DfD_UD_ID_DfA: Design for Inclusion in Sailing Yacht Design

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ABSTRACT

"Design for Inclusion" is a method that includes various way of thinking, for example: DfD_Design for Disability, UD_Universal Design, ID_Inclusive Design, DfA_Design for All. Today these disciplines are often evaluated in the same way; UD, ID, DfD are frequently used as synonymous. Actually there are many differences among them. To shed some light on this problem can help us to work better and to understand the importance that these disciplines have on yacht sailing design today. This Paper shows the result of the first step of a research for University G. D'Annunzio (Chieti-Pescara, Italy), Architecture and Design Department, in order to complete a three year Ph.D. At the end of the third year the target to goal is to put the final touch on an analysis system that should be useful to distinguish the foretold methods by studying the sailing yacht. On this document we can read the theory back on the research and we can find the most similar features and differences among DfD, UD, ID, DfD methods. Continuing we can read about how "Design for Inclusion" influenced sailing yacht design using also historical examples.

Keywords: Design for Inclusion, DfD, UD, ID, DfA, Sailing Yacht Design

INTRODUCTION: DESIGN FOR INCLUSION

Significant social changes are occurring in contemporary society, in terms of both population ageing and increasing of multiculturalism. The diversity in age, culture and ability is indeed nowadays greater than ever. Design is trying to solve so much problem than ever, looking after the needs and the aims of a high complexity population, founding new methods, for example using "Design for inclusion".

The premise is that: "it doesn't matter where are we looking at, we won't find a medium height man, just because he doesn't exist. No one lives in a 2.3 room apartment, takes 3.7 trips per year or has 1.7 children. Those figures only exist in the statistics". (EIDD 2006).

Designing manufacture products just referring on these data it means working for a little part of people. This idea shoot a big change on design in the user's mind. Now it's easier to realize that spaces, products and services can cause disability when they're the result of a bad design. In a few words: "Good design enables, bad design disables". (Hogan, 1993; mentioned in Accolla, 2009).

In this way each specification for people is considered as a difference and not as an ability or a disability. Furthermore, the birth of a social consciousness in design, has led to consider the differences as resources not as problems. Everybody has equal rights and opportunity to be actively involved in every day life, without barriers or

obstacle. The aim of "Design for Inclusion" is to include everybody in using a product, a environment or a service. Several approaches and methods arose in this field throughout last decades. *UD_Universal Design, ID_Inclusive Design* and *DfA_Design for All* are the most important.

Universal Design

UD was born in U.S.A. about in '80s. As method we can find some notices also in '50s about "Barrier Free" organization focused on II° word war disabled veterans and person with disabilities. They claim to be actively involved in everyday life and works. Since '50s some acts were introduced to prevent: "discrimination of disability in employment, access to places of public accommodation, services, programs, public transportation, and telecommunications" (Architectural Barriers Act, 1968).

When designers tried to improve these new deals, they realized that they had to eliminate architectural barriers using "special" solutions, too expensive and so bad. UD could arise acknowledging the existence of cheaper, nicer and not-discriminating solutions.

Ronald Mace, the pioneer of UD, decided to describe it as: "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" (Mace, 1985). Mace established in North Carolina University the Center for Universal Design in 1989, then it became the benchmark for this discipline. UD design method focus on 7 principles: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, appropriate size and space for approach and use. All these 7 points help designers to look back on current design and to improve future plans.

We can close with this declaration: "the intent of universal design is to simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost. Universal design benefits people of all ages and abilities" (The Center for Universal Design, 2008).

Inclusive Design

ID was born in England. This word was used for first time in 1994 by Roger Coleman. Then it was defined as: "The design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible [...] without the need for special adaptation or specialised design." (British Standard Institute, 2005). Therefore "the objective of inclusive design is to satisfy the needs and desires of the broadest range of users possible" (Warburton, 2003).

ID started with some initiative (exhibits, conferences, etc.) and with some design experiment since '70s. In this period designers realized how society was changing in England: aged people increase and so the movement for people with disability integration into society (Design Council, 2008).

At the end of '80s, designers start to think how design could promote autonomy and involvement in social life of aged people and people with disability. Since 2000 we can find some issues and publications very important to strengthen this method. The most important are: "Inclusive Design: Design for the Whole Population" (Clarkson e al. , 2003); "Countering Design Exclusion: An introduction to inclusive design" (Keates and Clarkson, 2003).

This publication describes a process to countering design exclusion on using a range of products. This method become the match point for ID. We understand that: "by identifying users vulnerable to design exclusion and designing to accommodate their capability levels, products can often be improved for all users and thus compete more effectively and appeal to a wider range of consumers" (Clarkson e Coleman, 2013).

ID involved some tools to help designers in considering the exclusion as integral part of the design process. For example: checklist, exclusion calculator, disability simulators on hands, on sight and on hearing (www.inclusivedesigntoolkit.com). Furthermore it was created a list of personas with some differences in order to analyse object interaction in everyday using. The aim of this method is also to understand how life style, age, skills and ambitions can change the way to use an object, a service or a space.

Design for All

DfA was defined as “design for human diversity, social inclusion and equality” in Stockholm declaration of EIDD (2004). It starts from Scandinavian functionalism of ‘50s and from ergonomic design of ‘60s. DfA borrowed the “society for all” idea from the first one; it borrowed the rule that focus the attention of design on human being from the second one.

DfA is the “design holistic approach, multidisciplinary and multi-sector -based, conceived to satisfy the need of many people with their peculiarities, considering at any time the informed use of human needs and ambitions analyse, including all the stakeholders from the beginning in dynamic way: customers, buyers, experts and users” Acolla, 2009).

Aim is: “to enable all people to have equal opportunities to participate in every aspect of society” (Stockholm Declaration of EIDD, 2004). Very important for DfA was the EIDD born in 1993, European Institute for Design and Disability, that focused on designs that were built up to improve life for people with disability. In 1998 this Institute guess international conference on “Design for All” in which, for the first time, social inclusion was declared as the starting point for good designing. This result was permitted by the mutation of what people think about disability in the last time. In 1980 W.H.O. (World Health Organization) defined disability as “any limitation or loss of capability to act in the usual way a human can make it”.

On the contrary, in the last years disability is considered not only a problem of a few group of people but also as an experience that everybody can live in his life. In 2001 W.H.O. proposed an universal disability model relevant for everyone, able or disabled. This new point of view made changes also in the DfA. It's not by chance that in 2006 EIDD was renamed “Design for All Europe”, leaving all disability references.

DIFFERENCES AND COMMON POINTS

UD, ID and DfA are latest methods. Their born is about ‘50s, official and scientific recognize is about ‘80s. Their development is the same, but in different places: U.S.A. for UD, U.K. for ID and U.E. for DfA. In spite of different locations, these three methods are based on very similar premises, purposes, and initial means. There are some common points. All these methods start from people changing in our world. O.N.U. data say to us how people is ageing and how people with disability is increasing. The aim is the same: everybody social life must be dynamic and active through the medium of inclusion.

These three methods share even the tool, that is to say design. Only a good design can help people to live and to use in the right way tools, environments and services. So it stands to reason why different methods have been related in scientific community too. It also explains why their naming has been considered interchangeable and usable without distinction, so that UD, DfD e ID, became synonymous de facto. For example Francesc Aragal in his book: “Universal design. The HUMBLES Method for User- Centred Business” says that: “ nowadays the concept of Design for All is identical to strategies known by different names in certain geographical areas, such as UD, ID […]” (Aragal, 2012).

Or also “Two major trends have driven the growth of Inclusive Design (also known as Design for All and as Universal Design in the USA) - population ageing and the growing movement to integrate disabled people into mainstream society” (www.designcouncil.info). So we can read much more similar examples. As a matter of fact, in spite of any a attempt of assimilation, thesis we're considering have relevant differences and are not equivalent. It’s easy to understand if we analyze 4 points of view:

Users : DfA users are “real people” divided in two parts: dependent and autonomous. People with disability are in the first part, in which we find men that can use any system, whether or not the help of a third person. On the other hand the second partition involves people with so much critical peculiarities that they can't use it by themselves (Accolla, 2009). UD users are real people. However the theory at the base of ID is that no

single design can answer all the needs of every kind of user, therefore ID tries to decrease the number of excluded people (Coleman and Clarkson, 2013).

Design method: DfA has a two part process: meta-design and design. The first phase includes: idea conceiving, analysis of the users and of their desires, briefing. The second phase includes: design briefing, creation of a prototype to test with users; once the most- qualifying-for-most-people solution is found it is possible to realize the project (Accolla, 2009).

Also the ID can be divided in different phases: to understand the aims of the product and to make a feasibility study; to observe the users and their behaviour creating a list of their needs; to transform the concept into a project; to create a prototypes to identify which people are excluded; to choose the definitive concept and realize the project (www.inclusivedesigntoolkit.com).

The participation of the users to the design process: in UD the users participate to a every phase of the process. In DfA not only the users participate to the process but also all the others (e.g. the sellers, the buyers, etc.) with a holistic approach. In ID the users participate only to the initial phase and the final testing phase.

The Aim: DfA wants to create social inclusion thinking for all; UD focuses on the product; ID tries to answer to all human needs in order to make the best product for all (also for commercial success).

This brief description show how big the difference are between the three approaches. Therefore using UD, DfA and ID as synonymouses can make confusion in terms of both definitions and procedures, breaking the relationships between the supposedly used approaches and results. It is not surprising to find products, environments, services supposedly designed with UD, DfA and ID and which do not respect the principles of these approaches. An analyses of the differences among DfA, UD and ID could help us to better understand their influences in the various areas where they were applied. However this is not the proper place for further discussing it.
This paper is mainly focused of “Design for Inclusion” on the sailing yacht design.

DESIGN FOR INCLUSION IN SAILING YACHT DESIGN

In yacht design little sailing boat were mostly influenced by “Design for Inclusion” . To be more precise we're speaking about boats with a full length under 32 ft. In this class we can evaluate various study case indeed:

Economics: lower price, lower cost for maintenance and mooring than price and cost of bigger boats. Thanks to these factors little sailing boat were appreciated not only by private citizens but also by sport associations that promote sailing for everyone. They are often without a monetary scope, so they work thanks to voluntary work. Lower price is an important factor for choosing.

Logistics: easier transportation and maintenance. People can use a little carriage for transportation and travel on the road. In this way the ship owner can move easily on overland track;

Adaptability: people can insert each type of tools both for ability or disability. This feature was very important for the diffusion of sailing on people with disability in the overture of the Design for Inclusion disciplines development.

As a matter of fact the awareness of disability helped the development of sport activities in these last 50 years by a new part of population. Sport activities that were considered prerogative of a little part of people with cultural, economical and physical duties, are used today by people with physical and mental disabilities. Among them there is boating too.

At the beginning it was possible thanks to sailing yachts designed or adapted for this kind of users, but then designers understood that the design of these special tools highlighted differences between “able and disabled

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people".

For these reasons even yacht designers changed their mind about "Design for Disability" and started to think about design for much more people it is possible. The aim become the same of "Design for Inclusion": it is to make usable sailing sport without age, sex, abilities, disabilities or social condition differences.

'80s

One of the first sailing boat for disabled people was designed by Rod McAlpine Downey in 1979 and built by Cheesman Rollo in 1980 in England. It's a trimaran called Challenger (length 15 ft) designed for Diana Campbell, a paraplegic young woman. This boat can solve problems of movement about the legs of Diana. The first item was safety on board and on navigation. Trimaran is a good boat for its stability but the designer had to study other important tools for safety, for example the boom slanting for preventing head collisions and the main sheet on the back of helmsman. He is positioned in the middle hull in a suitable seat. From this fixed position he can control the helm and the sails. The tiller bar is head of the helmsman and the lines led back to the cockpit. All of these items will be later resumed and re-edited in many boats designed specifically for all users.

In the '80s too some other boat for one or two members with central seat were used by people with disability. These boat has one hull only and they are called Class Mini 12. This name was taken by affinity with sailing boat of America's cup in New York in 1980, (www.gaviayachts.com). Various type of this class were built in some country in the world. In England we can find "Illusion" and "Shadow", and in the U.S.A. were built "Millimeter" and "Defender".

The most important sailing boat is the 2,4 Mr (length 13 ft), built in Scandinavian countries, Peter Norlin is the designer. This 2,4 Mr. become popular winning the status of international class in 1992. In 2000 in Sidney become official single -person keelboat for Paralympic Games. These targets were achieved thanks to designing the boat not only for abled body sailors, but also for people with different disability.

Its stability is guaranteed by two basic factors. The first one is a deep keel of 396,83 pounds that avoids capsizing. The second one is the helmsman positioned in the middle of the hull. The biggest part of his body is under the waterline. The weight is not important during navigation in close-haule in the wind. So he can stay in his position without sticking out the hull to set off against swayings. Furthermore, rigging from the cockpit allows the helmsman to steer sails without changing position. According to the disabilities of the helmsman the tiller bar can be changed by a cloche or pedal system.

Another important boat is "Sonar" (length 23 ft). It won international class in 2000 during Paralympic Games with three crew members . Designed by Bruce Kirby in 1979 was built in 1980. Sonar wasn't designed for people with disability but was designed for family and for fun. For these reasons the boat had to be easy to steer but funny too. These skills helped the boat to became popular all over the world for its adaptability for all people with disabilities too. It was possible just adapting some new tools to the boat, for example: transfer bench to slide from side to side during maneuvers, a grab bar for people with legs impairments , cloche, etc.

These examples of boats were designed for three different target:

Challenger: sailor with a particular impairments;
2.4 Mr : abled and disabled sailors;
Sonar: families for first, then disabled people.

In the '80s ID and DfA were growing up. There were not official definition of these methods, so designers spoke about Design for Disability. Only UD was defined in 1985 by Mace. But we hade to wait some years later to see these method officially used by boat builders and designers. '80s were a very important period for "Design for Inclusion" in sailing yacht. From this time many boats have been modified and adapted to allow disabled people to practice sailing sports. Which became more user. The starting point for disabled people in sport sailing activities.

'90s

An important element was the “Sailing for Everyone” an idea that was born thanks to some sport sailing association (that works a lot for awareness of these situations with event, meetings and regattas). “Sailability” is one of the most important (“An organisation facilitating sailing for everyone, regardless of age or ability”) with many clubs around the world (www.sailability.org). It was born during the ‘80s in England and it grew up in Australia in the ‘90s.

In Australia Chris Mitchel, thanks to Sailability, was able to use and promote two boats designed in that period: Access 2.3 and Access 303, today renamed Hansa 2,3 and Hansa 303. They were built with the will of designing for everyone and not for people with disability. In 2003 Mitchell during an interview said: “The Access Dinghies claim was that this new style of boat could bring millions of new people into the sport, turn around the decline in sailing and also provide a totally integrated recreational opportunity for people with any kind of disability”. Few years later, this way of thinking about design will lead him to use UD principles.

Hansa 2.3 (length 7 ft) and Hansa 303 (length 9 ft) are one or two crew-member type. They are different considering the form of the hull and the sailing system. Hansa 2.3 has only one sail rolling on the mast according to wind condition. The helmsman can do that by his seat in the cockpit. Hansa 303 has the mainsail and the jib each one rolling. The boom was slanting as in the Challenger and each one has centreboard, a cloche in the middle of the hull is the helmstock to make more easy the movements. These items can help different kind of people to use these sailing boat.

In the same period Martin 16 was born in Canada, it’s a 16 ft length boat for one or two crew members ; it was designed by Don Martin “for sailors from the ages of 10-and-under to 70+, from 40 kg to heavyweights, from novice to national champion. In addition, the boat is ideal for sailing schools and training clubs, while it is also accessible for seniors and persons with disabilities.” (www.martin16.com). Marin 16 has been one of the first sailing boat with electronic tools to improve navigation for disabled people. An important example is “sip-and-puff “ system. This solution can helps people with quadriplegic conditions to steer the boat with breathing, without using arms or legs. Today we can find this tool in some sailing boat: Sonar, Freedom 20, Catalina 22, Cal 20, 2.4 Mr e Challenger.

Another example is “Windlass Power Winch”: it allows to haul and to ease the lines electronically with a simple switch. Also the tiller bar can be replaced by a joystick to help people with no energy in his arms. These tools can help people with serious physical diseases to join sailing boat sports.

These two case history can show how in the ‘90s boat design starts by thinking about a use for everybody and not only for people with disability. Throughout last years “Design for Inclusion” started to give up with the idea of designing for disabled people. Moreover all the methods described in chapter 1 started to reinforce and to organize in the academic world. In the’90s we can find first definition of ID in England. In the same period EIDD was born and social inclusion become an important stage for a good design. “Design for Inclusion” influenced very much the designing and the construction of Access 2.3, Access 303 and Martin 16 even if they were thought without this method. Conceptual development goes with constructional stages in this case.

From 2000 to Our Days

Since 2000, boat design “for disabled people” and “for everyone” developed itself over and over. In England were born Artemis 20 and Wood 101. In Spain Gos 16. In Italy Emozioni, Tripesit, Seaflyer 18H trimarans and Dream Boat a single hull boat.

In the U.S.A. we can find some new multi hull boat very popular. In these years were born Windrider 17 (length 17 ft) e Windrider Tango (length 10 ft) . Windrider 17 “has features to please just about everybody. With the affordability of this boat we are bringing the joy and pleasure of sailing high-quality boats to as many people as possible” (www.windrider.com/windrider-17/). This boat can carry 6 crew members. They are seated in two cockpits in the central hull; the helmsman in the back o (aft?)and the rest of the crew forward. To handle this boat is very simple and intuitive. It is controlled by pedals system for the helm, so we can control with arms all the lines by the cockpit.

Thanks to these tools the Windrider 17 can be steered autonomously by one person only. For this reason it has been chosen by Alison Gunn in 2004 in order to catch a new record: first blind woman succeded in solo-circumnavigation of Wight Island.
In France was born another important proposal in the same years: Neo 495 (length 16 ft) . Alain Inzelrac before construction, has studied design for all and ergonomics. The design wins Accessible-to-All Awards 2013 in Paris. This boat in effect: "it is designed for all, not only for disabled people" (Inzelrac, 2013). Moreover it was realized for teaching too in a simple way for everyone. Two crew members are seated side by side in the cockpit and they can steer the boat with a central joystick. It allows the best control for a unskilled skipper. All the lines led back to the cockpit thanks to a console in the middle easily reachable by both sailors. A "special" console was designed for blind people too. The console is realized with braille labeled controls and control lines are made with different diameters to help indicate its function. Neo 495 has an high accessibility level. It means that a wide range of population can steer this sailing boat.

In Australia, one year after, the designer of Hansa 2.3 and 303 produced Skud 18 (length 19 ft). Its name is an acronym of Skiff Universal Design. In effect it was realized according to the seven principles of UD. It's a simple use boat controlled by one, two or three crew members. Skud 18 became an official Paralympic Class in 2008. During these particular regattas the crew must be of two members seated in the middle of the hull.

Some tools developed allow both able and disabled people to steer this boat. In the cockpit it is possible to fix one or two seats, with different measures or position if necessary, with a joystick to rotate the seat. This tool can help the sailor to stabilize the boat if he isn't able with his energy. Another type of joystick can replace the tiller bar. Joysticks are different according to different cases. If you can't use arms, for examples, you can steer the boat just by one foot thanks to this technology. If you can use your hands but you're not able to steer the helm using your arms, you can navigate on the Skud18 with just one hand. All the lines are led back to the cockpit to reduce human labour.

How you can see since 2000 some boats were truly designed following "Design for Inclusion" methods. Skud 18 and Neo 495 are important examples. The matter of coherencies between method used and construction application is clear looking on these two boats. The UD says about product: "they must be usable by all people without the need for adaptation or specialized design". Skud 18 can be used by a large part of population according to foretold seven principles but it is possible thanks to special tools built on. The same for Neo 495 with special aids contrasting with DfA method.

Throughout last years to clarify the situation - and to value project of designers, builder and society that have worked using the standard of this method - Start and Quality became two quality labels in order to certify the methodology used DfA. They are used "to certify products, environment and systems that express DfA method with no contradiction in terms" (www.dfaitalia.it). To obtain the quality labels, it is necessary to hold by them and to follow the right design process. In the same way, even if there isn't an official quality labels for the UD, it is possible to verify the right way to design an object just using the seven principles seen above. These standards show how people and designers want to solve the question in order to improve designing, construction and use, according to UD and DfA methods.

CONCLUSIONS

Leisure sailing is a production area in which the search of performances intensify the questions related to the use of placements and equipments. "A sailing yacht can be considered an *organized work system* defined by an interrelated set of elements (activities, riggings and people), working in special environmental conditions, pursuing the main object of *sailing* with efficiency, effectiveness and with satisfaction for everybody." (Vallicelli and Di Bucchianico, 2008). It's clear, in this situation of efficiency and organization, that some problems about accessibility and tools easily usable are very complex for all type of people (man, woman, child, aged, abled and disabled).

In the last 30 years, "Design for Inclusion" influenced accessibility, especially in the little sailing boat. In this sector there is a good list of examples to explain situations. In the paper, trough some descriptions, we can see how theoretical development goes with technical solutions according to DfA, UD and ID. Obviously the little confusion

on terms was transferred to sailing yacht design.

So next step, on the years during the Ph.d. in the Architecture and Design department of G.D'Annunzio University of Chieti-Pescara, will consist in clarifying better the possible design contradictions between the methodological premises of DfD, DfA, UD, ID and the construction of sailing yachts..

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