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Cross-Cultural Influences on the Semantics Ascribed to Assistive Technology Product and Its Envisaged User

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Abstract
Culture is an important variable when considering the communication of meaning through an artefact. A literature review has highlighted distinct differences in the cognitive processing that delivers perception between individuals from individualist and collectivist societies. The projected growth in Assistive Technology (AT) online marketing suggests industrial designers need to be more aware of the influence that diverse cultures may have on consumer's perception of an AT product attributes. Artefact semantic language is the vehicle to deliver design intent during an online user-product visual interaction. Little is published about how cultural differences in cognition relate to semantic preferences of AT product attributes and their users. This study aims to evaluate visual interaction of an AT product and its perceived user by individuals from culturally distinct countries; United Kingdom (individualist) and Pakistan (collectivist). A survey was conducted with first-year undergraduate students (N=281) from both countries, to evaluate their perception of a conventional attendant wheelchair. A Semantics Differential (SD) scale was employed having sixteen pairs of adjectives defining functional, meaning, and usability attributes of the product. The mean, standard deviation values were acquired for each pair of adjective and compared between both groups by performing appropriate statistical tests. In results, diverse cultures did not appear to have overtly influenced the meanings ascribed to the product, which was unexpected. Following statistical analysis minor but critical differences were found for some pairs of adjectives (bulky-compact, heavy-light), with p-value of less than 0.05 indicating the differences. Studies are planned to further investigate outcomes and validate results.

Keywords: AT Products, Diverse Culture, Product Semantics, Visual interaction, Wheelchair

Introduction

This paper presents a study of semantics, the meanings ascribed to the visual representation of a manual wheelchair and towards its envisaged user, as perceived by two student's groups having diverse cultural backgrounds; one from Pakistan (PAK) and the other from the United Kingdom (UK). The research documented elicits insights on cross-cultural similarities/differences in society's views, towards meanings associated with visual stimuli of an Assistive Technology (AT) product. The following sections provide background to the work and terminology used in the study.

The lead author has been a practicing industrial designer and graphic designer for ten years, in which time they recognized that the artefacts being designed are significant not just in terms of functionality, but also their communicative/semantics content and values delivered through cultural coding. This view is shared by the two co-authors, one a graphic designer, the other an industrial designer. The viewpoint of a visual language being embodied within an artefact acquires more meaning and importance within the domain of AT products. This marketing sector is neglected by mainstream industry and design in Pakistan, causing potential loss to the Pakistan economy (The Economist, 2014). The communicative/semantics attribution presented in AT products could be utilized to reframe individual's or social group's perception towards those artefacts and to the larger issue of their perception of disability. There appears to be a dearth of interventions relating to semantics ascribed to AT products particularly when perceived through the individuals having diverse socio-cultural background (Newell, 2003; Ripat and Woodgate, 2011; Lanutti *et al.*, 2015). The verb ascribed used in this context is the associated meaning, credit, attribute, given by an individual to an artefact based on their perception of it. This paper combines industrial design and graphic design knowledge of the authors, to provide a distinctive cultural viewpoint on AT products in the UK and Pakistan.

Demographics changes and Definition of AT products

Changes in world demographics have resulted in an increase of elderly populations and people with disabilities within societies (Newell, 2003; Sun, Wilson, Schreiber, & Wang, 2017). According to World Health Organization (WHO) (2011), over one billion people (10% of world population) are estimated to have some sort of disability. Elderly, individuals with disability and/or having limited physical or cognitive functionality may require the use of assistive technologies. A frequently cited definition in related literature of an AT product is:

"*Any item, piece of equipment or product system whether acquired commercially off the shelf, modified, or customized that is used to increase, maintain or improve functional capabilities of individuals with disabilities*" (Scherer and Glueckauf, 2005, p. 133; Cook, 2009, p. 128; Shinohara and Wobbrock, 2011, p. 705; Carver *et al.*, 2015, p. 2; Cook and Polgar, 2015, p. 17).

This definition covers a broad range of devices; however, among several AT products, a manual or attendant wheelchair remains the one that is used globally and across various cultures (Routhier *et al.*, 2003; WHO, 2008, 2010, 2017). Accordingly, the global wheelchair market is predicted to reach an estimated $6.1 Billion by 2022

(Lucintel, 2017, Market research reports Inc., 2017). Whilst the practical functions of AT devices have been considered in literature, still lesser importance is given to the communicative/semantic attribution of a manual wheelchair, particularly when perceived through the lens of diverse cultures.

Culture and terminology

'Culture' is a broad term often defined as

"*belief, values, meanings and actions that shape the lives of a collective of people, influencing the way people think, live and act, also, these beliefs, values and ways of understating are socially constructed and specific to culture in which they are found…"* (Ripat and Woodgate, 2011, p. 88).

It is the culture that gives certain meanings to artefacts and so provides rituals and values within which those products are utilized (Moalosi, Popovic and Hickling-Hudson, 2010; Hung, Li and Goh, 2013). From this perspective, culture may be seen as a primary determinant of meanings that individuals assign to certain artefacts. Accordingly, cultural insight has become a way to improve design and product sales within local and global marketplaces (Hung, Li and Goh, 2013).

Aim and Objectives

The aim of this research was to assess whether individuals from diverse cultural backgrounds would associate different meanings towards a given visual representation of a manual wheelchair and its envisaged user. To address this question, the research objectives were to:

- Critically review the literature related to semantic attributes of products/AT products;
- Review published articles to identify the appropriate method for studying culture;
- Identify available research methods, to probe semantic attribution of products particularly in diverse culture environment; and,
- Evaluate and investigate the visual interaction of individuals from diverse cultures.

Significance and implication of research

This study contributed towards a better understanding of semantic and/or communicative content perceived within AT product [a manual wheelchair] by diverse cultural groups that will assist AT product designers to investigate the perspective beyond practical functions. Also, this will enable industrial designers to consider the implications of cultural cognitive processing within the styling and design of AT products within a global market. This will have implications for the online sale of AT products, where products rely on electronic images that are presented on web pages to communicate the purpose and attributes of the artefact. Whilst the design of an AT product is within the professional practice of an industrial designer, the presentation of an image within a web page is the domain of a graphic

designer. Professional practice of both disciplines may be enhanced through the awareness of the principles highlighted by this study.

Literature Review

Product Semantics

Within a global market, the technological development in product design suggests an increase in competition. Industrial design is regarded as a discipline that offers a competitive advantage for companies in this competitive marketplace (Lu, Čok and Zhu, 2014; Chiu and Arbor, 2017). A product performs practical function as well as communicative functions (Muller, 2001; Evans and Sommerville, 2007; Crilly, 2010; Steffen, 2010). These key aspects of product functions are delineated in 'offenbach theory of product language' that distinguishes between practical and communicative aspects of artefacts (Krippendorff, 2007). Within the offline marketplace, the designer's intention is increasingly focused on the visual domain of products (Crilly, Moultrie and Clarkson, 2004). As the individuals respond not only to physical qualities of artefacts but act on what meanings they assign to them (Evans and Sommerville, 2007). Meanwhile, in an online marketplace, it is essential but no longer sufficient to offer just good functioning products. In visual product evaluation during online marketing artefact semantics, the associated meaning plays an important role in creating a differential advantage (McDonagh, Bruseberg and Haslam, 2002).

In the early eighties, product semantics was defined as:

the study of the symbolic qualities of man-made objects in the context of their use and the application of this knowledge to industrial design (Krippendorff and Butter, 1984, p. 4).

This definition highlights the significance of context within which an artefact will be used. However, little information exits of the cultural influences on the semantics associated with AT products.

Culture

The notion of 'culture' is widely discussed across the literature. Cultural experiences, beliefs and social practices influence and/or reinforce one's view of meanings assigned to a particular artefact (Moalosi, Popovic and Hickling-Hudson, 2010). One of the most frequently used approaches to study culture is Hofstede's culture model (Hofstede, 2001). The model presents culture as the 'collective programming of the mind'(Hofstede, 2001) and investigates culture at the national level, where individuals respond differently based on their doctrine, cultural belief and value system. Hofstede's model demonstrates the values systems that individuals possess, in terms of six cultural dimensions: power distance; masculinity/femininity; individualism/collectivism; uncertainty avoidance, long term orientation; and indulgence (Hofstede, 2001; Hung, Li and Goh, 2013; Bluszcz and Quan, 2016). See Figure 1.

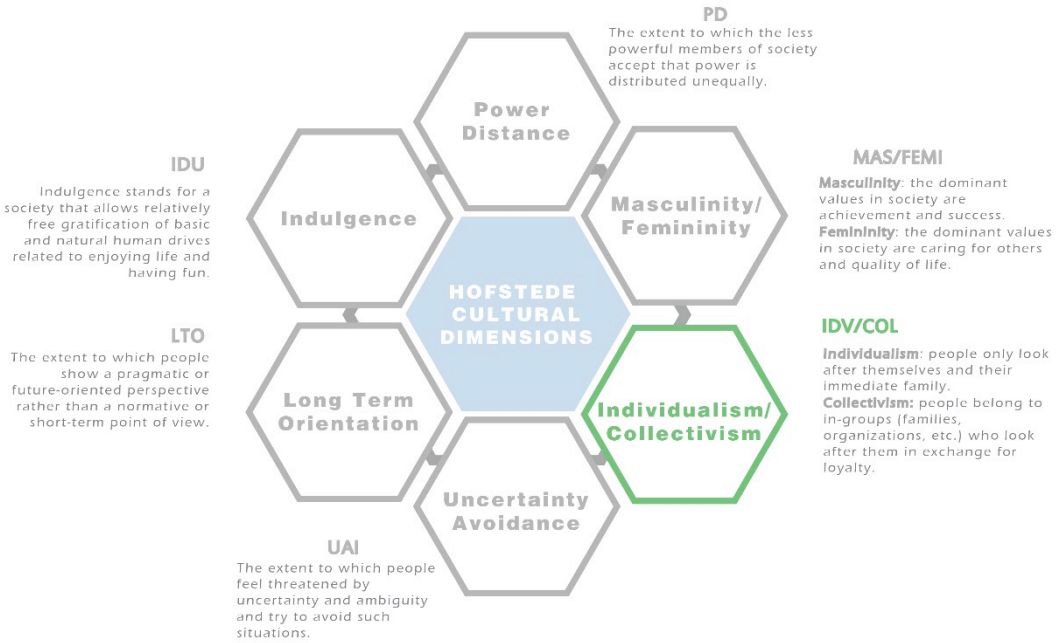


Figure 1: The Cultural Dimension of Hofstede Model (Based on Hofstede, 2001, Bluszcz and Quan, 2016)

Cultural dimensions

One way to study cultural differences is to divide the cultural perception into collectivist and individualist cultures. People who live in individualist societies are characterised with gaining mastery, control, self-sufficiency and predominantly independence (Ripat and Woodgate, 2011). Alternatively, individuals of collectivist societies are familiar with the social relationship, community, sense of belonging and interdependence (Lomay and Hinkebein, 2006; Hammell, 2009). Paratte *et al.* (2003) argue individualism as dominant features of European culture which taught care for oneself and become independent of the family; however, in collectivist cultures such as most of the Asian cultures, individuals are anticipated to be interdependent and count on other members in the community. Considering the distinct attributes of both groups (summarized in Table 1), individuals with diverse cultural context might assign different meanings to the artefact. Consequently, people may respond differently to the given representation of artefacts in the online marketplace (Chiu and Arbor, 2017).

Table 1: Comparison of collectivist and individualist societies (Based on: Hofstede, 2001)

Collectivist	Individualist
Maintain harmony, avoid confrontation	**Speak your mind**
High-context, implicit communication	**Low-context, explicit communication**
Use the word "we"	**Use the word "I"**
Show favour to in-group customers	**Treat all customers equally**
No business without a personal relation	**Task is more important than a good relation**
A relation brings rights and obligations	**Mutual advantage is the basis of relations**
Relations are given	**Build and maintain relations actively**
Save face for in-group	**Keep self-respect**
Responsible for group interests	**Responsible for personal interests**
Examples: China, Japan, Taiwan, India, Pakistan including other Asian countries etc.	**Examples: USA, UK, Germany, other European countries etc.**

Culture and Visual Perception

Culture acts as an independent variable that influences the formation of perception towards the real world (Acar *et al.*, 2011). When presented with a pictorial stimulus, the visual perception of individuals has been reported as different based on diverse cultural background (Nisbett, Richard, 2003; Acar *et al.*, 2011; Cenek and Cenek, 2015; Chiu and Arbor, 2017). Additionally, there is evidence indicating that the appraisal of sensory information is mediated by the native cultural settings (Acar *et al.*, 2011). For example, Nisbett and Masuda (2003) has argued that evaluation and appraisal of object varies cross-culture, such as among Westerns and East Asians. Lu *et al.* (2014). They have posited that Europeans (individualist societies) and East Asians (collectivist) employ distinct approaches towards the perception, comprehension and ascribed meaning of an artefact shape. Additionally, the word associations of individuals towards a given object was found to be different between North Americans (individualist) and Japanese (collectivist) (Acar *et al.*, 2011). The individualist (Western) cultures have been found to be analytical in their cognitive mechanism, whereas the collectivist (East Asians) noted to be more holistic in terms of considering the overall field (Nisbett *et al.*, 2001). Importantly, Chiu *et al.* (2017), confirms the cognitive differences applied to evaluate aesthetic preferences of an artefact by individuals from diverse cultures. They suggest industrial designers need to consider 'cultural cognitive style' while designing a product for a global market.

Research Gap and Hypothesis

These findings from reviewing the literature demonstrate that cultural differences in visual perception can influence the way an artefact is perceived, valued and appraised. From this the question arises: how does cross cultural cognitive style lead to distinct semantic attribution of an AT product and its envisaged user?'. If this is a legitimate question, people may respond differently to the given representation of the artefact, indicating its implications in online marketplace (Chiu and Arbor, 2017). The notion

of semantic attributes within a product design appears to be ubiquitous, and individuals may perceive and respond different based on their cultural experiences. The semantic (the meaning) attribution of an AT product, and its user, based on the perception of individuals from diverse cultural backgrounds have not been adequately addressed. Diverse culture may influence the evaluation of an AT product during visual interaction. Individuals from collectivists (Pakistani) may differ from individualist (United Kingdom) culture in terms of semantic attribution of an AT product and its envisaged user.

Methodology

Method

To date published research over last few years demonstrates the Semantic Differential (SD) scale method as a suitable fit to measure an individual's perception towards the semantic attributes of an AT product and associated user (Davis *et al.*, 1999; Fellinghauer *et al.*, 2011; Ajani and Stork, 2014; Lanutti *et al.*, 2015; Carneiro *et al.*, 2016). This scale was originally developed for use in psychology based interventions (Osgood, Suci and Tannenbaum, 1957; Osgood, 1964) but was rapidly adopted by the disciplines for other areas of research. Furthermore, the developer of SD scale, Osgood (1964) presented factorial analysis based on three domains; Evaluation, Potency and Activity, that were confirmed by previous pan-cultural studies (Osgood, 1964; Heise, 1970; Ciabuca, 2015). These terms described as evaluation relates to goodness or badness, morality, utility etc., Potency to magnitude, social power, strength, expansiveness etc., while Activity relates to speed, animation, spontaneity, etc. (Ciabuca, 2015). The SD scale typically loads on three meaning dimensions that found recurrent attitudes that individuals use to appraise words and sentences (Lanutti *et al.*, 2015). The potential of an SD scale approach to measure semantic attributes of the AT product and associated user has resulted in the development of two scales incorporated in a survey.

Developing Scale and Stimuli

To measure the perception of individuals towards envisaged user of the manual wheelchair, sixteen pair of opposing adjectives were loaded on a bipolar seven-steps scale. The selection of adjectives was made from the international organizations websites (e.g. WHO, UN etc.), and published articles (see Appendices). For the second scale, to analyses the semantic attribution AT product [manual wheelchair], this research adopted semantics differential scale as outlined by Lanutti *et al.* (2015) with added adjectives. Figure (2) shows an example of the pair of opposing adjective incorporated in the scale. For both scales, '1' was strongly aligned with words listed on left-hand side,'4' signifies the neutral positions, and '7' was strongly aligned with the adjectives on right-hand side. Those SD scales were presented to participants comprises of adjectives in arbitrary grouping to reduce bias response.

	1	2	3	4	5	6	7	
Heavy								Light

Figure 2: Example of pair of adjective used in SD scale

To evoke participants response, the basic visual of a manual wheelchair on plain white background was intentionally developed, presented in figure (3). This eliminates any related biases associated with the user of the wheelchair, environment (field) of object, which is radically different between both cultures. This also reduces any unnecessary influences from the image, having applicability and comprehension within both cultural groups (Pakistan and United Kingdom).



Figure 3: Semantic profile (visual in questionnaire)

Subject

The desk-based survey was conducted in the higher education institutions in Pakistan (PAK) and United Kingdom (UK). Ethical protocol were followed throughout this study and ethical approval was sought prior to conduct the survey by the two institutions involved. In this study, first-year undergraduate students (N=281) from Loughborough University (England, UK) and University of Engineering and Technology, (Punjab, Pakistan) participated, in lieu of individualist and collectivist societies, respectively.

The respondents of two cultures were matched on their age and year of registration in their respective institutes. The selection of university students as sample provides dual benefits for this pilot research. Firstly, university comprises of the students from various regions of country that makes an easy access to participants representing different regions. Secondly, this reduces bilingual barrier between two diverse cultures; as the university students understood a common language (English). A potential bias is that a university environment may have an impact on the student's home life beliefs, which may influence or alter cultural values possessed by the students. To diminish this potential bias, first-year, first semester undergraduates were identified as having been least influenced by a university environment.

Procedure

In both cases respondents were provided with a survey in the form of a set of papers including; participants information sheet, informed consent form and questionnaire in sequence. Prior to data collection, the subject read the participants information sheet, and short verbal instructions, regarding the structure of questionnaire, was provided by one of the authors. The respondents were advised that they could take appropriate time to mark their response on the scale, but that a spontaneous and intuitive response was recommended. Participants were asked to look at the picture of the manual wheelchair and mark their response of seven-point SD scale.

Post-processing

Corresponding to the hypothesis, analysis of questionnaire data was attempted to report and probe the nature of influences on the perception of participants from both groups in relation to the meaning ascribed to the product and its user. As this study employed probability (simple random sampling, convenience) sampling for data collection the data exploration was made by using statistical analysis, accordingly. Also, the exploratory nature of the research and its restricted sample size, finite numbers of statistical tests were performed.

In accordance to the nature of research question, the author considered responses from SD as scale (interval) data, parametric statistical tests were performed accordingly, to compare the response of both cultural groups. Primarily, normality of response data was confirmed by applying Shapiro-Wilk test. Considering the sample of both cultures as autonomous members, independent sample t-test was found appropriate. Following the normal distribution of questionnaire data independent sample t-test were performed to compare the responses between both cultural groups.

The response data was imported into computer software (Statistical Package for the Social Scientist (SPSS), Microsoft Excel). The descriptive and statistical tests were performed on questionnaire data by using SPSS and MS Excel. The graphical representation of the outcomes was made in Adobe illustrator CS6. From descriptive tests, minimum (min), maximum (max), mean (M) and standard deviation (sd) were obtained. Shapiro-Wilk test assessed the normality of questionnaire data. Although, normality assumption should not impact when sample size is large ($n>30$) (Elliott and Woodward, 2007), still normality tests (Shapiro-wilk) were performed to ensure appropriate selection from parametric or non-parametric tests. The Independent sample T-test compared the M values of each pair of adjective for both cultural groups.

Results

Demographic results of participants

For this survey, the male (66%) participants in UK group were larger than the female (34%). Contrary, more female (68%) respondents in comparison to male (32%) participated in this survey from PAK. The age range of participants remain between eighteen (18) to twenty-five (25) and eighteen (18) to twenty-two (22), for the UK

and PAK group, respectively. Table (2) shows the basic demographic details of samples from both cultural groups.

Table 2: Summary of basic demographic profile of participants

Basic demographic parameters	United Kingdom (UK)	Pakistan (PAK)
Total participants	114	114
Male	75	36
Female	39	78
Age limit	18-25	18-22
Average age	18.7	18.6
Religious Affiliation		
Respondents practicing religion	31	114
Respondents practicing no religion	83	00

Envisaged user of manual wheelchair

As described earlier, the first SD scale was presented to respondents to evaluate the perception of both cultural groups towards the envisaged user of the manual wheelchair. Initially, the descriptive statistics (M, sd, min, max) were obtained from questionnaire data for each group (presented in table 3).

Table 3: Descriptive statistics (envisaged user of manual wheelchair)

		Descriptive Statistics on data from UK				Descriptive Statistics on data from PAK			
	Pair of Adjective	**Min**	**Mean**	**Max**	**sd**	**Min**	**Mean**	**Max**	**sd**
Evaluation	**Old/ Young**	**1**	**2.63**	**6**	**0.91**	**1**	**2.43**	**7**	**1.48**
	Adult/ Child	**1**	**2.79**	**4**	**0.89**	**1**	**2.98**	**7**	**1.58**
	Able/ Disabled	**2**	**5.53**	**7**	**1.40**	**1**	**5.21**	**7**	**2.22**
	Independent/Dependent	**2**	**4.89**	**7**	**1.27**	**1**	**5.11**	**7**	**2.07**
	Immobile/Mobile	**1**	**3.18**	**6**	**1.31**	**1**	**3.51**	**7**	**1.93**
	Happy/ Unhappy	**1**	**4.24**	**7**	**1.15**	**1**	**4.75**	**7**	**1.61**
	Shy/ Confident	**2**	**3.68**	**7**	**1.11**	**1**	**3.96**	**7**	**1.82**
	Incompetent/ Proficient	**2**	**4.01**	**7**	**1.09**	**1**	**4.20**	**7**	**1.67**
Potency (Social Value)	**Beautiful/ Ugly**	**1**	**4.08**	**7**	**1.12**	**1**	**4.14**	**7**	**1.65**
	Unsociable/ Sociable	**2**	**3.98**	**7**	**1.01**	**1**	**4.04**	**7**	**1.69**
	Approachable/ Unapproachable	**1**	**3.76**	**6**	**1.31**	**1**	**3.60**	**7**	**1.88**
	Helpful/ Unhelpful	**1**	**3.94**	**6**	**0.95**	**1**	**3.71**	**7**	**1.94**
	Stylish/ Unstylish	**1**	**4.66**	**7**	**1.15**	**1**	**4.49**	**7**	**1.63**
	Polite/ Impolite	**1**	**3.43**	**7**	**1.18**	**1**	**3.54**	**7**	**1.74**
	Attractive/ Repulsive	**1**	**4.06**	**6**	**0.88**	**1**	**4.30**	**7**	**1.50**
	Similar/ Different	**1**	**4.54**	**7**	**1.18**	**1**	**4.41**	**7**	**1.73**

The findings from independent sample T-test suggest no significant difference exists between the both groups about the perception of envisaged user of manual wheelchair. Participants from cultural groups perceive an old, adult, disabled, dependent, immobile, and shy, being as the potential user of the product. Although, significance/reliability value (p value) was noted 0.006 (which is less than 0.05) indicating a difference, but this does not provide evidence based on which the overall results could be generalized. In addition to the results of independent t-test, graphic representation of the mean values of both groups confirms the similar nature of fluctuations between mean values of both groups (figure 4). It can be concluded from this comparison that within provided pair of adjectives, culture does not influence in terms of perceiving the envisaged user of manual wheelchair specifically among the adults from collectivists and individualist societies.

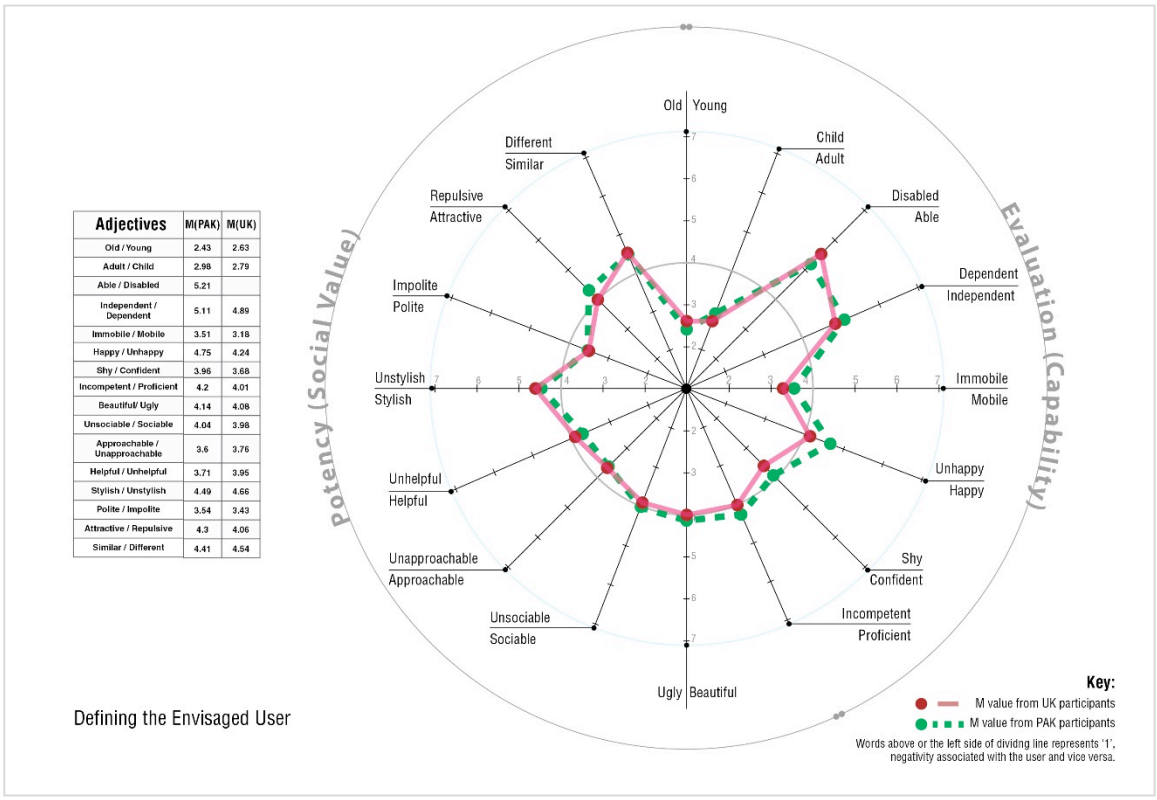


Figure 4: Illustration comparing M values of both groups (envisaged user of manual wheelchair)

Semantic attribution of AT product

In order to evaluate semantic attribution towards the visual of a manual wheelchair, by the participants of the UK and PAK, a second SD scale was presented to respondents during the same survey. This scale comprises pair of adjectives indicating the factor categories practical functioning (evaluation), social value (potency) and usability (activity) of the products. The contrary response was noted for the pair of adjectives defining the functional attributes of product. These include light-heavy, dynamic-static, compact-bulky. Additionally, independent sample T-test represents statistical difference (having p value less than 0.05). The graphical does not suggest the conflicting responses but represents differences with greater and lesser degree of variations between both groups. This similar trend was observed in category representing 'usability' (complicated–simple, difficult to use–easy to use, effective–

ineffective) aspect of the manual wheelchair. Although, the pair of adjectives indicating the 'social value' or meaning of the wheelchair, statistical differences were discovered from independent T-test. Considering mid-value (04) as neutral, responses of both groups were found to have differences with varied but relatively larger strength. Also, conflicting response was noted in this factorial category for some pair of adjectives (bulky–compact, beautiful–disgusting).

Finally, for statistical investigation of overall responses from both groups, mean (M) and standard deviation (sd) values of each group were obtained and analyzed. The independent t-test was performed using SPSS, resulting p value 0.615 ($p>0.05$). Although, some minor differences were noted between some pair of adjectives, but the significance value for overall groups suggests and support that no statistical difference exists between both groups.

Conclusion

In this paper, a survey of semantic, attribution towards AT products and its associated user, by the individuals of two diverse cultures (individualist and collectivist), were investigated via Semantic Differential (SD) scale method. Primarily, the respondents from both cultural groups perceived an old, shy, disabled, dependent, and immobile individual as an envisaged user of the manual wheelchair. This signifies their rational approach to evaluate the user by incorporating the larger concept of disability in their respective cultures. This also confirms the accurate relevance of SD scale utilized in this study. The second SD scale uncovered the semantic attribution of the manual wheelchair by the respondents of both cultural groups. While, no major statistical differences were noted, however, there was found to be some minor differences between the response of both cultural groups. This highlights the underlying problem towards the semantics ascribed to the AT products by the individuals of diverse cultures.

The implication of this study is that cultural-driven interventions towards semantic attribution of AT product provides new knowledge, approaches to visual and rationalize the product within the broader prospective of disability. Additionally, the notion of semantic attribution of AT product could be utilized as a force to manipulate individuals perception towards those artefacts and to the larger issue of their perception of disability. Also, this could be helpful for industrial designers in providing a viewpoint to incorporate cultural cognitive styles for an improved AT product selling in globalize online marketplace. As highlighted earlier, minor differences in terms of semantics ascribed to manual wheelchair were found, which needs to be further investigated. In order to evaluate visual preferences towards product image and to analyses the visual perception of individuals from diverse cultures, lab experiments are suggested to probe any prevailing blind spots. Finally, to generalize the findings of this study, this sort of survey needs to be conducted with the larger population (different age groups, sects, etc.), by introducing more pairs of adjectives indicating other aspects of the AT products.

Future work. Other variables to test:

1. Are University students less influenced by their collective culture as individualist the culture of a University campus?

2. Did all the respondents fully understand the meaning of the adjectives used in the SD Scale?
3. Should there be an additional action in the protocol to force people to read the descriptions of the terms? (It would increase time taken and complexity, reducing involvement).
4. Were the participants looking at the word ‘wheelchair’ and ‘disabled person’, the images of both or looking at both before making a decision on the SD scale?

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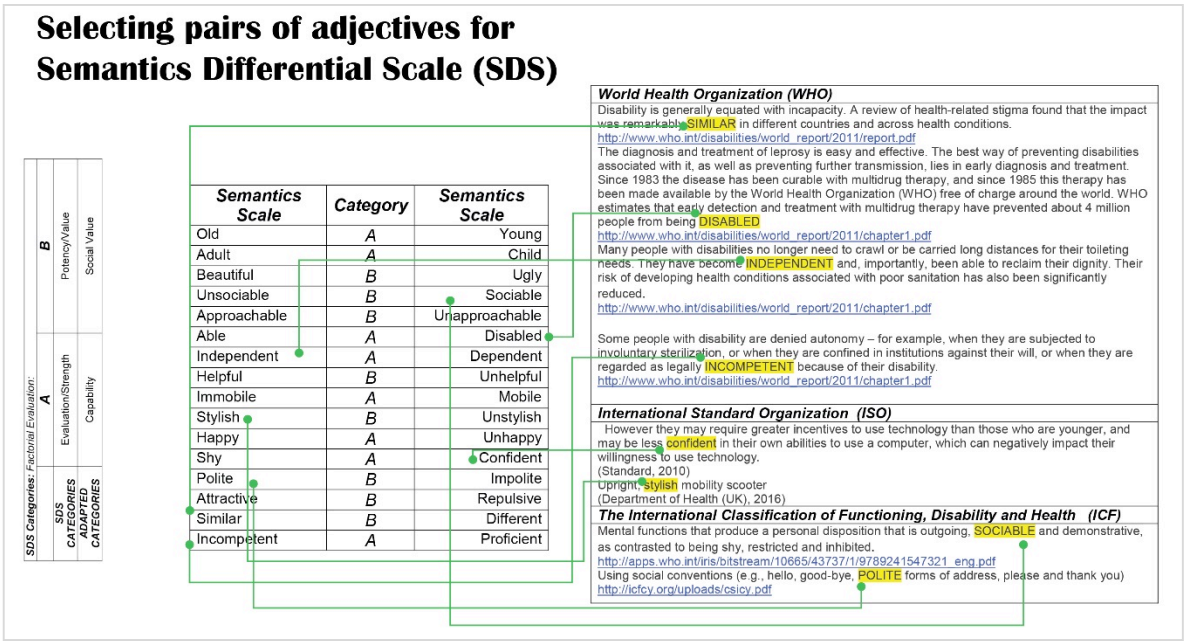
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Appendices


Selecting pairs of adjectives for Semantics Differential Scale (SDS)
SDS Categories: Factorial Evaluation:
A
Evaluation/Strength
Capability
B
Potency/Value
Social Value
SDS CATEGORIES ADAPTED CATEGORIES
Semantics Scale
Category
Semantics Scale
Old A Young
Adult A Child
Beautiful B Ugly
Unsociable B Sociable
Approachable B Unapproachable
Able A Disabled
Independent A Dependent
Helpful B Unhelpful
Immobile A Mobile
Stylish B Unstylish
Happy A Unhappy
Shy A Confident
Polite B Impolite
Attractive B Repulsive
Similar B Different
Incompetent A Proficient
World Health Organization (WHO)
Disability is generally equated with incapacity. A review of health-related stigma found that the impact was remarkably SIMILAR in different countries and across health conditions.
http://www.who.int/disabilities/world_report/2011/report.pdf
The diagnosis and treatment of leprosy is easy and effective. The best way of preventing disabilities associated with it, as well as preventing further transmission, lies in early diagnosis and treatment. Since 1983 the disease has been curable with multidrug therapy, and since 1985 this therapy has been made available by the World Health Organization (WHO) free of charge around the world. WHO estimates that early detection and treatment with multidrug therapy have prevented about 4 million people from being DISABLED
http://www.who.int/disabilities/world_report/2011/chapter1.pdf
Many people with disabilities no longer need to crawl or be carried long distances for their toileting needs. They have become INDEPENDENT and, importantly, been able to reclaim their dignity. Their risk of developing health conditions associated with poor sanitation has also been significantly reduced.
http://www.who.int/disabilities/world_report/2011/chapter1.pdf
Some people with disability are denied autonomy – for example, when they are subjected to involuntary sterilization, or when they are confined in institutions against their will, or when they are regarded as legally INCOMPETENT because of their disability.
http://www.who.int/disabilities/world_report/2011/chapter1.pdf
International Standard Organization (ISO)
However they may require greater incentives to use technology than those who are younger, and may be less confident in their own abilities to use a computer, which can negatively impact their willingness to use technology.
(Standard, 2010)
Upright, stylish mobility scooter
(Department of Health (UK), 2016)
The International Classification of Functioning, Disability and Health (ICF)
Mental functions that produce a personal disposition that is outgoing, SOCIABLE and demonstrative, as contrasted to being shy, restricted and inhibited.
http://apps.who.int/iris/bitstream/10665/43737/1/9789241547321_eng.pdf
Using social conventions (e.g., hello, good-bye, POLITE forms of address, please and thank you)
http://icfcy.org/uploads/csicy.pdf