Chapter 1

Is Universal Design a Critical Theory?

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1.1. Introduction

Universal design is a term that was first used in the United States by Ron Mace (1985) although forms of it were quite prevalent in Europe long before. For the purpose of this chapter Universal Design is defined as 'the design of all products and environments to be usable by people of all ages and abilities to the greatest extent possible (Story, 2001, p.10.3). Universal design in recent years has assumed growing importance as a new paradigm that aims at a holistic approach ranging in scale from product design (Balaram, 2001) to architecture (Mace, 1985), and urban design (Steinfield, 2001) on one hand and systems of media (Goldberg, 2001) and information technology (Brewer, 2001) on the other.

Given the popularity, Universal design still remains largely atheoretical i..e. the researchers of Universal design do not explicitly affiliate themselves to any form of theoretical paradigm. One of the reason is perhaps because Universal design is a melting point between cross paradigms. By paradigms I mean basic orientations to theory and research (Newman, 1997, p.62). In this sense Universal design can come under functionalist paradigm (because it caters to utility), pragmatic (because it is instrumental in nature), positivistic (because it strives for universal principles), normative (because it prescribes certain rules) and critical theorist paradigms (because it gives voice to the oppressed).

Conventionally the word *universal* is synonymous to *general* and refers to a set of principles that are stable, timeless and value free. In this sense universal design could be interpreted as deriving from a positivist paradigm. However, given its history and perspective, and with the universal design examples I provide, I will demonstrate several instances where the universals do change, are time bound and value laden. In this sense I argue that Universal design follows a critical theory paradigm in its conception and knowledge generation. By conception I mean how universal design came into being as a body of concepts and by knowledge generation I mean how the concepts pervade and are shared by the community of researchers.

1.2 Universal Design as a Critical Theory in its Conceptualisation

1.2.1 Social Emancipation

Social emancipation is to help people change conditions and build better world for themselves. Critical researchers conduct research to critique and transform social relationships by revealing the underlying sources of such relationships and empowering people, especially less powerful. Such an emancipatory role is demonstrated in universal design concept as the researchers argue for the importance of making through design, so-called weak component in the society as strong as every other part (Balaram, 2001).

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Mullick and Steinfield (1997) argue that in the beginning years of universal design in United States, the concept sprang up from the new thinking of the era dominated by the famed Brown v/s Board of education case of 1954. In this case the Supreme Court ruled that separate educational facilities are inherently unequal. The decision forced the desegregation of public schools in 21 states. The axiom *separate is not equal* inspired the beginning days of the universal design concept.

This reformation was not unlike the social changes that occurred in other European countries such as Sweden. For example, Universal design emerged when Karl Grunewald of the Swedish Social Sciences Department and his team started to translate the normalisation principle into the built environment (Sandhu, 2001, p.3.5). The normalisation principle was originally created to normalise the way in which one perceived and portrayed people who are disadvantaged and to establish people with a handicap in socially valued roles so far as their capabilities allow. Hence the roots of universal design can be attributed to emancipatory attitudes reflected in that era.

1.2.2 Social Inclusion

Critical theory argues for social inclusion. By social inclusion one means that social reality consists of multiple layers and includes several segments of society. By probing into these layers the critical researcher can identify and provide voice to the oppressed. While, the beginnings of Universal design catered to the special groups of people, i.e. people with diminished abilities such as physical impairment, retardation, advanced age, pregnancy, and so on, the current trend provides for the needs of the majority. According to Lawton (2001) this is demonstrated in the ADA (American with Disabilities Act) venture that has extended the boundaries of

design for everyone by translating special-user design to mainstream designs. This is done by enhancing the aesthetics and the commonplace look of products and give it as much attention as the function. In this way equality and inclusiveness is conveyed socially.

1.2.3 Social Reality as Probabilistic

For the critical researcher reality is seen as constantly shaped by social, political, and cultural factors. The critical science approach considers that people have a great deal of unrealised potential, are creative, changeable and adaptive In this sense critical theory is probabilistic.

A similar outlook can be seen in Universal design. Lawton (2001) defines Universal design as the best approximation of an environmental facet to the needs of the maximum possible number of users. In recognition of this, Lawton argues that personal need motivates affordances (where affordances are what the environment offers, provides, furnishes, and invites).

Lawton lists a variety of probable affordances that the environment could offer for a variety of needs. Some of them include physical privacy, proper orientation of features, social opportunity and so on. The probabilistic view is also expressed in the principles of universal design which allow for 'flexibility of use' (Story, 2001, p.10.1-10.8). Flexibility means to provide choices in methods of use, accommodate right or left hand access, provide adaptability to the user and facilitate the user's precision. In this sense Universal design is probabilistic in its conceptualisation rather than deterministic.

1.2.4 Social Reality as not Value Free

Critical theory is based on belief that facts require an interpretation from within a framework of values, theory and meaning. Theories are based on beliefs and assumptions about what the world is like and on a set of moral-political values. In order to interpret facts, one must understand history, adopt a set of values, and know where to look for underlying structures. Hence, different versions of critical science offer different value structures (e.g. Marxism v/s feminism). Although the word universal could be attributed as value neutral, in the recent times, Universal design researchers have embraced cultural differences as an integral part of social reality.

Balaram (2001) for example, argues that in the non-industrialised majority world, where there is overwhelming diversity in language and customs, disability refers to issues beyond physical disabilities, and is essentially a social construct. He argues that in Asia it is an extremely unsociable act to send their disabled or elderly relative to institutional care. Hence he advocates an Universal design which can work with the relevant value system. He proposes interventions such as changing societal attitudes, educating for the future, positive thinking, welfare networking and so on.

The idea of value laden universal design is also reflected in two of the seven principles of universal design: 'simple / intuitive' and 'perceptible information' (Story, 2001, p.10.7-10.8) Both these principles refer to environmental legibility in diverse settings that accommodate wide range of literacy and language skills.

1.2.5 Critical Theory as a Third Way in the Subject-Object Debate

On one hand critical theory considers that the subjective ideas are important. On the other hand it assumes an objective world in which there is unequal control of resources and the power in which subjective opinions are based. This paradox is aptly demonstrated in the many examples of universal design in the dichotomy between universality and subjective needs.

Lawton (2002) has argued to bridge this gap by catering to several individual issues such as self-actualisation, systematic consideration of each need for every prospective user, systematic assessment of individuals on the characteristics of representation members of each group, assessment of environment in terms of affordances and a participatory design process. As needs and competencies are assessed environmental design affordances are matched to the personal characteristics. Hence the individual and subjective attributes are considered important to what is ultimately defined universal.

1.3. Universal Design as a Critical Theory in its Knowledge Generation

1.3.1 Critical Theory as a Provision of Resources

According to Newman (1997), critical theory seeks to provide people with a resource that will help them understand and change their world. Once people discover the resources they can use them to alter social relations, and to improve how things are done. Hence, a critical theory grows and interacts with the world it seeks to explain. Such knowledge generation is also seen in universal design.

Story *et al*. (2001) has used several versions (almost four versions in a period between 1994-1997) to formulate the seven principles of universal design. In her paper she charts out how these seven principles evolved from its fuzzy beginnings and how different studies suggested new changes in the principles. Hence, the seven principles of universal design emerged from a variety of sources which were made available to the society.

Subsequently, the principles themselves became a resource for others to make use of. For example, Manley (2001) uses the seven principles to create an accessible public realm in England where she argues for an universal approach to street design. She argues for street spaces which provide freedom to walk without interruption in city streets. Similarly Calkin *et al*. (2001) use Universal design

principles for a comparative study with the design guidelines of Dementia care nursing home. Hence knowledge generation occurs through the resources being made public and constantly deliberated.

1.3.2 Replication of Facts in Critical Theory

Unlike positive science where facts are neutral and agreeable, according to critical theory facts are set within the framework of values. Researchers in different countries consider universal design principles as a loose body of concepts which could be reinterpreted to their own settings. Hence the replication of facts has to adhere to the respective value systems.

For example, in Japan Universal design has to include factors to tackle earthquake disasters (Takahashi, 2002). In Israel there exists a great sensitivity to provide universal design to injured soldiers (Ramot, 2002).

In Switzerland, universal design has inspired a new place types such as care apartment complex in Switzerland (Hurlimann, 2002). Care apartments were created so that it fosters more social relationship than the convention hotel-like care of the nursing homes. The care apartments are integrated into regular housing without standing out or causing social stigma. Hence the replication of facts in universal design is not deterministic or based merely on facts but takes the prevailing social attitudes into consideration.

1.3.3 Knowledge Accumulation

In critical theory knowledge is accumulated by the consequence of action. Universal design also strives to accumulate knowledge through design action. In the environmental behaviour research it is generally believed that environment causes people to behave in a certain way. Calkins *et al.*, (2001), for example, assumes that specific interventions in the environment of Dementia patients cause improvement in their stress levels.

Among the several interventions mentioned, one of them amounts to reducing negative stimulation. Negative stimulation is done by reducing scale of the environment, controlling ambient conditions such as auditory and visual backgrounds, limiting unnecessary choices and providing a place for retreat. Hence by catering to specific interventions in the environment, it is assumed that relevant changes occur in behaviour.

Similarly, Lawton uses several environmental indicator examples to demonstrate how certain environmental affordances can be accomplished by intervention. For example to fulfil an affordance called preference he uses an environmental indicator such as toilets near activity spaces.

The core of Lawton's model is, therefore, a set of human needs, and a parallel set of affordances, that can be fulfilled through relevant environmental interventions. Hence the knowledge accumulation is universal design comes from interventions and the consequences.

1.3.4 Testability and Modification and Change in Critical Theory

A researcher tests critical theory by describing accurately the conditions that are generated by underlying structures and then by applying that knowledge to change social relation. Hence critical theory informs practical action or suggests what to do, but the theory is also modified on the basis of its use. The testability and modification in universal design has been proposed by the Post Occupancy evaluation (POE) (Preiser, 2001). According to Preiser universal design performance can be measured by defining the degree of fit between people and their environment, testing the human activity support systems, measuring the adverse effects of products and understanding how designs cater to multiple uses. Hence, the performance is based on the seven universal design principles laid down by Story (2001). Changes for increased performance are then prescribed based on the outcomes. Hence knowledge grows by an ongoing process of eroding ignorances and enlarging insights through action.

1.4. Prologue

Much of the information on Universal design is fragmented and hence its' theory has not been adequately developed. However, as demonstrated in this study, Universal design can be seen in the paradigm of critical theory in terms of conceptualisation and knowledge generation. In application, perhaps, it is closer to a normative paradigm. Some have called critical theory follow an universal pragmatic logic as against universal reductionist logic of positive science (Habermas, 1972) i.e. an universality that takes into account pragmatic conflicts of society and not an universality that is devoid of everyday life of people. While Universal design does not fit neatly into such the mainstream critical thought (such as Marxism and feminism), it consists many facets of a critical theory that may perhaps indicate that it operates as an universal pragmatic system.

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Chapter 2

Cross-market Product and Service Innovation – the DBA Challenge Example

J. Cassim

2.1 Introduction

The DBA Design Challenge is an annual competition run by the Small Business Programme of the Helen Hamlyn Research Centre (HHRC) at the Royal College of Art (RCA) in collaboration with the Design Business Association (DBA), the UK's official trade body for design consultancies. Leading design firms are challenged to work with young disabled consumers to develop inclusive design prototypes in a concentrated period of three months.

Now in its fourth year and with twenty projects undertaken to date, the event builds on existing initiatives at the HHRC – the Design for our Future Selves Awards and the Helen Hamlyn Research Associates Programme. These match RCA design students and new graduates respectively with marginalised groups, placing end-users at the centre of the design process from inception to end to encourage more socially responsive design.

The DBA Design Challenge aims to capture the interest of the professional design community in these objectives, not just the student or postgraduate community at the RCA. This external focus meant that it was important for the HHRC to form an alliance with a professional body with its own established network of design firms to whom the Challenge could be addressed.

It turned again to the Design Business Association, reviving a partnership and replicating a mechanism first used with great success in the early days of the DesignAge action research programme at the RCA – a programme, which subsequently evolved into the Helen Hamlyn Research Centre in 1999. The only major difference was that where its DesignAge namesake focused on the design needs of ageing populations, the new DBA Design Challenge and the Small Business Programme, of which it is part, centre on partnerships with young disabled users.

This chapter discusses the rationale behind this and some of the mechanisms employed to achieve the objectives of both.

2.2 Perceptions of Disabled and Older Users

The inauguration of the Small Business Programme in 2000 coincided with the publication of three reports by the Audit Commission (Audit Commission, 2000), Needs Must (Frazer and Glick, 2000) and the United Kingdom Department of Trade and Industry (DTI 2000). The latter outlined the impact on older and disabled people of the poor ergonomic design of such everyday consumer products as kettles, refrigerators and generic packaging types and its relation to accidents in the home.

By identifying the nature of problems in five areas (manipulation, grip, lifting, reach and transport), it sought to determine the characteristics and capabilities that should be measured to provide designers with information that would result in safer products.

The Needs Must and Audit Commission reports described the financial impact of inadequate provision in the UK's social services programmes and National Health Service (NHS) equipment respectively.

Absent from all three was any discussion of the psychological impact of 'special needs' design on disabled or older consumers – the emphasis was on function, efficacy or the financial cost of failure. The Audit Commission Report, for example, stated that the services were a 'gateway to independence' that could 'make or break' the quality of life of the 4 million disabled people and the 1.7 million informal carers who used them in the UK.

It further stated that 'the right equipment can make the difference between an enriched, independent life or a miserable, isolated existence'. The Audit Commission Report acknowledged that much NHS issue equipment was of 'dubious quality' but provided no design guidelines even for such standard items of equipment as crutches or hearing aids, nor did it single out existing examples of good design.

Absent too was any comparison between the lifestyles, aspirations or consumer patterns of older people with the multiple minor disabilities of age and younger people with more severe congenital or acquired disabilities. They were seen as a single homogeneous group, united in their desire for functional products and accessible services but with no distinction made between their actual tastes or consumer behaviour.

Their primary profile was a combined medical one of age and/or disability and while both groups were seen as aspiring to good design, what each meant by that expression was not explored aesthetically or otherwise. Their respective roles as consumers whom mainstream market forces might target by virtue of their significant market share was also ignored (Employers Forum on Disability, 2001). Instead, they were viewed as passive NHS clients and not consumers in the usual sense.

Another aspect absent from these reports was any discussion of their potential role as advisors to the design process, one which went beyond their usual limited status as test subjects who could highlight the ergonomic failure of products.

2.3 Yo-Yo's, WOOF's and Rainbow Youth

Marketing agencies have traditionally focussed on the aspirations of young people in the development of new products with 35 seen as the cut-off age of interest in them as consumers (Compton *et al*., 2003).

With falling birth-rates, the impending pensions crisis and the ageing of the 'Woodstock Generation', there is, growing recognition that post-war baby boomers – the so-called Yo-Yo (Young-Old) (Taylor, 2002), WOOF (Well Off Older Folks) or 'Rainbow Youth' (Stevenson, 2003)– are a lucrative market of consumers who cannot be defined by age alone in their buying patterns (Scales *et al*., 2000).

As product and technology literate as their children and grandchildren, they use the same work or leisure-related consumer products yet require enhanced functionality. They desire a form of inclusivity by stealth - one that takes into consideration their declining physical, sensory even cognitive capabilities but lacks the aesthetic stigma so common to special needs products that would single them out as old or disabled, for they view themselves as neither.

2.4 Young Disabled Users as Crossover Consumers

Recognition of this scenario has brought into focus the important role that young disabled consumers can play in the product and service development process. They simultaneously embody the aspirations and lifestyles of youth but the limitations imposed by their disability demand a flexible, alternative and non-stigmatising design response that is cross-market and mainstream in appeal.

This reasoning underpinned the decision to strategically position the DBA Design Challenge around the aspirations of younger disabled consumers and frame it as a creative response to their need for mainstream consumer design. It ensured that emphasis was placed equally on aesthetics and function, thereby promoting the idea that inclusive products and services of this kind had the ability to span generations. Other considerations came into play as described in the following sections.

2.5 Empathy between Contemporaries

Matching designers with their disabled contemporaries was seen as a means to facilitate empathy and dialogue between two groups with broadly similar tastes and lifestyles but radically different ways of achieving the same ends. Efforts have been made to match the designers with disabled users from the creative industries or professions directly related to the project in question.

For example, the lead (graphic) designer for Coley Porter Bell's 'c' system, which won the DBA Design Challenge Inclusive Design Award in 2002, consulted extensively with Rebecca Harris, a congenitally blind artist and her exact

contemporary in age. The proposed ‘c’ system consists of a labelling system for clothing using a tactile language of shapes representing colour and size to be used on the swing tag and silk label of the garment. The system enables visually impaired users to identify over 60 colours by learning 16 core tactile shapes. A bar code reader gives additional product information relating to style, material, pattern, care instructions and the whole system has applications for other products where colour selection or co-ordination is important (Cassim and Dong, 2003).

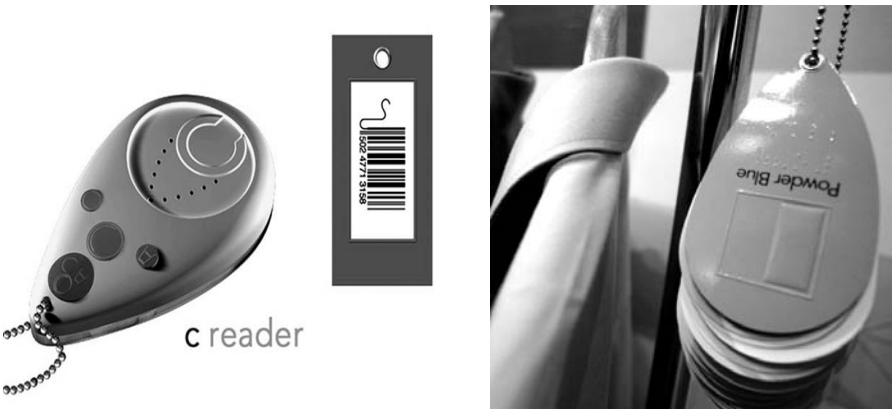

Figure 2.1. ‘c’ system bar code reader and tag itself

For this project, the lead designer and Harris went on shopping trips together, developing an open-ended relationship that took place outside of the academic or test framework common to user research involving severely disabled people.

Experiences such as these tend to concretely reinforce the practical considerations and psychological reality of the context in which the final design must exist. In the case of the ‘c’ system, this had been outlined anecdotally by the other visually impaired participants in the user forum and formally in the mentoring session held by the author at an initial stage of the project.

2.6 Innovation Triggers

Severely disabled young people were targeted in preference to older users with minor disabilities for the user forums that are an integral element of the competition. It was felt that the former could offer complex scenarios of everyday situations informed by the lateral, creative coping strategies they adopted individually in response to the deficiencies of design or service provision.

It was hoped that these would act as triggers for new concepts or for innovative features in the final design. Secondly, it was a mechanism to ensure that those design teams wishing to rethink such standard items as kettles, saucepans, milk cartons etc would return to first principles in product and service concepts and not merely re-style them cosmetically.

A further rationale behind this decision to prefer youth over age and severe disability over minor impairment was that the young users were likely to display higher degrees of competence and understanding of mobile communications technology and interfaces (Cassim and Dong, 2003).

Where the project involved their use, it was essential that those who advised the designers were not 'technophobes,' had an understanding of the technology under discussion and could discuss such issues on a basis of equality, shared expertise and contextual relevance. Many such users were members of the British Computer Association of the Blind (BCAB) or the Foundation for Assistive Technology (FAST) and had volunteered their services in response to calls circulated through their email networks by the author.

There was sufficient informal evidence from the first two Design Challenges to indicate that these assumptions regarding the difference in response between older users with minor disabilities to young users with severe disabilities (i.e. critical users) were accurate. However, in order to test them, two older users from the University of the Third Age were invited to participate in the forum held for Fitch: London's 'i-connect' project in 2002. This looked at ways to redesign such complex transport interchanges as Waterloo Station through environmental design measures that harnessed the service potential of Bluetooth technology (Cassim, 2003a).

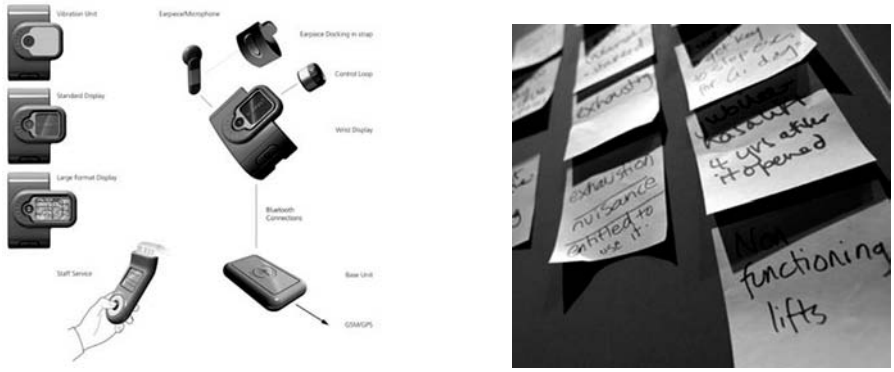

Figure 2.2. i-connect wearable device and storyboard for the project

Frequent users of public transport with physical and sensory disabilities participated in the user forum, which took the form of a complex question and answer session. Each stage of their individual journey was mapped and analysed. The disabled users described in detail their coping strategies and offered logistical and technological solutions to the kind of impasse in which they routinely found themselves.

In contrast, the two able-bodied older users, one in her late sixties, the other in his early eighties could describe such general issues as the tiring nature of stairs or the difficulty of reading signage but offered few coping strategies beyond the commonplace. Neither possessed mobile phones nor were they familiar with the principles and possibilities of Bluetooth which was central to the design team's proposals.

2.7 Creation of the End-User Network

Each DBA Design Challenge depends upon a network of 'critical users' of the type described above. Appeals are made through email networks and online discussion forums to members of such organisations as the Computer Association of the Blind and the Foundation for Assistive Technology (FAST). Many are computer engineers or software developers who can introduce designers to relevant developments and new technologies that would assist them in realising their 'blue-sky' product concepts. Not all projects are 'blue-sky' concepts or involve the use of complex technology.

To ensure that issues relating to motor, visual and cognitive skills are comprehensively covered in user forums which relate to the design of such well-established products as kettles –KettleSense by Alloy in 2001 (Cassim, 2002), drinks containers – Milkman by Factory Design in 2000 (Cassim, 2000) and packaging – SiebertHead in 2001 & 2002 (Cassim, 2002) similar appeals are made to members of such charities as Arthritis Care, Different Strokes and the Parkinson's Disease and Multiple Sclerosis Societies. As a result, a significant network of individual expert end-users has been created with new volunteers being added each year.

Figure 2.3. User Forums for the DBA Design Challenge

2.8 New Areas of Innovation

An overriding aim of the DBA Design Challenge is to convince design firms and small businesses, that the inclusive design process and partnerships with their young disabled contemporaries in particular can be a fertile source of ideas for new product and service innovation in areas that they may not have considered. This being so, great emphasis is placed on the business and creative case for engagement with disabled people, in the briefs and initial presentations held to encourage DBA members to participate. In 2002 and 2003, the new area of 'smart

wearables' (Cassim, 2003b) was delineated resulting in Pearlfisher's project of the same name in 2002 and a rise in entries centred on wearable or embedded forms of technology (Cassim, 2002). Pearlfisher a branding and futures company worked with a fashion designer to develop a range of clothing using Outlast™ a temperature regulating fabric developed by NASA. It has since gone on to market a clothing range for young children as a result of their experience of participating in the DBA Design Challenge in 2002 and the new product ideas that the process generated.

Figure 2.4. Part of Pearlfisher's clothing range for DBA Design Challenge 2002

The participating design teams range in age from their early twenties to early forties providing a typical cross section of the design community. There is evidence to suggest that firms submitting entries are using the opportunity for various reasons. Some cite its importance as a means of building teamwork in-house and a way of challenging and stimulating them creatively with projects that they would normally encounter.

There is recognition, too, of its role as a training exercise to enable staff to gain new skills in an area of increasing importance to their clients in light of the ratification of the Disability Discrimination Act (DDA) in October 2004 in the UK. The final presentation, be it in PowerPoint or movie formats, is restricted to six minutes with the latter medium encouraged. The rationale offered to firms by the HHRC is that it can serve as a portrait of best practice and their own company culture and processes – caring, creative, responsive and so on – which can be used by them when pitching to new clients or for more general public relations purposes. Many commercial projects they undertake are bound by client confidentiality and cannot be described in detail for these reasons. No such restrictions apply to their Design Challenge projects, hence its value as a promotional tool.

Interestingly, although the Challenge was first structured as a simple invitation to designers to participate in the inclusive design process, it was changed to a competition in the second year at the request of the DBA. This strong competitive element has meant that it is not viewed as an altruistic training exercise alone but as an event on par with other professional design competitions. Accordingly, the quality and quantity of entries has grown each year along with its profile as one of the major events of the design calendar.

Figure 2.5. The audience at the DBA Design Challenge 2002

Importantly, it has yielded a varied cross-section of concrete exemplars of mainstream inclusive design practice of relevance to the constituencies it seeks to serve – the business, academic, healthcare, design and disabled communities – the five key players vital to the improvement of industry standards in the healthcare sector.

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