# Design for All



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#### Design for All in Italy: the results of an interdisciplinary workshop

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#### Introduction

The paper reports the main results of an interdisciplinary workshop (see Appendix), organised at Milan, Italy, by the Italian Ergonomics Association to discuss the Design for All approach, and coordinated by Pier Luigi Emiliani, Italian National Contact Centre of the European network EDeAN and by Isabella Tiziana Steffan, European Ergonomist.

At a very general level, the aim of the Design for All approach is to improve the quality of life of all people, irrespective of their personal characteristics and environmental factors. It therefore cuts across much professional expertise and many sectors of application, for example, transportation, public parks and gardens, the design of buildings, rooms, furniture and objects, education, and, more recently, the emerging complex ICT environment. Moreover, legislation, policy and economy are involved.

In Europe, the ICT environment has been an important support for an understanding of the Design for All approach at a political level. Indeed, the European political push towards the development of an Information Society accessible to all has put Design for all at the core of technological development. In particular, in Italy, legislation (Law 4/2004 - "Disposizioni per favorire l'accesso dei soggetti disabili agli strumenti informatici") has been enacted which defines the minimum accessibility levels to information and information systems to be guaranteed to public employees and citizens. Even if it starts from the need to grant accessibility to people with disabilities, this legislation aims to improve the quality of information services for all citizens and to constitute a model for private enterprises in their interactions with clients. One of the main features of the legislation is a built-in flexibility to match the continuously varying needs of users.

Therefore, in order to improve the application possibilities of this principle, it has been considered important to compare the different experiences, discuss the underlying concepts, and present, whenever possible, concrete applications in Italy and in Europe.

The ergonomic environment appeared particularly suitable for an interdisciplinary discussion between experts who are apparently very disparate as regards the nature of their professional work, which ranges from industrial design to telecommunications and information technology. In fact, the final goal in all sectors is to produce objects, systems, and services that are easily usable and enjoyable by the final user. Ergonomics, as a

bridge between human sciences and physical sciences, provides a common ground for discussion.

# **Design for All: the conceptual level**

It is interesting to consider the connections between Design for All, ergonomics, and design in general, as emerges from the recent conceptual developments in ergonomics and the new methodological instruments produced by WHO as the ICF classification "International Classification of Functioning, Disability and Health", published in 2002, and the normative instruments set up by ISO with the standard 20282 "Ease of operation of everyday products".

The convergence between Design Ergonomics and Design for All starts from a special attention to the characteristics and needs of a real user within a specific context of use, choosing which type of ergonomics deals with any specific intervention. Its approach to design requires a change in emphasis from the definition of standardised user profiles, traditionally defined as the correspondence between specific needs and physical and cognitive characteristics of the users, to the identification not only of real user needs, but also of their requirements and preferences. This implies surpassing the traditional evaluation of the "ability/disability levels", which is insufficient to capture the inherent differences between human beings, and aiming at a design approach that is centred on the real needs and expectations of people with different ages, levels of autonomy, and health conditions, which may change during their lifetime.(*see Workshop Program* – Tosi)

For example, in the architectural design of the city environment and in the industrial design, the Design for All approach does not represent a new modality of design, but identifies a process and a cultural attitude that aim to use diversity as an added value.

From the second part of the 60's on the European cultural approach, but also the Italian one, moved from the idea of Design for special needs (special products conceived for special users) and the idea of an Architectural Barriers Free Design (focused on removing existing barriers) to a more holistic concept of design such as "Inclusive Design", "Universal Design" and "Design for All". Unlike in Anglo-Saxon and Scandinavian countries, in Italy, in the 50's and 60's architectural barrier free design and accessibility was not a widespread matter. The first approach was taken in 1965 when two associations in Rome organised an international conference in Stresa (on Lake Maggiore) considering "architectural barriers"<sup>1</sup> as the main topic of discussion. Since then the field of architectural design attentive to the handicapped features in Italy a wide legislation. In Italy the referring technical legislation is about architectural barrier free design: D.P.R. 384/78 (replaced by DPR 503/96) was a legislative cornerstone in the area of public buildings and spaces and those open to the public, even though it was ignored for many

<sup>&</sup>lt;sup>1</sup> At the conference in Stresa there were delegates from many European countries and from U.S., Cile, India. Selwyn Goldsmith from U.K. described his work: his handbook "Designing for the Disabled" RIBA, Technical Information Service, London, 1963, was a reference to the most sensitive Italian designers for a long time.

years by operators and public administrations. In addition to dealing with public and private means of transport, art. 24 of Law 104/1992 also governs building aspects and accessibility of public walkways and pedestrian crossings as well, including with acoustic traffic lights for the blind and signs installed in a manner not to impede crossing. Also important are Law 13/1989, which extends the field of application to both private and public residential buildings, and the decree implementing it, DM 236/1989, which, with DPR 503/1996, is now the reference point at state level for all public and private places [1].

Ergonomics as a multidisciplinary and interdisciplinary approach is connected with Design for All thanks to its attention to concrete applications and to its characterisation as a User-Centred design approach. In this specific application environment, the DfA approach aims to implement physical spaces, products, services and organisational modalities that:

- can be used in complete autonomy and with a minimum of adaptation, while offering security and comfort;
- satisfy the needs of the maximum possible number of users without the need for adaptations or a specialised design.

In order to comply with the above requirements, it is important to:

- include in the analysis all possible users, including those who up to now have been excluded or insufficiently considered;
- offer alternatives through a design that take into account the needs, requirements and preferences of users who are disabled or differ in some way from the average user;
- merge the concept of accessibility with those of usability and usage satisfaction;
- emphasize the importance of a multi-sensorial approach and of the expressive and aesthetic aspects;
- involve users in the design and evaluation. (*see Workshop Program* Monzeglio)

It is important to take into account the fact that Design for All must not be only concerned with the design of objects and systems, but must also aim to develop learning methodologies accessible to all, especially by taking into account people with cognitive disabilities (*see Workshop Program* –Ippoliti). In Italy, due to the application of Law 68/99, an increasing number of people with disabilities are being integrated into the private industrial sector. At present, the problem is to conserve working positions by means of continuous training. Within this environment, the Lombardy Region and the Province of Bolzano (with the cooperation of the Regions of Campania, Latium, Liguria, Marches, Sardinia, Sicily, and Aosta) have started a project aimed to dealing with the continuous training of people with disabilities who are working in industry.

As regards ICT, the aforesaid general concepts are the final conclusion to a long development that started from the need to give people with disabilities access to information technology, equipment, and applications and to telecommunications services [2]. The main difference is that, when an interest in information technology and telecommunications for people with disabilities arose, a variety of equipment (e.g. personal computers) and terminals were already available. They had been developed for

"average" users, that is, for users with well-defined physical and cognitive abilities. Therefore, the only possibility available was to make them available to users with disabilities by using ad hoc adaptations (Assistive Technology), which involved problems connected to the high cost and the delay with respect to those for other users. Consequently, the Design for All approach was considered to be a good opportunity to identify product specifications by taking into account the needs, requirements and preferences of all potential users, and thus to meet the needs of most potential users without the necessity of specific adaptations. However, when it is attempted to transfer this approach for the environments in which it was developed (architecture and industrial design) to the development of equipment, services and applications in ICT, certain problems arise. This is true in the design of human-computer interfaces, where the idea of designing an interface which is valid for all appears simply utopian, but is particularly critical when the new development of the Information Society is taken into account. According to the pertinent documents of the European Union [3], intelligent environments are supposed to emerge. Social environments will evolve that will integrate computational systems which permit interconnected intelligent devices embedded in a physical environment to support activities mediated by technology and access to services. These environments are supposed to exhibit increasing "intelligence" for support of users, depending on their characteristics and on the contexts of use. In fact, some of the foreseen features are starting to be incorporated in the emerging telecommunications services, which tend to be reconfigurable in real time in order to accommodate varying needs and contexts of use, to mix functions of access to information and interpersonal communication, to be interactive, multimedia and multimodal in order to address different sensorial and motor abilities, to enable cooperation between users themselves and users and their representatives (agents and/or avatars). This requires the use of Design for All concepts in order to simplify the necessary interactions, by increasing the complexity of the systems at levels that are not visible to the users and by offering interactions that use known metaphors in order to be easily understood and managed by most potential users.

As discussed in the following section, one possible solution to the problem is to introduce enough intelligence into the devices, systems and services to make them automatically adaptable to the different users and contexts of use and adaptive to the way in which they have been used.

# **DfA in practice**

A first, interesting example of the Design for All approach presented at the workshop is the design of an object for everyday use, namely a door handle, as an object meant to satisfy the requirement of being able to move freely in the home without encountering physical and psychological barriers (*see Workshop Program* – Bianchetti). It has an innovative form, which makes the object pleasing to the eye, easy to grasp by people with prehension problems, and usable by people of different heights, children, adults, and people in wheelchairs.

An interesting example of application of the Design for All at the system level is in the environment of tourism where, starting from the design of accessible spaces for people with disabilities, it has become clear that, in addition to clarifying user needs, it is necessary to consider the organisation of tourism and reception as a complex system that takes care of all the needs of all potential clients. The system is made up of the following subsystems:

- design and management
- reception
- information and communication
- education and training

and requires the integration of different disciplines. It is an interesting example of synergy between industrial design and ICT.

This field of activity has received a lot of attention at the Italian and European levels. Examples of this are:

- the "Albergo in via dei Matti n.0" project (funded by the European Project Equal [4], which deals with inclusion, reception and accessibility in a hotel environment;
- The C.A.R.E. Project (funded as a part of the European Interreg-Cadses Project), which is aimed at sharing common strategies for the development of accessible cities;
- The "Assoviaggio" Project (supported by "L'altra Romagna" in the frame of the European initiative Leader+), whose objective is the production and dissemination of information for promoting localities, buildings and services accessible and/or usable by all.

An interesting example mentioned of design according to the Design for All approach is a hotel in which there are no special rooms with dedicated bathrooms for people with motor disabilities, but each bathroom is adaptable according to the abilities of the user.

In ICT, the situation is more complex from the perspective of application. It is clear that in considering, for example, the problem of the human-computer interface, it is impossible to use a technical approach like the above-mentioned one used in the design of the door handle. No single human-computer interface will be good for everyone. Therefore, a different conceptual and technical approach has been proposed, according to which "Design for All" implies the production of intelligent architectures that are able to adapt the information content and the human system interface to the needs of the individual users. Therefore, everyone is served, because the system is able to offer to each of them the needed individual representation of information and interface.

The question is whether this is possible or a utopia. Several projects have been carried out within the framework of the research programmes of the European Union. In the ACCESS project [5], it has been shown that it is possible to design adaptable and adaptive human-computer interfaces. In AVANTI [5], the interfaces have been implemented and the approach has been generalised in regard to the information contents of Web services. In Palio [5], the approach has been generalised in regard to mobile systems and to a consideration of the context of use.

Moreover, "ambient intelligence", where adaptivity is a general feature that characterises the environment, appears to be the prevailing paradigm in the development of the Information Society, thus confirming the soundness of an approach based on adaptability and adaptivity.

The use of available technology to make possible an increased integration of all citizens has also been presented (*see Workshop Program* – Zoels). Examples of this are:

- Integration of the mobile telephone with orientation and navigations systems;
- The "Access!" service from Nokia, which uses the cell phone and the web to distribute relevant information for moving around. It is possible to download multimedia information that shows how to overcome physical obstacles or helps in planning the trip.

#### **DfA in Europe**

In order to favour comprehension of the Design for All approach, the EDeAN network (European Design for All e-Accessibility Network, http://www.e-accessibility.org) has been set up in Europe, and includes at the moment more than 160 organisations. Its objective is to favour discussion and the exchange of information regarding related topics and to disseminate the relevant knowledge in public and private environments. The network activity is based on a complex and efficient information and telecommunications infrastructure, which makes an accessible support available for.

# Conclusions

Dissemination results as an essential aspect in order to increase the application of this approach. Therefore any event, such as meeting, conference, or workshop, aiming to discuss even only some particular aspects of this approach can give a positive contribution. Moreover, as this approach can be used in a large number of sectors, in which is very difficult to find a common language, the comparison among implementations in different fields of applications is to foster, because it demonstrates how the same principles can o must be apply or modified in order to meet different needs of the context.

In order to carry on this discussion, a second workshop will be held in Milan, in February 2007. This workshop, organized by Italian Ergonomics Association- sezione Lombardia, the Faculty of Design of the Politecnico di Milano, the Italian National Research Council and the European Design for All eAccessibility Network), will investigate the relationship between Ergonomics and Design for All in Italy and in Europe.

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# Appendix 1 - Workshop "Design for All" Program

11 February 2006
Workshon "Design for All"
(coordinated by Isabella Tiziana Steffan and Pier Luigi Emiliani)
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I. T. Steffan, P. Emiliani
DfA in the European Society e in the Design world.
(Francesc Aragall - Beppe Benenti Design for All Foundation)
Design for All in the world of associations: Italian Institute of Design and Disability
(Marcella Gabbiani, President IIDD)
Design for All in the world of associations : European Centre of Research and Promotion of
Accessibilità
(Leris Fantini, Vice-president CERPA)
Design Sector
Ergonomics and Design for All
(F. Tosi, Professor, Politecnico di Milano)
DfA approach in urban design. Architecture and objects Design.
(Eugenia Monzeglio Professor Politecnico di Torino)
Forniture for All and urban scene
(Marcello Balzani, Professor University of Ferrara, Department of Architecture)
Tourism for All: product, environment, information
(Leris Fantini, Association Si Può – National Lab for accessibile tourism)
DfA application in an object of daily use
(Fabrizio Bianchetti designer)
(1 uorizio Dranonom, designer)
Information Sector
Italian Legislation in Design for All
(R Ridolfi CNIPA member and President of the Government commission for
the use of ICT in favor of disabled and disadvantaged people)
Design for All in the Information Society
(Pierluigi Emiliani Director of the Institute for Applied Physics of Italian
National Research Council)
The EdeAN European Network
(Renzo Andrich SIVA - Isabella T Steffan IIDD)
Interactive products
(Ian Christoph Zoels Experientia)
(Jan-Chilstoph Zoels, Experientia) Design for All in the design of learning methodologies
(Isshells Inpoliti, SIS Consortium System Social Company)
(Isabena Ipponu, Sis Consoliuun System Social Company)
Discussion and conclusions