

Inclusive or universal design demands 'joined up' thinking, but this is difficult to describe generically in legal terms to ensure that it is done. Current requirements in the UK require planning applications to include a more holistic 'Design and Access Statement' which is a short report accompanying and supporting a planning application to describe the strategic elements of making connections between the buildings and facilities, vehicular access and parking. Local authorities have some control over the extent of these and standard templates and advice may be downloaded to assist the applicant. For example statements *"should show that the person applying for permission (the applicant) has thought carefully about how everyone, including disabled people, older people and very young children, will be able to use the places they want to build. Demonstrating how the local context has influenced the design is also an important element. This should be discussed in relation to the scheme as a whole."* The Government's design adviser, the Commission for Architecture and the Built Environment, has produced guidance on how to write, read and use design and access statements (CABE 2011). However, this legislation is currently under pressure by the present Conservative government in order to speed up planning applications and reduce staffing loads so may only be required where projects of a certain size, or in conservation areas, are involved, thus eroding the advantages recently gained, despite government claims that "this would remove statutory burdens on applicants, but it is not considered that this would be at the expense of good design and accessibility."

In 2010 the Irish government introduced the Disability Access Certificate, relating to the relevant parts of building regulations, apparently without reference to CEUD. It was felt that this might encourage local authorities (of which there are 37 in Ireland) to enforce disability standards more thoroughly. But although this is a 'prescriptive' standard and applies only to individual parts of new buildings or major adaptations, the interpretation of this is still left to the discretion of the local inspector and is quite loose in its definition; as such it returns to the simple ticking-the-boxes approach that falls short of encompassing universal design principles (Swanton, D. 2013).

Legislation to require accessibility is not the same thing as universal design, but is an important back-up to it. The Disability Discrimination Act in the UK, and similar anti-discrimination legislation in other countries, follow another route to enforce alternative ways towards creating a more 'joined up' and inclusive environment (Disability Discrimination Act 2005). This also has the benefit of applying to existing buildings, not just new-build or refurbishment, as with building codes. But, by definition, anti-discrimination legislation will only make sense in countries where other forms of equality are pervasive.

Although the imperative for buildings to become more 'user-friendly' may be becoming increasingly accepted by the design professions, there are still areas of ignorance or grudging acceptance just to satisfy the basic requirements of the Part M technical document. (Swanton 2013) Attitudes to disability may continue to improve, but there is no place for complacency. In Britain the influence of the 2012 London Paralympics undoubtedly helped in changing attitudes – and yet there may be a misconception that all people in wheelchairs or using prosthetic legs are capable of winning athletic events, whilst needs of the less-able are overlooked and complacent attitudes feed on generalisations about disability. There is, of course, only one Stephen Hawkins.

Education in user-friendly design is a key factor in improving the built environment and this includes disciplines other than architecture. As previously mentioned, in Ireland significant initiatives are being taken by the Centre for Excellence in Universal Design. The CEUD remit also includes more ephemeral applications in ICT, as defined in the Disability Act of 2005. Recently a Universal Design Module has been sponsored by the Centre to develop third-level instruction which is currently being trialled at Dublin Institute of Technology. Efforts to extend this initiative into the design courses in architecture, interior design, civil engineering and product design are still awaited but are certainly needed.




Fig 3. The home environment is familiar, both in personal and family/communal spaces.

HOME AND AWAY: TWO DIFFERENT WORLDS

In assessing the success and limitations of Universal Design in the built environment, and to postulate how and where it may be extended or further improved, it is useful to consider one of the most fundamental factors about the way we use our world. For almost everyone, except the housebound (and they are a cohort we shall later consider), there are two distinct worlds that we inhabit. Our familiar, home or 'everyday' living space: our dwelling, workplace, the pavements we use to connect with the bank, post office, shops and everything that we use regularly. And these may be further divided into the more personal zones which have been used and tailored over time by ourselves, our families and those we share that space with, and the other places we use regularly and have learned to use for our own comfort, safety and security. For those who need them, fixed assistive devices may be appropriately installed, ranging from handrails to powered stair lifts.



Fig 3. In an unfamiliar setting we rely more on conventional design and wayfainding symbols.

When we venture further into the world, however, travelling or using unfamiliar facilities or services, we are outside our own 'home-zone' Out there is a bewildering array of unfamiliar places and things in the public domain which we all have to confront in order to use the facilities, drive our car or visit another location. In order to make this use possible a well-designed built infrastructure will take into account the various requirements of its users, including those who use assistive devices for mobility, such as ramps, and handrails for the greater safety of older people. It is most likely also to present internationally recognizable conventions in the way the built environment is formed in general, from the road or footpath layout to the door handles, information and signage or the facilities that we need for convenience.

For people with visual impairment these conventions can be particularly important. Whereas it is relatively easy to impose components for physical access, it is more difficult to design for sensory impairment; the design issues in this field seem to be the most contentious, possibly because it is more difficult for the average architect to imagine the potential problems for this user group. In Europe it is not uncommon for people with vision impairment to use a guide dog to assist them in getting about independently, particularly in the public domain. These fully-trained dogs are taught to recognise the conventions of the everyday built environment, from the kerbs at the edge of footways, pedestrian crossings, steps and doorways. Whereas the human mind can process visual information and make a rational judgement, for the guide dog there is no such refinement. Consequently a short ramp at a pedestrian road crossing, rather than a defined kerb, may not signify the edge of the pavement to the canine brain, with hazardous results as the dog and owner venture into the path of moving vehicles. In this way it might be said that the limits of universal design extend to non-human users!



Fig 4. In Europe many blind people use guide dogs to assist them in the public domain.

One recent and contentious initiative in Europe is the ‘Shared Space’ concept, whereby urban traffic and pedestrians are not separated by distinct edges (Trinity Haus 2012). The logic is to ‘tame’ motor traffic on urban streets, relying on courtesy rather than road signs, white lines and traffic lights. Whilst some schemes in the Netherlands and elsewhere have been seen to work adequately, this may be due to the novelty and the politeness of the drivers. For many pedestrian users and cyclists the concept is not appealing; in the UK the National Guide Dogs for the Blind Association has spoken out about this, since people with low or no vision are especially vulnerable. People with limited hearing also find this unfamiliar situation quite inhibiting. This is a case where the street, with changes to its familiar conventions, is suddenly made unfamiliar to an intolerable degree.



Fig 4. The concept of ‘shared space’ seems attractive, but presents problems for some users.

Travelling to another country often highlights those apparently commonplace aspects of our environment, even though globalization and travel have brought a high degree of homogeneity in the everyday equipment and facilities that will be encountered; but in Asia, for instance, a Westerner will find conventions that are quite different from home. Traffic may travel on the opposite side of the road and even the way the bathroom is used needs to be explained to the newcomer. Tourism is a major economic factor in many countries and a high proportion of the people who travel are described as 'active-elderly' and though they may have only minor impairments in mobility and vision, well-designed elements in the built streetscape can make their visit more comfortable and safer. Tactile guide or warning strips on footways are there for the benefit of users with vision impairment and can be interpreted like a code, but even this may vary from country to country, or even between cities. Those whose responsibility is to provide such facilities may work from guidelines and standards current in the location, but may not understand the importance of the consistency that is essential to make the user feel comfortable and secure when using these. In Ireland, for instance, it is not unusual to see tactile strips that end in blank walls or flower beds; clearly the designer had little empathy for the people who should be able trust these strips.



Fig 5. Tactile Strip, Dublin. The designers obviously have little understanding of its use.

In order to make public spaces usable there are innumerable conventions and standards that we expect whenever we go to a new or less familiar place, without having to read instructions or learn new rules. As we have discussed, in any design it is important to distinguish between two domains; the first, the individual's 'home zone', which is familiar so may generally be used without difficulty. In the public domain, however, the same person may be a stranger and hence much more reliant on inclusive design, which accommodates the widest range of users, many of whom may be using it for the first time. The less familiar the setting, the more the benefits of standardisation and inclusive design come into play, implying various design compromises, balancing physical needs against intellectual ones; the connectivity and 'legibility' of the overall environment and its detail design become a matter of particular concern for the designer, to benefit the "greatest number of people" referred to in the 7 Universal Design Principles.

As we all become more mobile, locally or internationally, we may expect public amenities such as toilet facilities, cash machine or telephone to have some degree of uniformity or to provide enough conventional clues to allow for their use without confusion. In an ever-changing world, new technologies bring their own challenge, even close to home. For instance, the personal electronic communication devices that we use everyday often seem to be confusingly over-sophisticated, particularly for the older user; who has not been baffled by the array of buttons on a hand-held remote control or mobile phone, when it is necessary to make a 'long-hold' action for 2 seconds in order to activate some application?

AGEING, DISABILITY AND BECOMING 'HOUSEBOUND'

In order to understand the best way to include the widest range of users it is necessary to recognise the range of abilities that must be served and hence to be able to prioritise their different needs. Universal Design, having moved on from 'barrier-free' design, embraces more diverse needs than just providing for people with disability and recognises that in everyone's life course various forms of disability will be experienced, with differing degrees of seriousness.

Perhaps one of the greatest advantages of adopting universal design principles is that they are inclusive of everyone, and not just providing for 'special needs' users or thinking merely of a 'barrier-free' environment. Older people benefit not just in better mobility but also in terms of personal safety. The Principles of Universal Design do not specifically address the removal of hazards, which should be a *sine qua non* for any design, but in designing for less-able people this is so vital. Health and safety legislation and the powerful threat of litigation have made owners and authorities become more aware of their responsibilities, but there are still many areas that are causes for concern. Minor disabilities, none of which the person might describe as a medically-recognisable case, can affect many people as they age. Reduction in visual acuity, loss of balance, fatigue, pain from arthritis or a combination of these and other conditions will inevitably inhibit the individual in their daily life. For many older people the awareness, and often the very real experience, of falling or other accidents, will quite understandably cause them to develop phobias about going out, for fear of tripping or the embarrassment of being unable to cope with unfamiliar situations. A simple accident may lead to permanent disablement, hospitalization or worse. Though people are generally living longer, the prospect of being housebound in their later years is not acceptable.

Global demographic changes show that the age factor is particularly significant, with concomitant forms of disability. In Europe the incidence of dementia amongst elderly people is predicted to rise substantially in the near future, and so it becomes incumbent on designers to provide for greater ease-of-use in the public domain, and to understand that this is not confined to designing for physical accessibility, but also for comprehensibility and legibility.

Models of person-environment interaction have shifted in recent years, across disciplines, and can be best described as transactional, where the person is seen as being "embedded" in their total environment, and in a state of constant interaction. Understanding that this a more elaborate way of making the statement that "good design enables; bad design disables", how then can improved design, and especially emerging technologies, extend the limits of usability of anything that is designed, in both the public and the individual domains?



Fig 6. A centre for dementia patients needs special attention in design.

DESIGN FOR AGEING IN THE HOME ZONE

The less familiar the setting, the more the benefits of standardisation and inclusive design come into play. Any person may adapt over time to using his/her neighbourhood in a manner that maximises ease of use, by using the most efficient routes, or by favouring certain places over others on the basis of personal preference and usability. Where a person is unable to adapt further to the environment, and where that environment is not capable of ready modification to improve usability, a conflict occurs. The mismatch between person and environment can be expressed as stress in the person; over a longer period, ongoing stress can impact negatively on wellbeing. For example, a person with dementia is said to have "low threshold" for environmental stress, arising out of increasing cognitive impairment. Everyday tasks present increasing difficulties as the disease progresses. This, however, is a two-way-street; Burton describes how environments designed to maximise usability can be used for longer by an individual, and can act so as to slow or halt loss of function within the environment (Burton 2006).

Many of the behavioural problems associated with the later stages of dementia, especially where the patient loses their temper and becomes violent, are directly attributable to frustration with the

environment in which they have been placed and which they do not recognise and cannot understand. Good design should be easy to 'read', taking into account the abilities and experience of the users. For many older people, however, this may be more problematic, since their ability to process information in a logical way may be impeded. Their surroundings and the equipment that is the extension of living must consequently seem familiar to the user. Herein lies something of a paradox as universal design principles are not necessarily workable for this cohort of users. As an example of this problem, consider the specification of lever taps (faucets), now widely specified because they are easier to use for people with manipulatory problems such as arthritis; but for a person with dementia this will not be recognised as a tap because it does not have the familiar shape of the taps that they have used throughout their life. So although the Third of the Seven Principles of UD asks for 'Simple and Intuitive Use', clearly this does not work for one particular set of users; the strange remains strange to them.



Fig 7. Lever Taps are now commonly specified, but may be confusing to some users.

FUTURE TECHNOLOGIES

When we consider how much technological sophistication there is nowadays in even the most basic car it is disappointing that buildings are nowhere near as advanced. Although the 'smart homes' concept has been around for some time and the technology already exists to achieve more user-friendly buildings, we rarely see any major application in this area. One reason for this is might be that the construction industry deals more with 'one-off' projects, the product of which are meant to last a long time, whereas the automotive industry mass produces vehicles and relies on technological superiority in each new model that it launches.

Design solutions may apply current technology in two ways: firstly we can use various communication devices, such as sensors and the kind of applications ('Apps') that are used extensively on mobile phones, Bluetooth or RFID (Radio Frequency Identification) with proximity sensors as used for audio guide handsets in museums and art galleries. These can be located to activate existing parts of the building, such as opening doors, switching lights or providing information of any kind. Through the use of wearable sensors the services can be designed to respond to the individual needs of the building user, rather than just for people in general. We are all used to the automatic door openers on public buildings, but these are not selective; for a more limited range of users the door might only open to individuals who carry some form of identification, which may be preset to inform the system of their personal needs (Harrison & Dalton 2011).



Fig 4. Platform lift in a museum returns to a usable stair when not used for wheelchair access.

The other approach embraces appropriate ways to use the available technologies, whether simple or sophisticated, to allow us to re-think the activities that we take for granted; there may be other methods by which we could perform everyday functions such as moving about, eating, toileting and many other activities, made possible by applying our design imagination at a more strategic level.

"The key agent in this transformation is that of imagination, because it is only through the exercise of imagination that one can see the potential for change in what otherwise might appear restrictive. Social or architectural reality, if viewed as a set of determinate rules and procedures, tends to shut down the imagination, because the apparent certainty leaves no gaps for it to open up. However, the contingent, with its multiple but uncertain potentials, allows the imagination room to project new futures." (Till, 2009)

Universal design, by its very nature, urges this approach, but so far we see very few examples of this in practice. The potential exists for 'Adaptive Architecture' to provide more accessible and user-friendly solutions, where sensors can instantly personalize particular aspects of the building to compensate for the individual's limitations, mental or physical; all that is needed is imaginative designers to put this into practice.

CONCLUSION: BACK TO UNIVERSAL DESIGN

As we have seen, some paradoxes arise when considering Universal Design; the beneficial elements should be unobtrusive and yet pervasive, which is not easy to achieve. People do not wish or need to see strident or glaringly obvious components and signage, with elements such as ramps and contrasting colours on kerbs or step nosings, or the ubiquitous blue wheelchair sign on every door or facility. Although some facilities, such as 'disabled' parking, must be reserved for people with disability, these are obviously not 'inclusive'. But there is no reason, beyond cost, that all public toilets should not be wheelchair-friendly and all levels of buildings accessible by everyone, without the need for a designated elevator. Such things are more feasible in new buildings, and it is often the tacked-on access facilities, lacking in aesthetic quality, where existing buildings have been made accessible that actually give accessible design a bad name. Like the good pair of shoes, you should not actually be aware of Inclusive design as you use it; only the educated eye of the designer recognises the quality where it exists.

As with any high-minded principle, achieving of environments that are fully usable by everyone is something of a pipe dream, but even though it is a utopian state, that should not mean we shy away from the challenge. The use of the phrase "to the greatest extent" should encourage, rather than deter, our motivation to widen the extent to which design will apply. Universal Design can never fully be a 'one-size-fits-all' panacea for the difficulties that buildings pose to many people. As every designer knows, each design problem is unique and requires its own way of approach, so that it should not be simply a matter of satisfying the regulations, though they are the backbone of the intentions. There is still a need to have special facilities, but adopting standards that allow everyone to benefit should become the norm. Prolonging any person's independence with safety and comfort, particularly when they are disabled or elderly, is in all our interests: "Design for our future selves." (Coleman 2001)

As the number of elderly people with dementia is predicted to rise substantially in the near future, it becomes incumbent on designers to design for greater ease-of-use in the public domain, and to understand that this is not confined to designing for physical accessibility, but also for comprehensibility and legibility in the built environment. This applies at all scales, from designing for clear wayfinding at the scale of the city and the building, to detailed design of user interaction with embedded devices, one such example being pedestrian lights. The same design attributes increase ease-of-use for all users, and therefore may be considered to incorporate principles of inclusive design. Imagining a fairly typical extended family, we may assume that any member may have some form of disability: grandmother with a walking stick, grandfather who is short-sighted and with a weak heart and mother who is pregnant with a toddler in a stroller; there are many other possibilities, so here is obviously an imperative, and now the technology, for us to provide the infrastructure and design detail to allow them to enjoy a wide range of activities together, rather than excluding any individual. Universal design can extend the quality of life and experience of any person. As designers we need to continually extend our knowledge, using our resources to make the strange familiar and then to use our imagination to make the familiar strange, in the appropriate proportions and for right the reasons, in order to extend the limits of universal design still further.

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