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REDESIGNING EDUCATION FOR INCLUSIVENESS: Universal Design in Context

Abstract

By responding to issues such as Accessibility, Disability, Inclusive Education, and Universal Design, Design Education is uniquely placed to positively impact upon the greater community. This paper discusses the emerging subject of Universal Design and its potential contribution towards greater inclusiveness in education (and by extension professional practice) in particular, and in society in general. Though Universal Design is relevant to disciplines such as Urban & Regional Planning, Architecture, Interior Design, and Graphics/Information Design, the focus will be on its applications in the context of Industrial/Product Design.

The changing higher education landscape presents new opportunities for redesign of course offerings for realignment with expected learning outcomes. This is the rationale for a case study on a newly introduced dedicated module on Universal Design at NQF Level 6. The said case study is used to test the validity and reliability of adopted outcome-based assessment and evaluation methods that include Self, Peer, and Facilitator Assessment modes.

The paper concludes by proposing strategies for promotion of Universal Design within a majority world context such as South Africa.

Keywords: *Inclusive Education, Universal Design, Socially Responsible Design*

Background

Design as a profession is better known by its products, as opposed to its process. To illustrate this point, one only has to consider the following definitions posited by one of the most influential designers in recent times;

...*“design is the conscious effort to impose meaningful order”* (Papanek, 1971:17);

...*“design is the conscious and intuitive effort to impose meaningful order”* (Papanek, 1985:4);

...*“design is the conscious and intuitive effort to impose significant order”* (Papanek, 1995:211).

The underlined words indicate Papanek's quest to find an ever illusive definition that satisfies the greatest number of people possible. This confusion over semantics or nomenclature afflicts not only design, but *Universal Design* (as shall be discussed elsewhere in this paper). On the other hand, few designers would disagree that *“design is both the underlying matrix of order and the tool that creates it”* (Papanek, 1995:211). In accepting the pervasiveness of the influence of their profession, designers must also acknowledge their responsibility to the society. Unfortunately though, plenty of evidence abounds to vindicate Papanek's (1995:147) sternness on designers for neglecting the elderly and, people with disabilities and everyone else who as special needs. Whiteley (1993:141) provides further damning evidence in that many products do not take cognisance of women's needs as users.

Papanek (1995:216) emphasises the need for an information network that would highlight examples of best practices around the world, but cautions against blind zeal lest developing countries repeat the mistakes of more advanced economies in the quest for fall advancement. It is imperative that developing countries such as South Africa tap into the local knowledge base whilst simultaneously keeping abreast of pertinent international developments and more progressive technologies (Papanek (1995:217).

Whiteley (1993:119) proposes socially responsible design as a way of dealing with the dilemma of prioritising design endeavour in developing countries. Designers in South Africa can relate to the challenges of creating technologically sound design solutions within a majority world context.

Whiteley (1993:119) further argues that “a product or process which does not grow out of the habits and customs of a country or region is unlikely to be successfully integrated into the society’s culture”. Designers also need to respond to the geopolitical realities they and their “clients” subsist. Papanek (1995:211) states rather categorically that “we are all involved in design. As end-users we are both consumers and victims of the environment, buildings, tools, and artefacts that make up our world”.

In response to this challenge a *New Model of Socially Responsible Design* (Davey, Wooton, Thomas, Cooper, & Press, 2005:5) places the design agenda as the basis of a vision that is both inclusive and holistic that touches on *Government, Economic policy, Fair Trade, Ecology, Social inclusion, Health, Education, and Crime*. Of these eight core tenets of *Socially Responsible Design* (Davey et al, 2005:5), the tenets of immediate significance to Design Education would be those of *Government* (through policies on education), *Ecology* (in emphasis on Eco-design and Green design practices), *Social inclusion* (through inclusive education) and *Education* (as a core competency).

Increased awareness of the needs and rights of previously marginalized and ignored sections of society has benefited from the very public commemoration of such milestones as:

- *The African Decade of People With Disabilities*- 1999-2009;
- *Year of the Disabled* in Europe- 2003;
- *The International Day of the Left-Handed Person*- 13th August 2003;
- *The International Day of the Older Person*- 1st October
- *World AIDS Day*-1st December.

Oliver argues passionately on the failings and limitations imposed on people with disabilities due to systemic use of the *medical model* of disability. He proposes the “*sociological approach*” (now known as the *social model*) to address these shortcomings (Oliver 1990:68; 1996:34). It is now commonly accepted in most professional contexts that the social model supersedes the medical model and the main drive is now on changing the society and environment to allow people with disabilities full participation in every possible respect (EDeAN, 2006b). This model finds expression in a host of policies to enforce equity and eliminate discrimination such as the *Americans with Disabilities Act* (1990 in the USA), the *Disability Discrimination Act* (1992 in Australia; and 1995 in the UK) and the *Promotion of Equality and Prevention of Unfair Discrimination Act* (2000 in South Africa).

Universal Design

The visionary pioneering work of Tim Nugent of the University of Illinois at the Champaign Urbana campus set the foundation for what would eventually become known as Universal Design (UD) (Goldsmith 2000:4). Through their passion and commitment, Tim Nugent, Ron Mace (Clarkson, Coleman, Keates, & Lebbon, 2003:13; McGuire, Scott & Shaw, 2006:167), and Selwyn Goldsmith (Clarkson et al, 2003:13) are acknowledged as champions of the UD movement. There appears to have been a phase of divergence and competition as different proponents sought to clarify their unique perspective on the UD debate. This phenomenon is not uncommon as a reading on the birth and growth of *Ergonomics/Human Factors* reveals. UD has its origins in the *Barrier-free Design* and *Universal Accessibility* in the field of architecture ((Preiser & Ostroff, 2001:1.5; Center for Universal Design, 2006a; EDeAN, 2006b; Kyoyo-Hin, 2001:5) with the actual definition accredited to Ron Mace who first coined the term “*Universal Design*” in 1985 (Clarkson et al, 2003:12; Preiser & Ostroff, 2001:1.5; Centre for Universal Design, 2006; EDeAN, 2006b; Kennig & Rhyl, 2002:3; Kyoyo-Hin, 2001:1). The seven UD and five Kyoyo-Hin principles are virtually identical as the following table (Table 1) shows:

Principles of Universal Design	Principles for Kyoyo-Hin and Kyoyo Services
1. <i>Equitable Use</i> . The design is useful and marketable to people with diverse abilities.	1. Adaptation to various types of physical and mental disabilities for easy use by as many people as possible.
2. <i>Flexibility in Use</i> . The design accommodates a wide range of individual preferences and abilities.	
3. <i>Simple and Intuitive</i> . Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	3. Operation and use by means that are intuitively understood and require little psychological strain
4. <i>Perceptible Information</i> . The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	2. Easily comprehensible communication using plural means (visual, aural, tactile, etc.).
5. <i>Tolerance for Error</i> . The design minimizes hazards and the adverse consequences of accidental or unintended actions.	5. Concern for safe use in all aspects, including material, structure, function, procedure, and environmental features
6. <i>Low Physical Effort</i> . The design can be used efficiently and comfortably, and with a minimum of fatigue.	4. Easy use with little physical burden (e.g., can be handled with little effort, easy accommodation of motion and approach, etc.)
7. <i>Size and Space for Approach and Use</i> . Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.	

Table 1: Comparison of Principles of UD (Centre for Universal Design, 1997) and Principles for Kyoyo-Hin (Kyoyo-Hin, 2001)

The terms *Inclusive Design*, *Design for All*, *Kyoyo-Hin* are now treated as synonymous with Universal Design (UD) (Center for Universal Design, 1997; Design Council, 2006; EDEaN, 2006; Kyoyo-Hin, 2001:7). Related fields include *user-centred design*, *human-centred design*, *ergonomics*, *usability studies*, *design for disability*, *rehabilitation design*, *gerontechnology*, *transgenerational design*, and *lifespan design*. In Japan where there is a significant elderly population, the focus of *Kyoyo-Hin* and *Kyoyo services* integrate UD with *accessibility design*, *lifespan (transgenerational) design*, and *adaptive (adjustive design)* (Kyoyo-Hin, 2001:3; 2001:5; 2004a). The following table (Table 2) presents eight common UD-related concepts:

Concept	Definition
Universal Design (UD)	<i>"Universal design is an approach to the design of all products and environments to be usable by everyone, to the greatest extent possible, regardless of age, ability, or situation. It serves people who are young or old, with excellent or limited abilities, in ideal or difficult circumstances. Universal design benefits everyone by accommodating limitations"</i> (Universal Design Education Online, 2006).
Inclusive Design: mainly in the UK	<i>"Inclusive design is not a new genre of design, nor a separate specialism, but an approach to design in general and an element of business strategy that seeks to ensure that mainstream products, services and environments are accessible to the largest number of people"</i> (Design Council, 2006).
Design for All: Europe; India	<i>"Design for All is a process whereby designers, manufacturers and service providers ensure that their products and environments address users irrespective of their age or ability"</i> (EDEaN, 2006a).
Kyoyo-Hin and Kyoyo Services: Japan	<i>"Kyoyo-Hin and Kyoyo services are designed to be used by as many people as possible, including the elderly and those with disabilities"</i> (Kyoyo-Hin, 2001:3; 2004a).
Design for our Future Selves: mainly in the UK	<i>"Concept developed by DesignAge programme to encourage young designers to engage with design for ageing populations. Became the theme for many events at the RCA and of an annual competition resulting in many concept exemplars of age-friendly design"</i> (EDEaN, 2006b).
Transgenerational Design:	<i>"The practice of making products and environments compatible with</i>

mainly in the USA	<i>those physical and sensory impairments associated with human aging and which limit major activities of daily living” (Transgenerational Design Matters, 2006).</i>
Gerontechnology: mainly in USA and Europe	<i>“Concept developed at Technical University of Eindhoven, The Netherlands (NL), with US and Finnish colleagues. Combines human factors, social sciences, gerontology and engineering. Applying technology to address age-related factors. Consumer/market oriented approach” (EDEaN, 2006b).</i>
Universal Access	<i>“Universal access/access for all: to information and communications technology (ICT). Also used in assistive technology to refer to specialist interfaces and control devices to make ICT products accessible to people with high levels of impairment” (EDEaN, 2006b).</i>

Table 2: Comparison of definitions of UD and related concepts (various sources)

Two useful tools, the *Universal Design Pyramid* (Goldsmith, 2000:3) and the *Inclusive Design Cube* (Clarkson *et al*, 2003:99; EDeAN, 2006b), demonstrate that with change in design thinking it is indeed possible to significantly increase the number of potential users accommodated by products and built environments.

The *International Association for Universal Design* was inaugurated in 2003 with the objective of reviving the Japanese economy and promoting UD (IAUD, 2006; Tsutatani, 2005:47). This IAUD has encouraged convergence of UD activities such as the *Design for the Twenty-First Century* competitions.

Universal Design in Education

The *UD Educators’ Network* (2006) provides an opportunity for exchange between UD educators across the globe, as well as hosting an extensive database of useful links and resources. Similarly, though an array of options is available to UD educators including; *UD for Learning* (UDL); *UD for Instruction* (UDI); *Universal Instructional Design* (UID); and *UD for Education* (UDE), the first two are the more commonly used (McGuire, Scott & Shaw, 2006:167; 172). McGuire *et al* caution against using confusing terminology which is essentially a “*befuddling of adjectives with no specific meaning*” and emphasize that although UDL emphasizes an inclusive vision of UD, there is need for responsibility and recognition that some students will still require individualized special education services and supports (McGuire *et al*, 2006:172).

Inclusive Education

Papanek (1995:210) proposes four distinct ways in which design could benefit education including course offerings in (Higher Education Institutions) HEIs; educating and sensitising the youth; addressing physical barriers in the built environment; and (re)design of educational software. Outcome-Based Education (OBE) has been implemented in countries such as Australia Canada, New Zealand and the USA and has led to the globalisation and massification as OBE is “*currently favoured internationally to promote educational renewal*” according to Malan (2000:22). With this new dispensation educators need to manage diversity within a dynamic and fluid multi-cultural environment that has greater interconnectivity with the rest of the world.

The Special Education approach on the other hand has its roots in the medical model of disability and seeks to implement its inclusive education strategies over a twenty year period (South Africa. Department of Education, 2001:42-43). *The Declaration of Bamako* on Inclusive Education in acknowledging the fact that the New Partnership for Africa’s Development (NEPAD) omitted specific mention of the promotion of people with disabilities and seeks to remedy the situation (Inclusion Africa: 2002).

Further impetus for inclusive education is found in *The Higher Education Act* (South Africa, 1997:37.3) and closer home through *The Inclusive Education Western Cape* which encourages active participation of families and other role players (Inclusive Education Western Cape, 2006).

The Act (South Africa, 1997:38.1.) further encourages co-operation between public HEIs. Howell (2006:175) concludes that there is need to examine the physical environment as well as the philosophy and practice of teaching and learning. In this vein e-learning, smart technologies, and distance learning options would need to be incorporated for greater accessibility.

Case-study: UD for Product Designers at CPUT

The UD module was offered to students in their final (Third Year) of study for a Diploma in Three-Dimensional Design. The module was offered during a dedicated week set aside in the month of April 2006. At the commencement of the dedicated week, each student was given a handout of the UD module (as well as a copy of an A4 poster on Principles of UD). The handout contained information on *expected outcomes, recommended readings, activities, modes of assessment, evaluation criteria, important dates, and other dates to note*. As an exit outcome, each student would be required to have shown competence in the following:

- *identify special human needs in a product, system, or practice;*
- *apply The Principles of UD to actual design problems;*
- *use UD strategies to mediate and solve product design-related problems; and*
- *justify specific UD considerations in (re)designed solutions.*

The activities involved required students to:

- *identify one example of a product that they had previously designed and made a 3D model of;*
- *make a detailed case study of their chosen example using UD principles;*
- *identify specific ways in which they could improve the chosen example to accommodate excluded users; and*
- *incorporate suitable and justifiable UD considerations in their redesign solution(s).*

Figure 1 shows the distribution of the products students selected for this assignment.

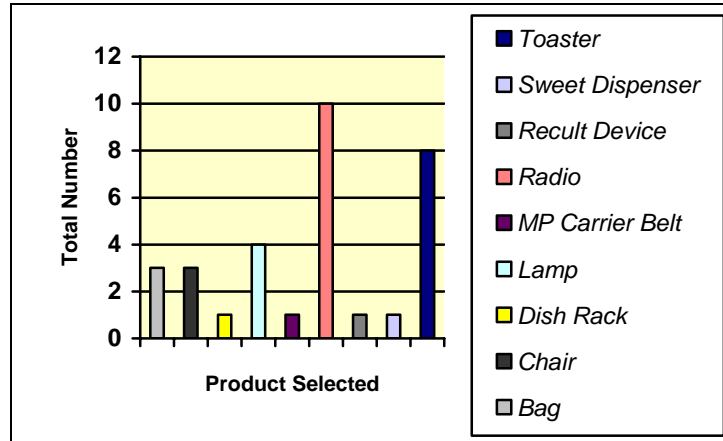


Figure 1: Distribution of products selected by students

The author made presentations to students on “*Special Human Needs*” and “*UD Perspectives in Context*”. One of the presentations to the 32 students included a guest lecturer from the Cape Town Society for the Blind who made a presentation on “*The Pathology of Blindness*”. Students were given access to both hard and soft copies of all presentation materials. At the end of the module, students also received feedback from two CPUT lecturers (who sat in as observers for the duration of the module), one focusing on their presentation and communication skills, whilst the other focused on technical competency in their proffered (re)design solutions. Similarly, each student was assessed by at least three of their peers on their presentations and submissions.

The modes of formative assessment included:

- 5-10 minute presentations highlighting specific points of UD intervention;
- sketches with accompanying notes on A4 format detailing and justifying specific UD considerations in the redesign of the selected product;
- peer-assessment of presentations on the dates specified (at least three per presenter);
- self-assessment of their presentation and submitted projects;
- assessment by the facilitator; and
- feedback on the module submitted to the facilitator.

81% of students submitted self assessment evaluations, whilst 94% of students received peer assessment as shown in Figure 2. This is a reasonable overall participation rate.

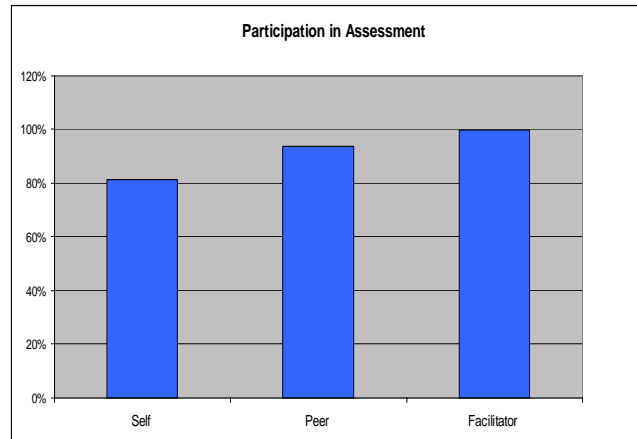


Figure 2: Participation in assessment

Question 1 on both self and peer assessment required the student to evaluate the assignment and assign a grade or mark corresponding to the current grading system at the Department of Industrial Design, CPUT as *Not Yet Competent: 0-49%*; *Competent: 50-74%*; and *Highly Competent: 75-100%*. All the students attained competency at the end of the module as shown in the Figure 3.

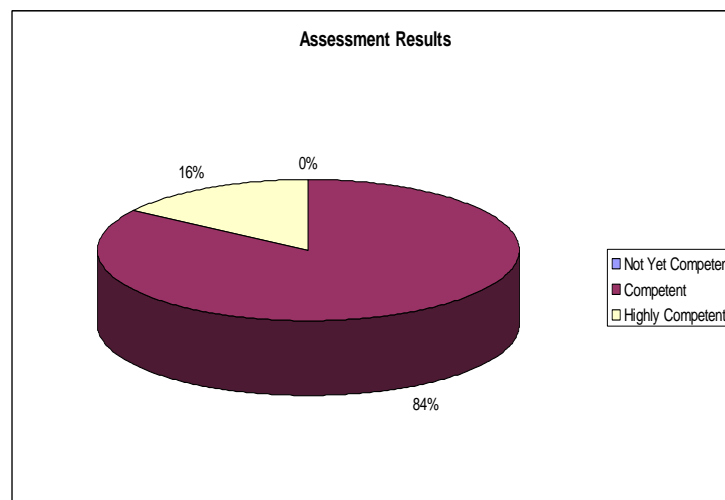


Figure 3: Assessment results

Further analysis of the actual marks awarded indicated standard deviations between the three types (self, peer and facilitator) ranging from 0 to 7.9. The average standard deviation on the marks for the entire group of students assessed was 1.7. Figure 4 shows the breakdown with a trend line for reference.

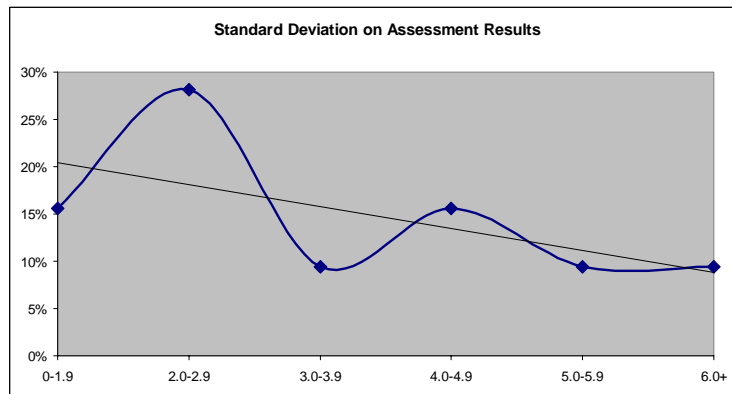


Figure 4: Standard deviation on assessment results

Students were then presented with four evaluative questions from Questions 2 through to Question 5. In response to Question 2: the majority of students (31%) on their self assessment felt they did *best* applying of appropriate UD principles to their chosen products; whilst 20% of their peers felt that the identification of problems with the existing product was what was *best* achieved.

In response to Question 3: the majority of students (53%) on their self assessment felt they did *least well* in the presentation (clarity, communication, or structure) of their chosen products; whilst 20% of their peers concurred that this was the part they performed *least well*. This was a surprising finding as students seem to have considered communication skills to be far more important than was anticipated.

In response to Question 4: the majority of students (22%) on their self assessment felt they found to be the *hardest part* was applying of appropriate UD principles to their chosen products; whilst 34% of their peers found it difficult to give any feedback on this aspect of the he assignment.

In response to Question 5: the majority of students (50%) on their self assessment felt the *most important* thing they learned in doing the assignment was the sensitivity they developed towards the needs of (potential) 'differently-abled' users of their chosen products; whilst 32% of their peers felt that the application of UD principles to selected products was the *most important* thing the student learned.

Discussion

It is important to remember that the ultimate aim of assessment (whether diagnostic, formative or summative) is for validating learning outcomes (Malan, 2000:6). The case-study at CPUT vindicated the usefulness of using a triangulated means of assessment and evaluation of a UD module. Due to the short duration in which the module was presented, students were encouraged to explore the possibility of applying UD principles in future assignment (Kennig & Rhyl, 2002:9). Subsequent interaction with the same group of students confirms that they are indeed implementing UD principles in their design work. It would be instructive to follow up on the progress of the same students once they are employed in industry. Luca and McLoughlin (2002) confirm the usefulness of self-appraisal and evaluation skills for enhanced participation and employment in the industry.

According to available records on enrolment at CPUT (2006), there are only 48 students with disabilities (out of a total student enrolment of 27,764) in 2006. This figure on persons with disabilities is a mere 0.17% of the entire student population works out to being one-thirtieth of the national average of 5% (Health Systems Trust, 2006) and about one-sixtieth that of international prevalence figures of 10-12%. Given that CPUT is now the largest HEI (in terms of enrolment) in the Western Cape Province, these statistics reveal the distance that HEIs need to travel in

increasing access to students with disabilities. For the students who took part in the UD module, part of their experiential learning involved the use of a wheelchair which was provided before, during and after the module for the students' exclusive use. Students reported experiencing the disabling effects of many barriers that they would have otherwise overlooked.

An inspirational example of one industrial designer's experience of disability is Kahwaji (2003:1) who had muscular dystrophy. He expresses his frustration with having to adapt to alterations (assistive device/technology) he has to interact with (*ibid*). One of our students, Green (2006) corroborates this experience in having to use his left foot to control foot pedals in an automatic transmission vehicle after a motorcycle injury left his right foot in a cast for six weeks. He also found the crutches he had to use extremely uncomfortable at all the pressure points, and realized the inadequacy of current schoolbag designs when one has to rely on one-handed operations use (Green, 2006). Such experiences could be the source of design inspiration if one draws on relies on 'tacit knowledge' (Whitely, 1993:145) as well as professional training to design products such as the beverage caddy in Figure 5 (Kahwaji, 2005).

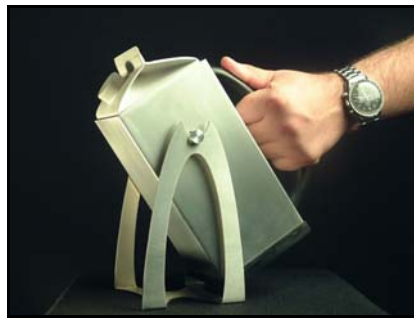


Figure 5: Beverage caddy ©2005 M.Kahwaji

Students wrestled with moral and philosophical dilemmas as to whether designers in majority world contexts only concern themselves with this prescriptive and exclusive promotion of "design for need". The consensus appears to be with the sentiments Whiteley (1993:170) emphasizes that "*design, fun and imagination*" are fundamental to the design process, or in other words, '*Form Follows Fun*' (Papanek, 1995:151). The following images of show samples of work selected for UD analysis by participating students (Figures 6-10).



Figure 6: Recultivated device © C.Fransolet, D.Brinkley & J.Smith



Figure 7: Wall-mounted toaster © F.Kruger



Figure 8: Armchair © C.van Aardt



Figure 9: Lamp © L.Pedersen



Figure 10: Lamp ©J.Lennard

The following image (Figure 11) by some of our Bachelor of Technology (BTech: Industrial Design) shows a *paraffin container* incorporating Braille.



Figure 11: Paraffin container © K.Golin & C.Fouche

The *universal bath*, also by BTech students (Figure 12), is designed along UD principles so that the bathtub walls rise around the user thereby eliminating the strain of getting in and out of the tub.



Figure 12: Universal bath © D.J.Coetzee & P.Kleinschmidt

Conclusion

Debate is still current over the efficacy of OBE. Malan (2000:26) argues that OBE is not strictly speaking a new paradigm, but describes it as an eclectic educational philosophy benefiting from best practices in the past with the prospect of being a visionary one. Malan (2000:28) calls for introspection and predicts that OBE's survival in South Africa would ultimately depend on the academic quality of those who joining employment and higher education institution. OBE's greatest benefit lies in its transformational potential. Herein lies Design Education's opportunity to redesign for inclusiveness.

The case study on the UD module is of a diagnostic type. A lot more work needs to be done to integrate UD into mainstream design curriculum for its potential to be appreciated fully. A collaborative systems approach is proposed which would cut across disciplines and include representation from other HEIs, government agencies, professional bodies, industry and society

at large. A sustainable and relevant contribution by UD must respond to the geopolitical realities and interrogate the unique context that South Africa is. For example, the fact that this country has eleven official languages presents opportunities for increasing access via visual and tactile mapping that would approximate a 'universal language'. The HIV/AIDS pandemic, high crime prevalence rates, as well as the income gap chasm demand an urgent and concerted intervention by all role players, including designers. A context-responsive model of socially responsive design should have *ubuntu* as a core value or tenet.

UD can be further promoted through publicising champions of UD through a database of best practice exemplars complemented by international competitions as catalysts for student and professional involvement. A dedicated UD forum, or network, or research group in the mould of successful international models would form the basis of a coordinated and pervasive strategy that promotes the exchange and sharing of information to the benefit of all partners.

UD makes good business sense as well. The OXO Good Grips™ range is cited as an excellent example of how *social inclusion* can be enhanced through design (Davey *et al*, 2005:5). Beyond business interests, UD needs political goodwill to ensure its sustainability. This latter goal can be secured through a concerted and focussed multi-dimensional strategy incorporating supporting legislation and social advocacy campaigns (Clarkson *et al*, 2003:13).

There is an urgent need for local, regional and national government agencies to invest in a coordinated UD strategy. The 2010 FIFA World Cup offers an unprecedented opportunity for the mainstreaming of UD in all spheres of life. The inclusive infrastructure that would be established would be a lasting legacy to the country long after the last whistle of the World Cup blows.

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Redesigning Education for Inclusiveness: *Universal Design in Context*

Mugendi K. M'Rithaa

a definition of design...

...“*design is the conscious effort to impose meaningful order*”

...“*design is the conscious **and intuitive** effort to impose meaningful order*”

...“*design is the conscious and intuitive effort to impose **significant** order*”

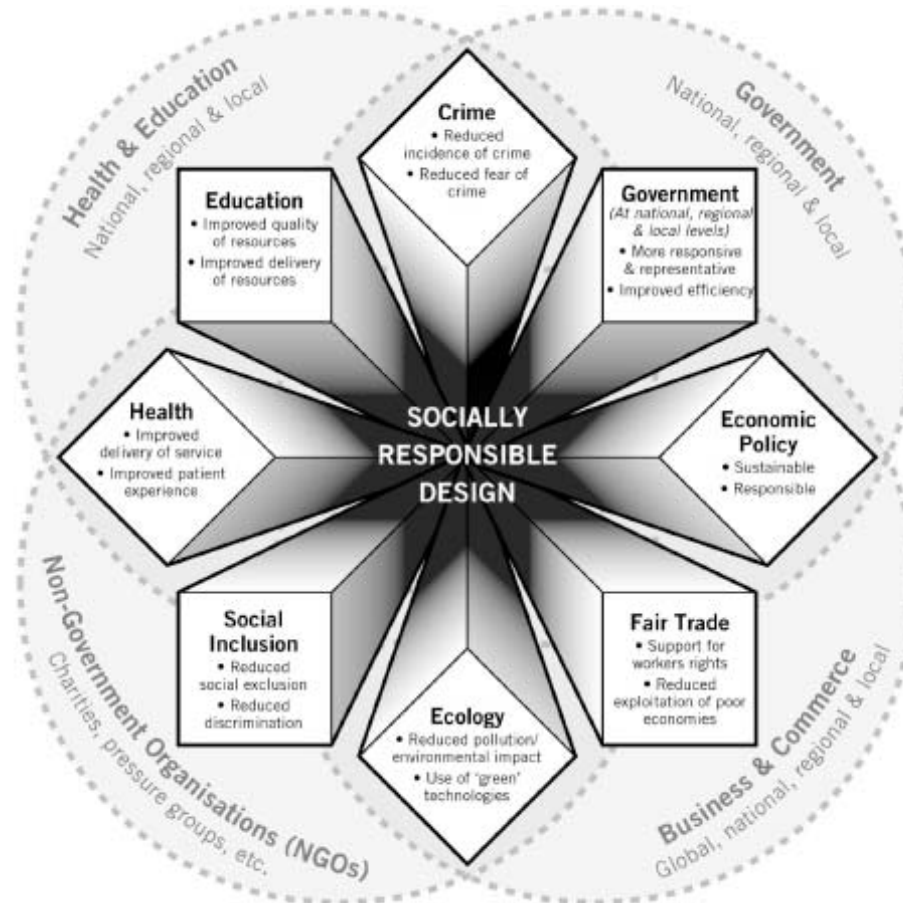
(Papanek, 1971:17; 1985:4; & 1995:211)

the pervasiveness of design

...“*design is both the **underlying matrix** of order and the **tool** that creates it”*”

(Papanek, 1995:211)

socially responsible design



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(source: Davey, Wooton, Thomas, Cooper, & Press, 2005:7)

disability

- ❖ **Disability:** *a physical or mental impairment that substantially limits one or more of the major life activities of such individual, a record of such an impairment, or being regarded as having such an impairment*
- ❖ **Handicap:** *disadvantage(s) experienced by the individual as a result of impairment and disabilities*
- ❖ **Impairment:** *any loss or abnormality of psychological, physiological, or anatomical structure or function; any loss of function resulting from injury or disease (International Classification of Functioning, Disability and Health: ICF).*
- ❖ A useful distinction between the terms **disability** and **handicap** is that the word *disability* refers to a specific impairment or disorder, whereas a *handicap* results from the person with the disability or by society. That is, persons with a specific disability can handicap themselves by believing that they cannot function under the right conditions. Society can also handicap persons with disabilities by refusing them opportunities.

disability²

- ❖ There are about 6.3 billion people alive today. According to *WHO* estimates for 2000, about **13.5%** (or 850 million people) of the world's population is affected by various types and degrees of disability.
- ❖ According to *Statistics Canada* (1991), **17.1%** of the Canadian adult population report some level of disability. This number works out to about 5.1 million of the country's total of over 30 million.
- ❖ In Japan (the world's *most rapidly aging* country) about **18.5%** of the total Japanese population are senior citizens aged 65 or older. Senior citizens will account for more than 25% in 2014.
- ❖ In South Africa, the *Health Systems Trust* reports the prevalence of disability at 6.5% (in 1996); 5.9% (1998); and **5.0% (2001)**. The latter figure represents a figure 2.25 million of out of a total population of 45 million (Health Systems Trust, 2006).

important milestones

- ❖ *The Decade of Disabled Persons- 1983-1993;*
 - ❖ *The African Decade of People With Disabilities- 1999-2009;*
 - ❖ *Year of the Disabled in Europe- 2003;*
 - ❖ *The International Day of the Left-Handed Person- 13th August 2003;*
 - ❖ *The International Day of the Older Person- 1st October; and*
 - ❖ *World AIDS Day-1st December.*
-
- ❖ *Americans with Disabilities Act (1990 in the USA);*
 - ❖ *Disability Discrimination Act (1992 in Australia);*
 - ❖ *Disability Discrimination Act (1995 in the UK);*
 - ❖ *Promotion of Promotion of Equality and Prevention of Unfair Discrimination Act (2000 in South Africa); and*
 - ❖ *The International Universal Design Association (formed in 2002 and hosted in Japan).*

disability models

<i>The individual model</i>	<i>The social model</i>
personal tragedy theory <i>personal problem</i> individual treatment <i>medicalisation</i> professional dominance <i>expertise</i> adjustment <i>individual identity</i> prejudice <i>attitudes</i> care <i>control</i> policy <i>individual adaptation</i>	social oppression theory <i>social problem</i> social action <i>self-help</i> individual and collective responsibility <i>experience</i> affirmation <i>collective identity</i> discrimination <i>behaviour</i> rights <i>choice</i> politics <i>social change</i>

(source: Oliver, 1996:34)

universal design

- ❖ “UD is the design of products and environments to be usable by **all people**, to the greatest extent possible, without the need for adaptation or specialized design” (CUD, 2006).
- ❖ “UD is an approach to the design of all products and environments to be usable by **everyone**, to the greatest extent possible, regardless of age, ability, or situation. It serves people who are young or old, with excellent or limited abilities, in ideal or difficult circumstances. UD benefits **everyone** by accommodating limitations”
- ❖ “UD has of recent years become synonymous with a designed world enabling **everybody** to participate in life and the activities taking place in our society on equal terms”

the scope of UD

ICT

Tourism

Education

Entertainment

Social Services

Employment Equity

Commerce & Industry

Education & Training

Sports & Recreation

Health-Care Provision

Product/Industrial Design

Rehabilitation Technology

Assistive & Adaptive Technology

Graphics; Informatics; Interaction Design

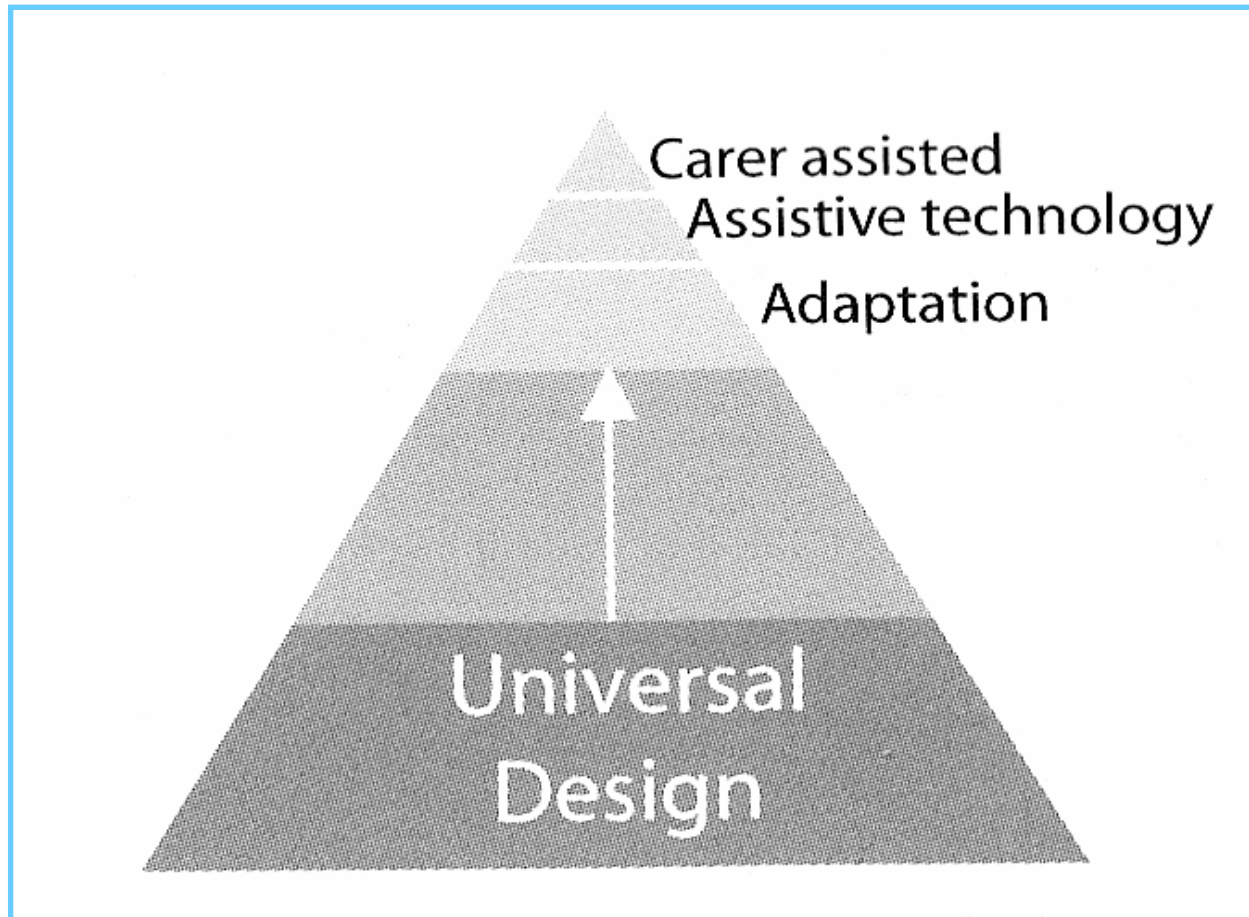
Applied Ergonomics; Biomedical Engineering

Architecture; Interior Design; Urban & Town Planning

etc

etc

UD and disability










(source: Clarkson *et al*, 2003:313)

divergence in UD

Concept	Definition
Inclusive Design (mainly UK)	<i>“Inclusive design is not a new genre of design, nor a separate specialism, but an approach to design in general and an element of business strategy that seeks to ensure that mainstream products, services and environments are accessible to the largest number of people”</i>
Design for All (Europe; India)	<i>“Design for All is a process whereby designers, manufacturers and service providers ensure that their products and environments address users irrespective of their age or ability”</i>
Kyoyo-Hin and Kyoyo Services (Japan)	<i>“Kyoyo-Hin and Kyoyo services are designed to be used by as many people as possible, including the elderly and those with disabilities”</i>
Transgenerational Design (mainly in the USA)	<i>“The practice of making products and environments compatible with those physical and sensory impairments associated with human aging and which limit major activities of daily living”</i>
Gerontechnology (mainly in USA and Europe)	<i>“Concept developed at Technical University of Eindhoven, NL, with US and Finnish colleagues. Combines human factors, social sciences, gerontology and engineering. Applying technology to address age-related factors. Consumer/market oriented approach”</i>

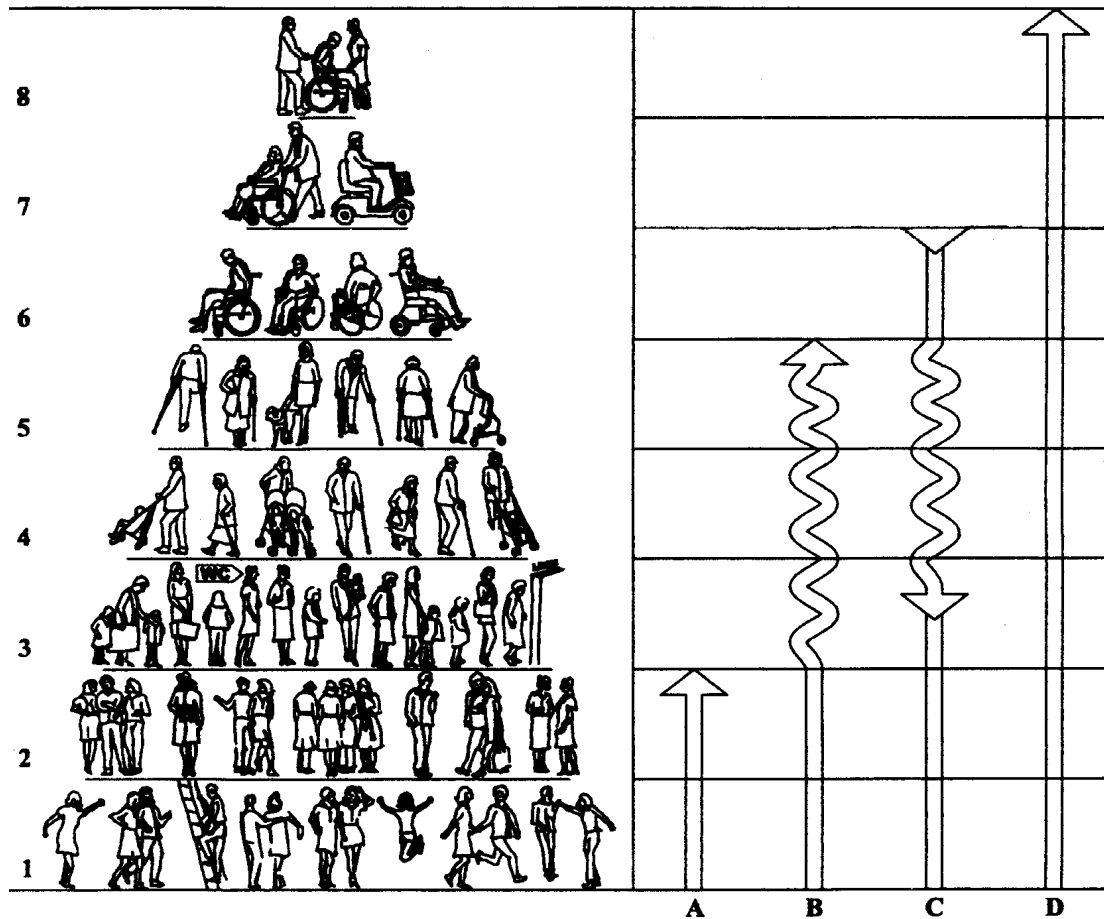
(source: EDeAN, 20006)

principles of UD & Kyoyo-Hin

Universal Design	Pictogram	Kyoyo-Hin and Kyoyo Services
1. Equitable Use. The design is useful and marketable to people with diverse abilities.		1. Adaptation to various types of physical and mental disabilities for easy use by as many people as possible.
2. Flexibility in Use. The design accommodates a wide range of individual preferences and abilities.		
3. Simple and Intuitive. Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.		3. Operation and use by means that are intuitively understood and require little psychological strain
4. Perceptible Information. The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.		2. Easily comprehensible communication using plural means (visual, aural, tactile, etc.).
5. Tolerance for Error. The design minimizes hazards and the adverse consequences of accidental or unintended actions.		5. Concern for safe use in all aspects, including material, structure, function, procedure, and environmental features
6. Low Physical Effort. The design can be used efficiently and comfortably, and with a minimum of fatigue.		4. Easy use with little physical burden (e.g., can be handled with little effort, easy accommodation of motion and approach, etc.)
7. Size and Space for Approach and Use. Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.		

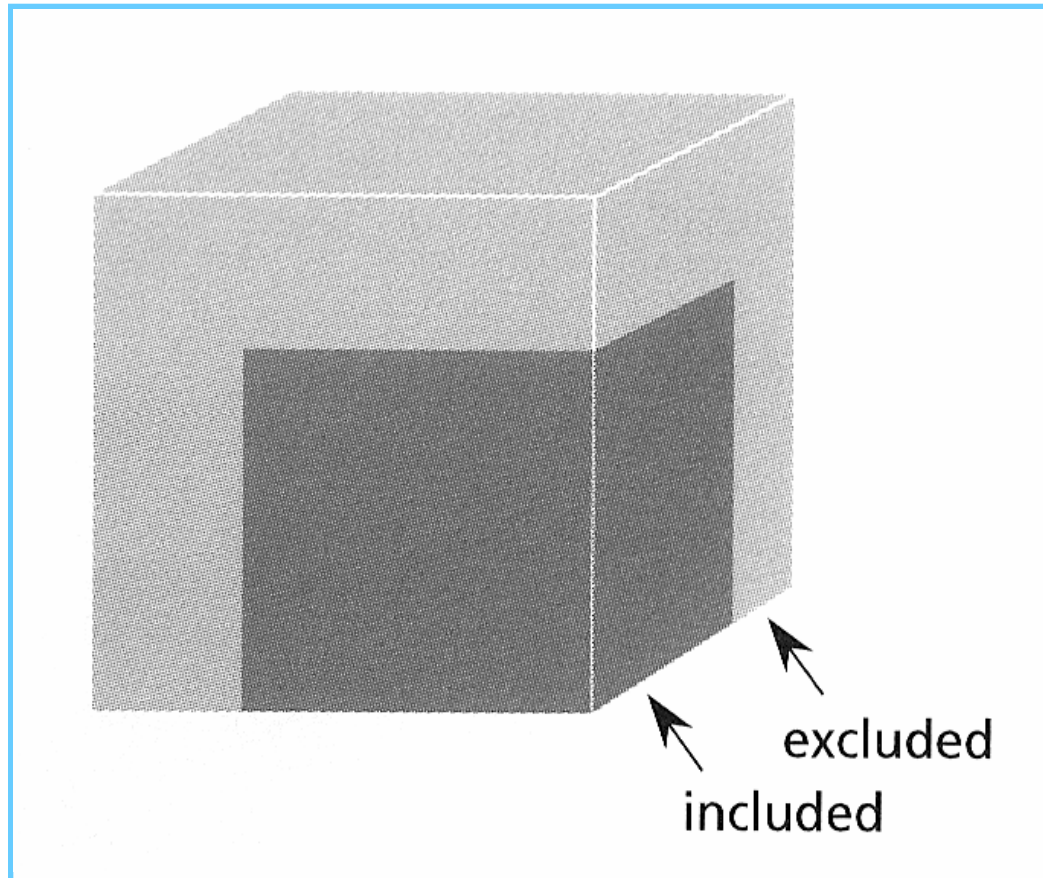
(source: CUD, 2006; Pictograms ©2001 Beth Tauke; & Kyoyo-Hin, 2001)

UD pyramid



(source: Goldsmith, 2000:3)

inclusive design cube



(source: Clarkson *et al*, 2003:99)

UD in education

- ❖ *Universal Design for Learning: UDL;*
- ❖ *Universal Design for Instruction: UDI;*
- ❖ *Universal Instructional Design: UID; and*
- ❖ *Universal Design for Education: UDE*
(McGuire, Scott & Shaw, 2006:167 -172).

inclusive education

'Mainstreaming' or 'Integration'	'Inclusion'
Mainstreaming is about getting learners to 'fit into' a particular kind of system or integrating them into this existing system.	Inclusion is about recognising and respecting the differences among all learners and building on the similarities.
Mainstreaming is about giving some learners extra support so that they can 'fit in' or be integrated into the 'normal' classroom routine. Learners are assessed by specialists who diagnose and prescribe technical interventions, such as the placement of learners in programmes.	Inclusion is about supporting all learners, educators and the system as a whole so that the full range of learning needs can be met. The focus is on teaching and learning actors, with the emphasis on the development of good teaching strategies that will be of benefit to all learners.
Mainstreaming and integration focus on changes that need to take place in learners so that they can 'fit in'. Here the focus is on the learner.	Inclusion focuses on overcoming barriers in the system that prevent it from meeting the full range of learning needs. The focus is on the adaptation of and support systems available in the classroom.

(source: Special Needs Education, 2001:17)

UD at CPUT

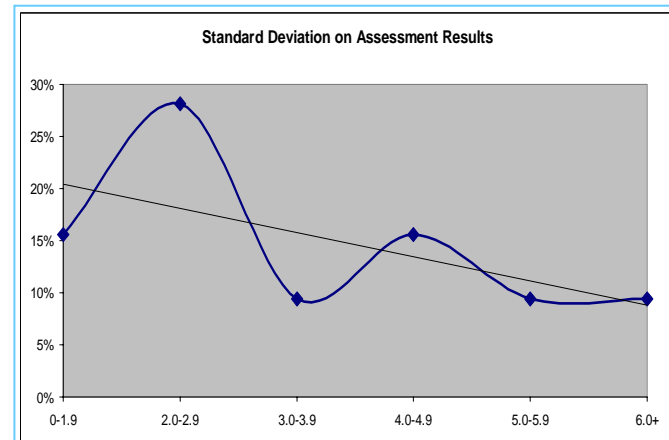
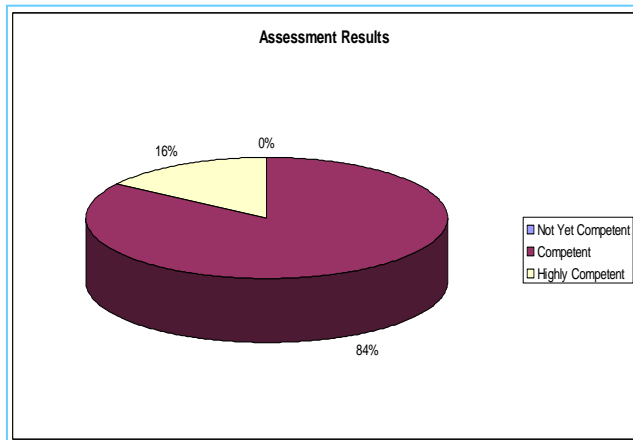
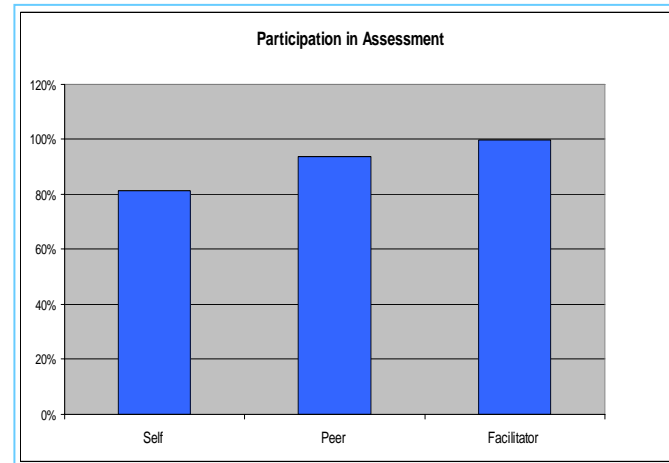
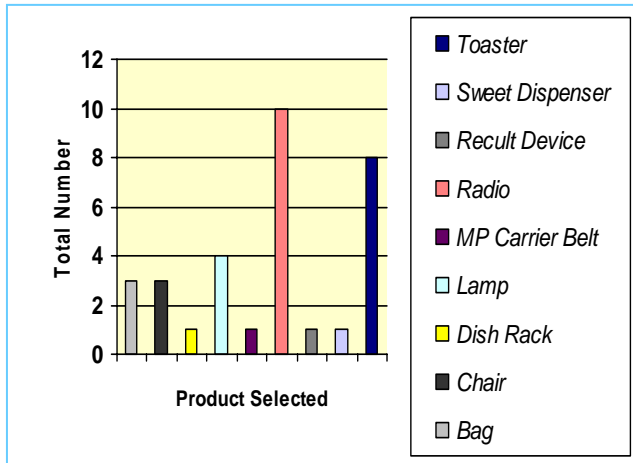
Learning outcomes- at the end of the module, students would :

- ❖ *identify special human needs in a product, system, or practice;*
- ❖ *apply The Principles of UD to actual design problems;*
- ❖ *use UD strategies to mediate and solve product design-related problems; and*
- ❖ *justify specific UD considerations in (re)designed solutions.*

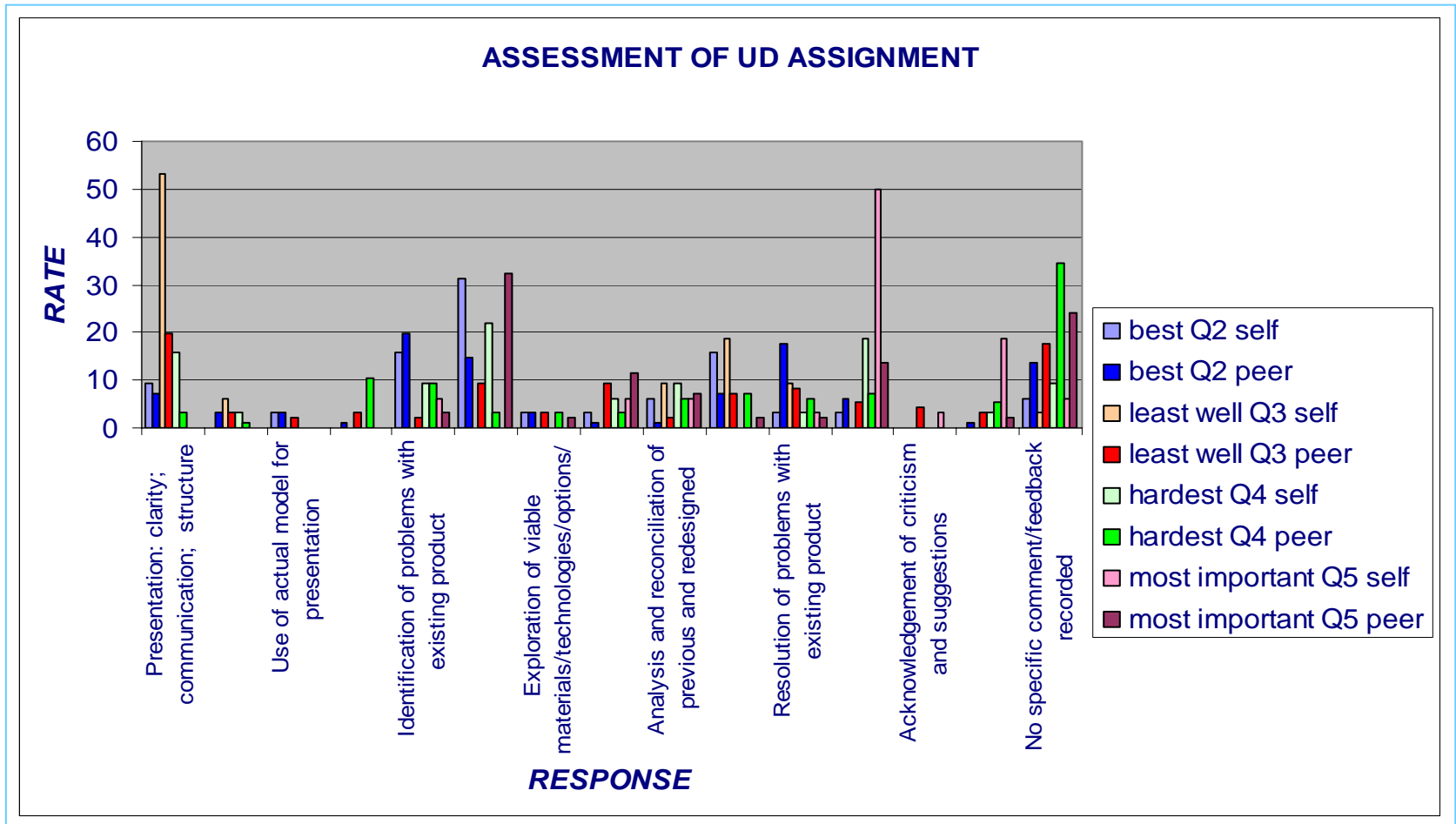
Student-centred activities :

- ❖ *identify one example of a product that they had previously designed and made a 3D model of;*
- ❖ *make a detailed case study of their chosen example using UD principles;*
- ❖ *identify specific ways in which they could improve the chosen example to accommodate excluded users;*
- ❖ *incorporate suitable and justifiable UD considerations in their redesign solution(s);*
- ❖ *present assignment to peers and facilitators during a 5-10 minute session;*
- ❖ *participate in self and peer assessment; and*
- ❖ *submit reflective evaluation (feedback) to facilitator.*

UD at CPUT²



UD at CPUT³



UD at CPUT: responses

Response to the Question 2: <ul style="list-style-type: none"> ▪ <i>What was the thing you think you did best in this assignment?</i>¹ ▪ <i>What was the thing you think the student did best in this assignment?</i>² 	Self-Assessment ¹ (%)	Peer-Assessment ² (%)
Application of appropriate UD principles to product	31.23	14.58
Identification of problems with existing product	15.63	19.79

Response to the Question 3: <ul style="list-style-type: none"> ▪ <i>What was the thing you think you did least well in this assignment?</i>¹ ▪ <i>What was the thing you think the student did least well in this assignment?</i>² 	Self-Assessment ¹ (%)	Peer-Assessment ² (%)
Presentation: clarity; communication; structure	53.13	19.79

Response to the Question 4: <ul style="list-style-type: none"> ▪ <i>What did you find to be the hardest part of this assignment?</i>¹ ▪ <i>What did you feel the student found to be the hardest part of their assignment?</i>² 	Self-Assessment ¹ (%)	Peer-Assessment ² (%)
Application of appropriate UD principles to product	21.87	3.13
No specific comment/feedback recorded	9.38	34.38

Response to the Question 5: <ul style="list-style-type: none"> ▪ <i>What was the most important thing you feel you learned in doing this assignment?</i>¹ ▪ <i>What was the most important thing you feel the student learned in doing their assignment?</i>² 	Self-Assessment ¹ (%)	Peer-Assessment ² (%)
Application of appropriate UD principles to product	0	32.29
Sensitivity to needs of differently-abled users	50.00	13.54

UD is good for business



OXO 'Good Grips'™



beverage caddy ©2005 M. Kahwaji

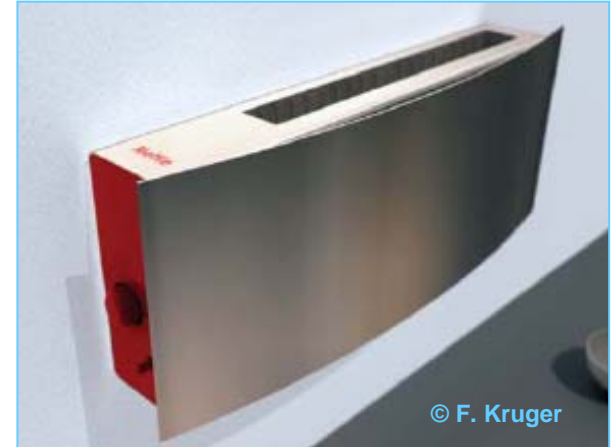
UD in product design @cput



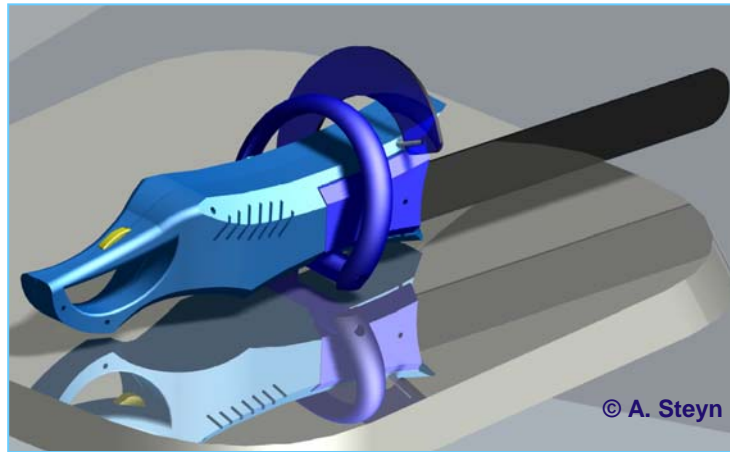
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UD in industrial design @cput



UD in industrial design @cput²



promoting inclusiveness...

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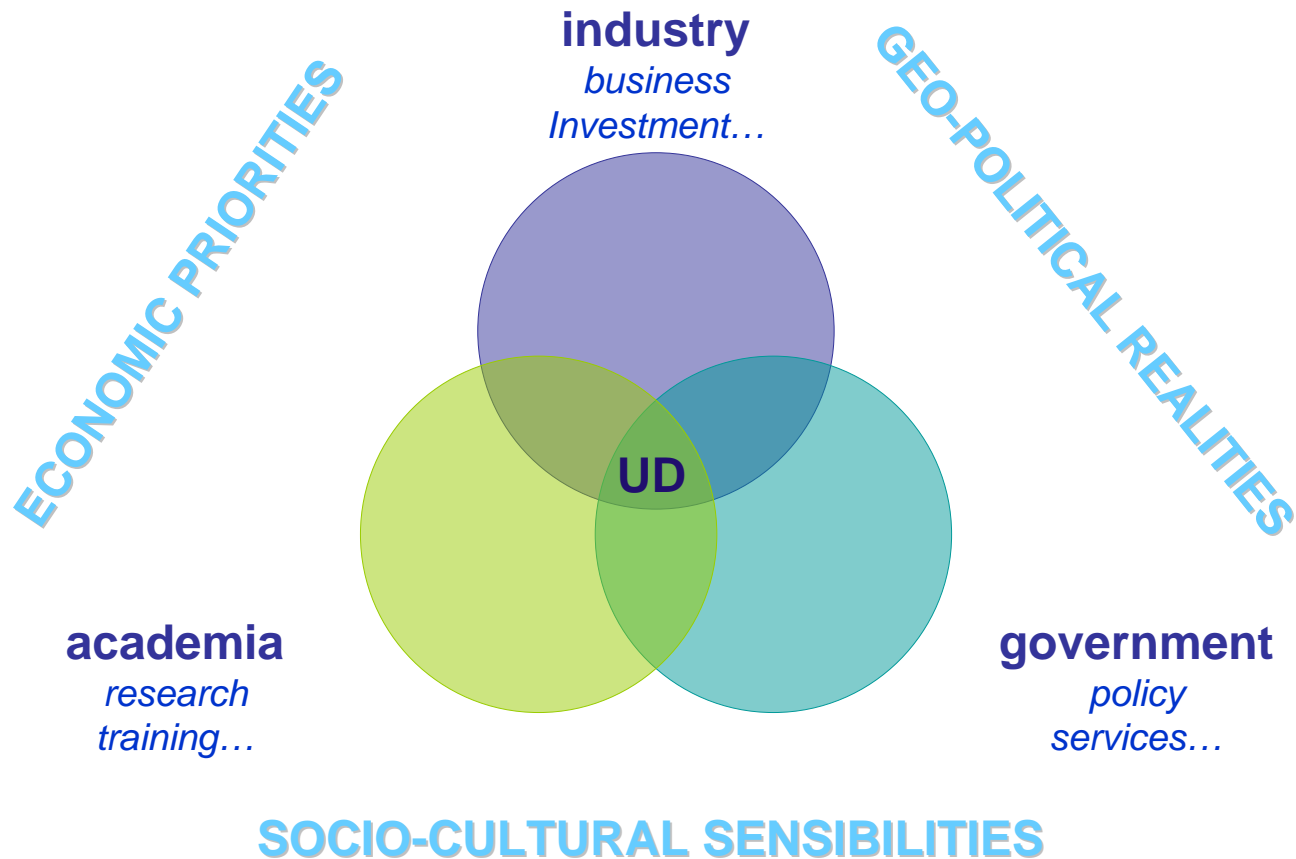
insular	<i>participatory</i>	collaborative
intra-disciplinary divergence special education simplistic	<i>cross-disciplinary convergence inclusive education eclectic</i>	trans-disciplinary transcendence universal design for learning holistic
isolation cynicism disablement medical model people then	<i>information pragmatism empowerment social model people now</i>	transformation optimism emancipation biopsychosocial approach? people always

PAST

PRESENT

FUTURE...

UD: an integrated approach...



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...thank you...