

Design for All



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Design Research by Under 40 Researchers

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His works has been published in more than thirty peer-reviewed publications, including: The Bloomsbury Encyclopaedia of Design (six items), Proceeding of AHFE, Proceedings of IEA, Proceedings of NES (Nordic Ergonomics and Human Factors Society) and Proceedings of SIE.

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GUEST EDITORIAL: DESIGN RESEARCH BY UNDER 40 RESEARCHERS

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Design Research has no age!

As we know, doing effective researches in Design and Design-related fields is strategic for our complex society; it can be surely defined as a collective, multidisciplinary and collaborative work of hundreds of people ranging from – approximately – 25 years old up to 65, and in some cases even more. Compared to past, researchers today can work together using a large number of tools and research-oriented infrastructures, they can compare their results and share insights very quickly for the enhancement of Design Culture. Designers and Design Researchers work both on theoretical aspects and on market-oriented issues, even envisioning or anticipating next generations of solutions, applications, large-scale effects and, finally, future training curricula.

As someone properly said, the only limit of human capability to reach new frontiers is people's imagination; we know indeed how imagination is important for Design...

In principle, we can say that the novelty, and in some cases the originality, of the researches in Design fields are mainly due to two factors: from one hand there is the capability of experienced researchers to constantly refine their knowledge and ideas

through iterative processes; this in fact generates a solid structural research that, in many cases, is used by community of experts to update their work, including professional one. On the other hand, the novelty of some ideas, which sometimes are really proactive compared their times, come up from young and less experienced researchers, which develop original and innovative frameworks and concepts to work with.

The history of Design is full of episodes where smart intuitions have generated radical innovations and new disciplines, changing the ways of thinking for generations. As a sort of naïve work – at that age is really appreciated – they sometimes can really contribute to draw some new lines for the societal innovation.

When I received the invitation to edit this special issue of Design for All, published by the Design for All Institute of India, I was both honoured and concerned. I obviously was honoured to contribute in the debate promoted by the Design for All Institute of India, which has a reputable editorial project internationally acclaimed, but at the same time I felt the moral oblige to honour all my young colleagues that worldwide work on exceptional ideas proactive scenarios for future development of the Design Discipline.

Therefore, this editorial Design Research by Under 40 Researchers' is conceived as a homage to all young brave, ambitious, and sometimes wild design researchers that have – or have had – the chance and the determination to focus their sights beyond the ordinary, exploring extraordinary concepts, visions, ideas using design-based and design-oriented approaches. As said, my work as Guest Editor for this special issue is to exalt the young talent in the achievement of original results.

This issue collects four essays developed by young Italian researchers that have completed their Ph.D. in Design and in Design-related areas. All essays sustain the idea of a human-centric value of people in the (inter-)disciplinary innovation, as a confirmation that while the continuous technological improvement generates technology-pushed innovations, the meaning-driven ones linked to the social and human spheres remain the most important to be faced in the future times.

This issue is also an indirect homage to all mentors, advisors and experts that have helped and encouraged the authors presented in the next pages to explore and develop very original ideas and personal concepts of the Discipline. With the wish that in the near future, next generations of designers would benefit from the insights produced by this new generation of free design thinkers.

Emilio Rossi

DESIGN OF KNOWLEDGE SHARING-ORIENTED COMMUNICATIVE PROCESSES FOR EMERGING COUNTRIES

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Tacit knowledge can be defined as a particular form of knowledge used by people to address, deal and manage practical issues involving the immediate use of experience, abilities and manual skills. It is a kind of knowledge acquired and refined through the iterative practice of "doing" and over the time, it becomes a continuous learning process depending to the context in which we operate and it is tied to people that maintain it. However, the process of 'know-how sharing' offers the possibility to give a real social and economic emancipation to practical experience and to tacit knowledge embedded in people. This possibility could allow the start of a collective and participative development of competences, abilities and skills usually belonging to a stakeholder's personal realm. In order to have good know-how sharing, it is necessary to have appropriately designed tools, which are able to codify, support and amplify this process. Among most advanced products available, communicative tools and collaborative networks are recognized as those mostly able to guarantee information management and an amplification

of communicative data. The paper describes how communication tools and collaborative networks can be used to share this particular kind of unspoken knowledge at interpersonal level. Starting from the analysis of the communicative process related to tacit knowledge, the study proposes a new process for sharing tacit information and introduces some strategic and communicative solutions, as well as some design scenarios related to knowledge sharing in emerging countries and developing economies.

Keywords: Tacit Knowledge Sharing • Communicative Exchange Processes • Communication Tools • Collaborative Networks • ICTs • Design Solutions in Emerging Countries.

Introduction

Contemporary network society is largely based on the use of ubiquitous ICTs, on networks and on the use of personal communication tools. During recent decades they have allowed people to share, in an easy and democratic way, their knowledge in the form of information, definitions and operating procedures.

Even though the most diffused forms of knowledge are "explicit" (i.e.: shareable facts, communicable notions, etc.), "tacit" knowledge (i.e.: experiences, skills, etc.) is very important because it is strictly tied to the manual doing and to the fulfillment of actions with practical purposes (Sennett, 2008). Tacit knowledge is intended as a particular type of procedural knowledge incorporated within people, and by its nature, it expresses undoubted communicative and representative

problems, both from the point of view of interpersonal communication and during the process of sharing with other people. This is due to the fact that people must explain their experience and what they know, through to use common and traditional mediums, such as speech or signs, that are not suitable to achieve this purpose (Ryle, 1949; Polanyi, 1966).

For these reasons, it can be shared almost exclusively through emulative, repetitive and learning-by-doing processes. In emerging countries this seems so limited due to; the distances among people, the linguistic differences, the impossibility for stakeholders to be physically close, and the lack of ad-hoc and well-designed procedures and tools able to share and convert tacit knowledge into explicit knowledge.

Communication tools and collaborative networks can help to support the sharing knowledge process through innovative and low environmental impact design solutions. The positive impacts that they already have in everyday life suggest that, if we could conceive operative knowledge sharing processes, applicable for example to the design of communicative solutions, the spread of well-codified tacit information can surely amplify and maximize the impact into all society.

So, considering social, economic and industrial backgrounds, emerging countries have become a privileged ground for testing new sustainable communicative solutions to share tacit knowledge. The exchange of experience-based information could contribute to increasing human wealth (Manzini and Jegou, 2003) in terms of security, work learning and in the improvement of manual experiences, that are recognised as pillars of the "context-based" Sustainable Development.

Aims

The paper shows early results of a theoretical and methodological study aiming to describe how communication tools and collaborative networks can be used to share tacit knowledge at interpersonal level. In particular specific paper aims are:

- *Proposing an operative knowledge sharing process applicable in the design of communicative solutions.*
- *Showing how to identify guidelines in designing communicative tools and collaborative networks for sharing tacit knowledge at interpersonal level.*
- *Proposing new strategic scenarios and sustainable communicative design themes related to knowledge sharing problems in emerging countries*

Methodology

The research was conducted following a logical path divided into three different phases listed as follow:

- *The first phase analyzes, from the communicative point of view, characteristics of knowledge and the communicative process related to tacit knowledge considering intrinsic problems and strengths.*
- *The second phase proposes a simplified process for sharing tacit information and experience; it is created from the reinterpretation and the extension of one among most common and popular methods used in Knowledge Sharing and Knowledge Management literature.*
- *The third phase demonstrates benefits and potentialities of the new sharing knowledge methodology, in the definition of*

design guidelines to be applied to communicative tools and collaborative networks.

Characteristics of the Tacit Knowledge's Communicative Process

In the sharing of tacit knowledge, one of the most important elements concerns the communication – also known as representation – at interpersonal level (Nonaka and von Krogh, 2009). So, good communication is really important because it enables to share with others, what we know and what someone has acquired over time through slow processes of personal experience-based synthesis and reflection.

However, as Michael Polanyi (1966) stated, interpersonal communication of tacit knowledge is also the main problem in the overall sharing process. Moreover, the problem concerns the necessity to communicate what, by its nature, cannot be communicated with common communication apparatus such as speech, signs, or today, through digital social sharing techniques. This aspect, indeed limits the potential applications of tacit knowledge, because the diffusion of information is confined in a strictly local dimension.

From a strictly communicative point of view, it is possible to identify some relevant critical elements characterizing good process of knowledge sharing. Among these, two are fundamental. A first element concerns the physical proximity between who owns knowledge and those who want receive it. About this, one of the most common and spontaneous sharing ways consists in the direct emulation through a very close observation (Nonaka, 1994), and the subsequent replication with learning-by-doing attempts. A second element concerns the

linguistic incompatibility between stakeholders involved in the knowledge sharing process. Indeed, possible forms of incompatibility limit people's collaborative aptitude and their involvement in task fulfilment (Kauppila, Rajala and Jyrämä, 2011).

A proper enabling tacit knowledge sharing process offers the possibility to give a real social and economic value to practical experiences and tacit knowledge embedded in people. This possibility could allow generation, through bottom-up processes, a collective and participative development of competences, abilities and skills usually belonging to stakeholders' personal realm, in the perspective of a Sustainable Development of context-based wealth conditions (Manzini, 2002; 2003).

Defining a Communicative Exchange Process for Tacit Knowledge Sharing

In economic sciences, since the 1990's, the matter of interpersonal tacit knowledge sharing has been a predominant research theme. In this field, the main contributions of the conversion processes from tacit knowledge into explicit ones have been gained from the works of Ikujiro Nonaka and Hirotaka Takeuchi (1995). In their research, authors have defined a new model – the so-called SECI Model – able to describe how tacit knowledge can be transformed into explicit knowledge.

SECI is the acronym of "Socialization", "Externalization", "Combination" and "Internalization". In detail, it is a model developed to describe how social dynamics, which are at the base of the creation of knowledge in organizations, are articulated. The model is represented by a spiral diagram describing four stages of process flows of combination and conversion of knowledge. It

allows the description of how this flow can be converted from a tacit and incorporated knowledge form, into an explicit and shared one. As Figure 1 shows, we have: "Socialization" (from tacit knowledge to tacit knowledge), "Externalization" (from tacit knowledge to explicit knowledge), "Combination" (from explicit knowledge to explicit knowledge) and finally, "Internalization" (from explicit knowledge to tacit knowledge). (Nonaka and Toyama, 2003)

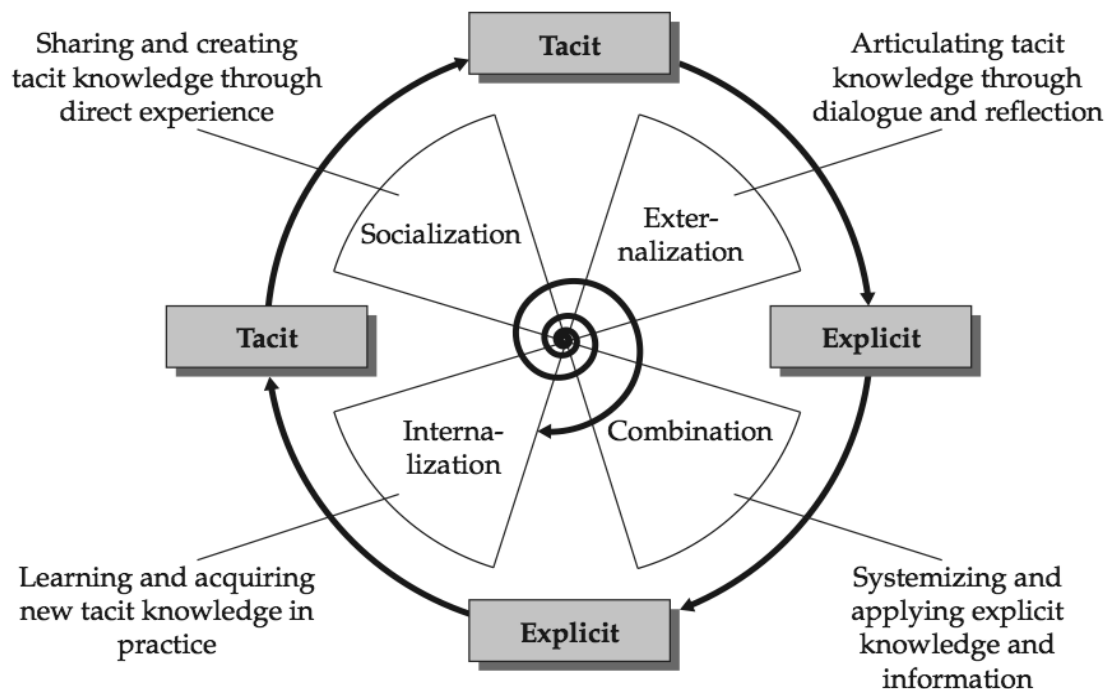


Figure 1: The SECI Model spiral diagram. (Takeuchi, 2006).

Even though SECI Model clearly describes the way to convert tacit knowledge into explicit knowledge, it doesn't provide clear and detailed information about the specificity of each stage. In addition, this Model seems inapplicable to communication tools and collaborative networks – due to the fact that it isn't conceived

for them – and so it seems essential to try to create a new SECI-based Model applicable to these new communicative paradigms.

The definition of a new communicative exchange process for tacit knowledge sharing is built starting from the SECI Model. Some common Knowledge Sharing discipline techniques such as: After Action Review, Mind mapping, Experience Capitalization, Knowledge Fairs, etc. (Knowledge Sharing Toolkit, 2012), integrate its concepts and enable us also to track new hypothetical design solutions.

Results obtained from this new communicative exchange process for tacit knowledge sharing are shown in Table 1, which contains the four SECI's stages (left) and new twelve detailed principles (right) applicable to the design of communicative artifacts for converting tacit knowledge into explicit knowledge.

Table 1: The new twelve principles for sharing tacit knowledge.

SECI Phases	New Principles for Sharing Tacit Knowledge
SOCIALIZATION (Tacit-to-Tacit)	<ul style="list-style-type: none">• Designing databases for collecting and organizing tacit knowledge.• Creating the knowledge background necessary to generate the whole model (providing available knowledge within database).• Representing and guiding existing tacit knowledge, its themes and aims using the most simple and comfortable communication methods.• Starting the sharing process of collected tacit knowledge using proper communicative tools (the choice depends on the task, from the

	activity, from expected outputs, from audience capabilities)
EXTERNALIZATION (Tacit-to-Explicit)	<ol style="list-style-type: none">5. Using personal syntaxes or mind maps for conceptualizing and fixing tacit knowledge.6. Thinking in a critical way about the quality of obtained results.7. Explicit acquired knowledge for creating the right stakeholders involvement in the topic.8. Developing and supporting over time the network of collaborations through effective feedbacks and stimuli
COMBINATION (Explicit-to-Explicit)	<ol style="list-style-type: none">9. Allowing collaborative peer-to-peer folksonomies on formalized knowledge in order to verify the led process and prevents further errors.10. Disseminating among stakeholders explicit knowledge until now acquired in order to affirm the grade of right information gained.11. Promoting explicit knowledge for stimulating common discussions and allowing other personal acquisitions
INTERNALIZATION (Explicit-to-Tacit)	<ol style="list-style-type: none">12. Organizing present explicit notions for starting the process of personal incorporation and replication (verify the lesson learned – translating explicit knowledge into tacit knowledge)

***Detecting Communicative Tools and Collaborative Networks'
Design Guidelines for Sharing Tacit Knowledge***

From the theoretical application of the new twelve principles for sharing tacit knowledge it is possible to identify, both for communicative tools and for collaborative networks, a set of design guidelines for designing communicative artefacts able to facilitate sharing knowledge processes.

Being a theoretical application, it is important to understand how the application of the twelve principles can support the design of new and evolved products for sharing tacit knowledge. For these reasons, for both cases a brief methodological experimentation will be shown in order to demonstrate potentialities and improvement in design activities.

In the design of communicative tools, such as personal devices, tablets or wearable displays, Dan Saffer (2006) suggests that an important aspect must be to take into account concerning the right design of input interface, because it mediates users' communications. So, applying the third and the fifth principle of knowledge sharing in the design of communicative digital interfaces, we can detect interesting design guidelines reported in Figures 2 and 3

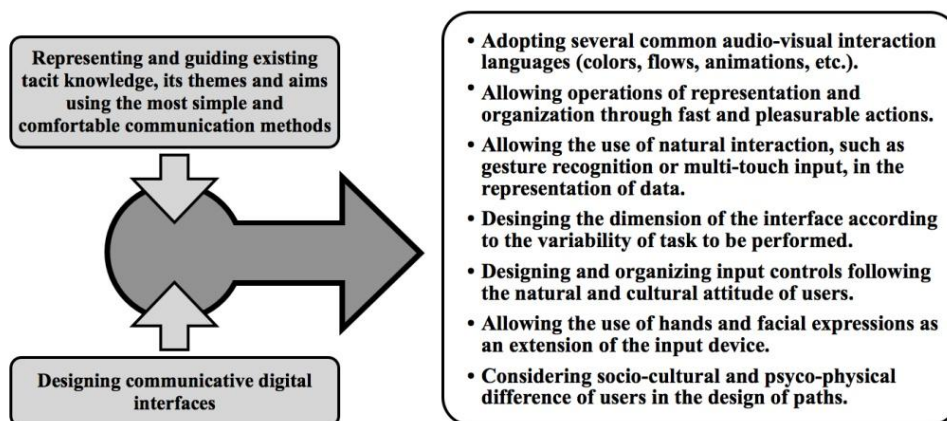


Figure 2: Design guidelines for creating communicative digital interfaces for representing existing tacit knowledge

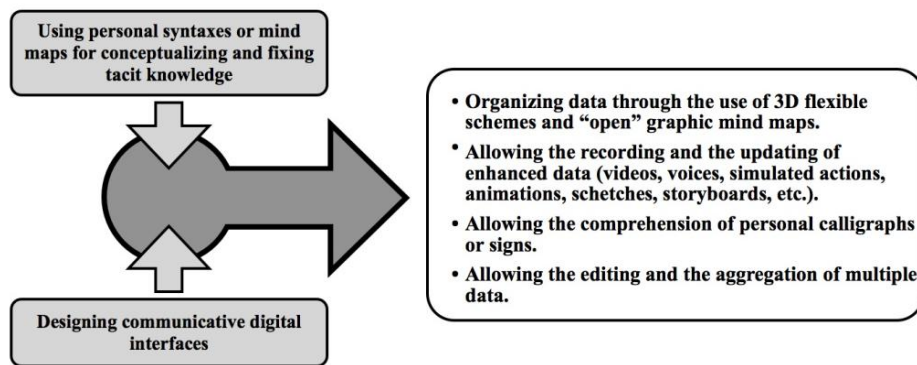


Figure 3: Design guidelines for creating communicative interfaces for allowing the use of personal syntaxes for conceptualizing tacit knowledge.

On the other hand, in the design of collaborative networks it has been demonstrated (Meroni, 2007; Jégou and Manzini, 2008) that the creation of open services aimed to generate self-aggregations of stakeholders' competences and skills, is an aspect to be taken into account in the network generation. So, applying the ninth principle of knowledge sharing in the design of such open services, we can identify the design guidelines shown in Figure 4.

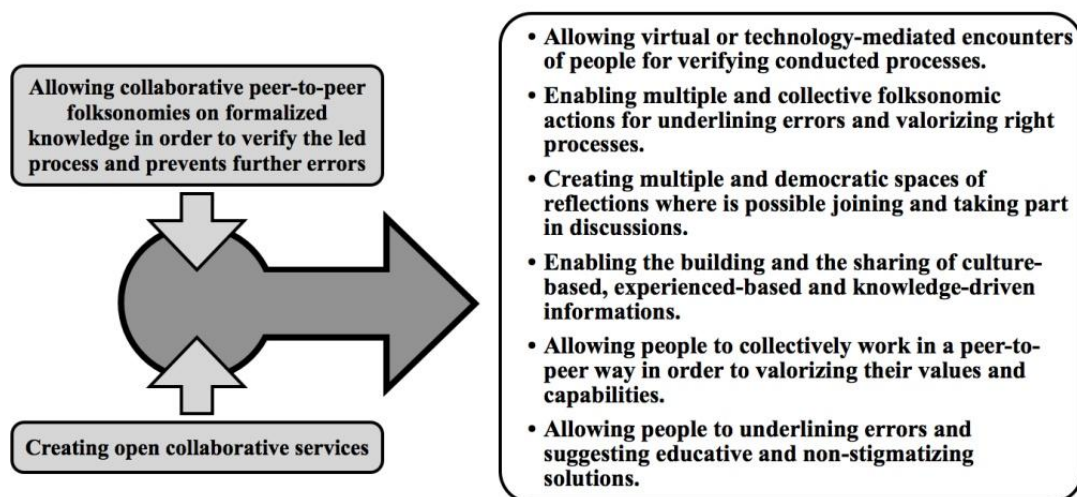


Figure 4: Design guidelines for creating open collaborative services for validating formalized explicit knowledge.

Findings

Interdisciplinary design findings obtained from the research have allowed us to define a new communicative SECI-based exchange process for sharing tacit knowledge, at interpersonal level, among stakeholders. The research has gained two main findings.

The new sharing principles clarify the strategic aims contained in the SECI Model and they are able to trace new practical ways (communicative tools solutions and collaborative network strategies) about how to share tacit knowledge.

Early theoretical applications of the new communicative exchange process in the design of communicative artifacts have demonstrated that is possible to ideate some design guidelines more oriented on the real problems of the communicative process.

As the paper has shown, through the use of a proper sharing method, it is possible to reuse and spread tacit knowledge among stakeholders through the use of ubiquitous ICTs such as communicative tools and collaborative networks

Discussion

The main discussion proposed by the research concerns possible applicative opportunities, resulting from the application of new sustainable communicative solutions, for sharing tacit information in emerging countries and developing economies. In such countries (i.e.: "BRIC", "Next Eleven" or "CIVET") existing economic, social and technological backgrounds offer, probably for the first time, the real possibility of designing and testing new and evolved communicative solutions, in order to promote new ideas of human wealth. As argued by Ezio Manzini and François Jégou (2003), the exchange of experience-based information is a

relevant part of the so-called "transition process toward the sustainable society". A new way of living where local values, people involvement, the sharing of nearby services, and the diffusion of local knowledge and skills constitute the pillar of a new "context-based" idea of well-being, and then, a new "context-based" idea of Sustainable Development.

Considering economic impacts, social benefits and technological improvements gained from market vitality, population growth, purchasing power, the rise of middle class and consumer connectivity (Florida, 2002), in the scenario of emerging economies the applications of the new communicative exchange process for tacit knowledge sharing with the paradigms of new communicative tools and collaborative networks suggest new design strategies and opportunities of development, mainly in three relevant and strategic areas of society. The aims of the following three parts is to present the positive benefits that could be made by the adoption of this methodological combination in the everyday living scenarios.

The first area concerns the medical field. Even though in emerging countries personal care is on the rise, the gap between metropolitan areas and rural communities, intended in terms of physical distance, linguistic differences, lack of infrastructures, etc., is still a weakness. In the field of safety and personal care, the exchange of basic practical information about how to prevent common diseases, such as AIDS, cholera, pneumonia or typhoid fever, is recognized as the key to prevent a large number of deaths and illnesses, mainly among young people, the elderly and children. The combined use of communicative tools, for example, for doctors or village chiefs, with a collaborative network for sharing information about illness cases, could resolve an important problem in emerging countries, especially for rural

areas. Enabling people to act in first aid situations will generate positive effects. For example:

- *It could allow developing competences about common risk situations.*
- *It could provide the sharing of information about how to deal with specific risk situations and allow essential decisions to be taken.*
- *It could allow the creation of debate platforms about the right and the best way to conduct prevention campaigns, in order to verify the effectiveness of care policies among rural, or marginal areas, and main towns.*
- *It could provide an amount of data about illness diffusions.*
- *It could generate a large and perceived sense of care: people feel safe and protected, they are able to self-monitor their own life and own health condition, they can share what they know or what they have had, people actively participate in the activity of diffused care.*
- *It could stimulate in youth, the sense and the essence of medical practice careers through low-impact distance self-learning technologies.*

The second area sector concerns the food field. The term of "emerging countries" quite often is equivalent to demographic growth; so in growing areas, sharing experience-based knowledge about food cultivation and about the importance of correct nutrition can contribute both to recovering food traditions in the perspective of sustainable growth and in reducing unequal food supply chains. Combining communicative tools and collaborative networks for sharing knowledge about the production of simple products and their treatment, could resolve the prominent problem of food crisis, for example in overcrowded contexts or, on

the other hand, in poor ones. Moreover, enabling people to reuse practical knowledge about nutrition could lead to consciously self-produced food products and create small and local sustainable markets. For example:

- *It could allow people to understand the value of proper nutrition, stimulating awareness of the medical importance of diversified and locally-based food programs.*
- *It could allow foreign food cultivations in order to revitalize disadvantaged contexts, such as those that still live in rural conditions.*
- *It could allow the creation of multimodal markets, both virtual and real, for the production, selling, buying and consumption of food.*
- *It could allow for the learning and understanding of the best ways to start local low-footprint food economies.*
- *It could allow the preservation of cultural food traditions, such as the handing down of food heritages belonging to forefathers and which can conserve local identities.*

Finally, the third area concerns the job field. As it is imperative to understand, the reuse of tacit knowledge can foster the improvement of work ability in everyday jobs. In emerging countries, the service industry is rapidly growing to the detriment of basic fields of work. The implication of this may be that practical knowledge about essential jobs could become lost. The combined use of collaborative tools and collaborative networks could contribute to restart a new educational phase about job employment through the sharing of practical information about first aid competences. This could be used in both "basic" fields, such as fishing, textiles, local arts, woodwork, etc., and in "highly specific" fields such as the construction industry, goldsmith's art,

hydraulics, etc. In the perspective of a self-reorganization of competences in society, for example:

- *It could provide the opportunity to share practical competences, skills and best practices in market-oriented contexts for sustaining local growths.*
- *It could allow the starting of new knowledge-based enterprises and building new supply infrastructures for covering the demand of services, competences and solutions.*
- *It could allow for the learning of new jobs to cover the demand of specific competences in specific contexts.*
- *It can allow the availability and sharing of knowledge from people now in retirement, to give opportunities to new generations of workers to compensate the normal turnover in a specific market area.*

Conclusions

As it has been argued in this paper, the reuse of tacit knowledge in ICTs, can be considered a real way to be taken into account for the transition towards a sustainable society.

The problem of interpersonal communication of tacit knowledge, such as experiences or skills, offers the real opportunity to work on new and unexpected design issues not considered before. This claim reveals an immense potential, mainly in developing countries, if we consider the positive effects that explicit and clear information have on the economic, technological and social dimensions.

Acknowledgments

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References

- Florida, R. (2002). *The rise of the creative class: And how it's transforming work, leisure and everyday life*. New York: Basic Books.**
- Jégou, F. and Manzini, E. (2008). *Collaborative services: Social innovation and design for sustainability*. Milan: POLI.design.**
- Kaupilla, O-P., Rajala, R. and Jyrämä, A. (2011). *Knowledge sharing through virtual teams across borders and boundaries*. *Management Learning: The Journal for Managerial and Organizational Learning*, 42 (4), 395-418.**
- Knowledge Sharing Toolkit. (2012). *KS Methods*. Retrieved April 30, 2013, from <http://www.kstoolkit.org/KS+Methods>.**
- Manzini, E. (2002). *Context-based wellbeing and the concept of regenerative solution: A conceptual framework for scenario building and sustainable solutions development*. *The Journal of Sustainable Products Volume 2*, (3-4), 141-148.**
- Manzini, E. (2003). *Scenarios of sustainable well-being: Design Philosophy Papers 1* (1), 1-13.**
- Manzini, E. and Jégou, F. (2003). *Sustainable everyday: Scenarios of urban life*. Milan: Edizione Ambiente.**
- Meroni, A. (2007). *Creative communities: People inventing sustainable ways of living*. Milan: POLIdesign.**
- Nonaka, I. (1994). *A dynamic theory of organizational knowledge creation*. *Organization Science*, 5 (2), 14-37.**
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: How japanese companies create the dynamics of innovation*. New York: Oxford University Press.**
- Nonaka, I. and Toyama, R. (2003). *The knowledge-creating theory revisited: Knowledge creation as a synthesizing process*. *Knowledge Management Research & Practice* 1 (1), 2-10.**

- Nonaka, I. and von Krogh, G. (2009). *Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. Organization Science, 20 (3), 635-652.***
- Polanyi, M. (1966). *The tacit dimension. London: Routledge.***
- Ryle, G. (1949). *The concept of mind. Chicago: University of Chicago Press.***
- Saffer, D. (2006). *Designing for interaction: Creating innovative applications and devices. Berkeley: New Riders.***
- Sennett, R. (2008). *The craftsman. New Haven: Yale University Press.***
- Takeuchi, H. (2006). *The new dynamism of the knowledge-creating company. In H. Takeuchi and T. Shibata (Eds.), Japan, moving toward a more advanced knowledge economy: Volume 2 – Advanced knowledge-creating companies (pp. 1-9). Washington D.C.: World Bank Institute.***



ALESSIO PAOLETTI

Dr. Alessio Paoletti, PhD, during his work experiences also carried out the research activity, obtaining with Honours a doctorate in Design, with the thesis "Design and Neuroscience. For an evolution of the Product Design tools, from UCD to UX".

He did his BSc in Automotive Design and graduated with Honours, then worked for two years in the Automotive Industry in projects involving world leading automotive companies. He then did his MSc in Design and Visual Communication and graduated with Honours, where he worked on a thesis about Corporate Social Responsibility and communication, which prompted him to pursue a Master in Management and Corporate Social Responsibility.

His working experience started as an Automotive-Junior Designer in Pomezia, then continued as Automotive Designer in Milan and Product Designer in Rome. During these years he always worked with leading companies worldwide, such as Brembo, Arca Camper, Ad Hoc.

His areas of investigation are: Emotional Design, Neuroscience and Design, Neurodesign. His professional fields are Product design and Transportation design.



LOREDANA DI LUCCHIO

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She is also; member of the Editorial Board of the Scientific Journal DIID – Disegno Industrial industrial Design published by List Lab; co-editor of the Annual Journal 'Design Principles and Practices' published by Common Ground Publishing; Co-Coordinator of the Working Group ReVeDA (Research Vector in Design and Arts) of Cumulus Association; member of the Board of the European Academy of Design.



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Professor Babiloni is author of 250 papers on bioengineering and neurophysiological topics on international peer-reviewed scientific journals, and more than 250 contributions to conferences and books chapters. He wrote several books on EEG signal processing. His total impact factor is more than 450 and his H-index is 62 (Google Scholar). He is an Associate Editor of several scientific Journals, "IEEE Trans. On Neural System and Rehabilitation Engineering", "IEEE Trans. On Biomedical Engineering" and he is Editor in Chief of the "International Journal of Bioelectromagnetism". Since 2007 is IEEE-EMBS Conference Editor, since 2011 to 2016 was Chair of the IEEE-EMBS Technical Committee of Biomedical Signal Processing and since 2012 is in the advisory committee of the IEEE-EMBS.

DESIGN AND NEUROSCIENCE: POTENTIAL SHIFTS IN PRODUCT DESIGN TOOLS

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With the goal to improve the Product Design tools, in the Emotional Design approaches, we investigated if the designers can interpret neurophysiological responses analysed by means of Cognitive Neurosciences' tools. For this purpose, and to facilitate the dialogue between these two disciplines, we defined the tool and method named Alpha Matrix and Cards. With the latter, designers can integrate their specific knowledge and skills with new information gathered by Cognitive Neurosciences, to understand even better the user's response. We describe the application of the Cards, used to interpret neurophysiological data related to 2 real stimuli, from the perspective of the designer. The research is part of the PhD thesis of the Author.

Keywords: *Emotional Design • Neuroscience • User Centered Design • Neurodesign • Method Cards.*

Introduction

The emotional relationship that can be established between the user and the product has been studied in the Design Research by the Emotional Design approach (Babbar, Behara, & White, 2002; Desmet, 2003a, 2003b, 2003c; Green & Jordan, 2002; Hekkert, 2006; Jordan, 1997, 1998, 2005, Norman, 2015, 2013). Emotional response is today also measured with tools and methods of Cognitive Neurosciences; therefore, there's a need of get the designer closer to some of the relevant aspect of this emerging field of research, looking at the touching points between Neurosciences and Design. Recent case-studies about Neuroaesthetics, Neuromarketing, and Neurodesign are showing that Cognitive Neurosciences can also potentially represent a shift in the approaches of Emotional Design. The research is part of the PhD thesis of the Author (Paoletti, 2019).

ALPha Matrix

We combined the scientific contributions of Norman (2013), Desmet and Hekkert (2007), related to Emotional Design research, in specific the research related to the Levels of Processing a product and the Levels of Product Experience, with the scientific contributions developed in Cognitive Neuroscience to investigate the user-product interaction.

Among the constructs proposed by the scientific literature in Cognitive Neurosciences, three have been identified as representative of the user's response in cognitive, emotional, and behavioral terms. Namely, the indexes are: Mental Effort, Emotional Index, and Interest (Vecchiato et al., 2014; Cavanagh & Frank, 2014; Gevins & Smith, 2003; Klimesch, 1999; Davidson,

2004; Harmon-Jones, Gable, & Peterson, 2010). Through a purely theoretical study, we hypothesized that the three constructs can correspond to three design aspects expressed in the three constructs of Norman, the three levels of processing (Norman, 2013).

- *H1. Mental Effort can describe the Reflective Level.*
- *H2. Emotional Index can express the Visceral Level.*
- *H3. Interest can represent the Behavioral Level.*

As consequence we hypothesize:

- *Low-level of ME = high usability.*
- *High-level of EI = high aesthetic value.*
- *High-level of INT = high attractiveness.*

These hypotheses H1, H2, and H3 are described and justified in the PhD Thesis of the Author (Paoletti, 2019). In addition, to consider the user-product interaction in its entirety and complexity, we combine these indices with the three levels of user-product experience proposed by Desmet and Hekkert (Desmet & Hekkert, 2007).

Breaking down the user-product experience in three levels of interaction is a simplification of a holistic process; we adopted this approach to investigate all the phases systematically, trying to combine them again in a unique process at the end. Furthermore, each level of user-product experience can have dominant qualities of the product affecting it. We hypothesized: Instrumental Interaction will be affected mainly by the Functional qualities of the product; Non-Instrumental Interaction will be influenced mainly by the Morphological qualities of the product whereas Non-Physical Interaction will be mainly defined by the Semantic qualities of the product. Therefore, by combining

research in Emotional Design and Cognitive Neuroscience, we depicted the Alpha Matrix (Figure 1).

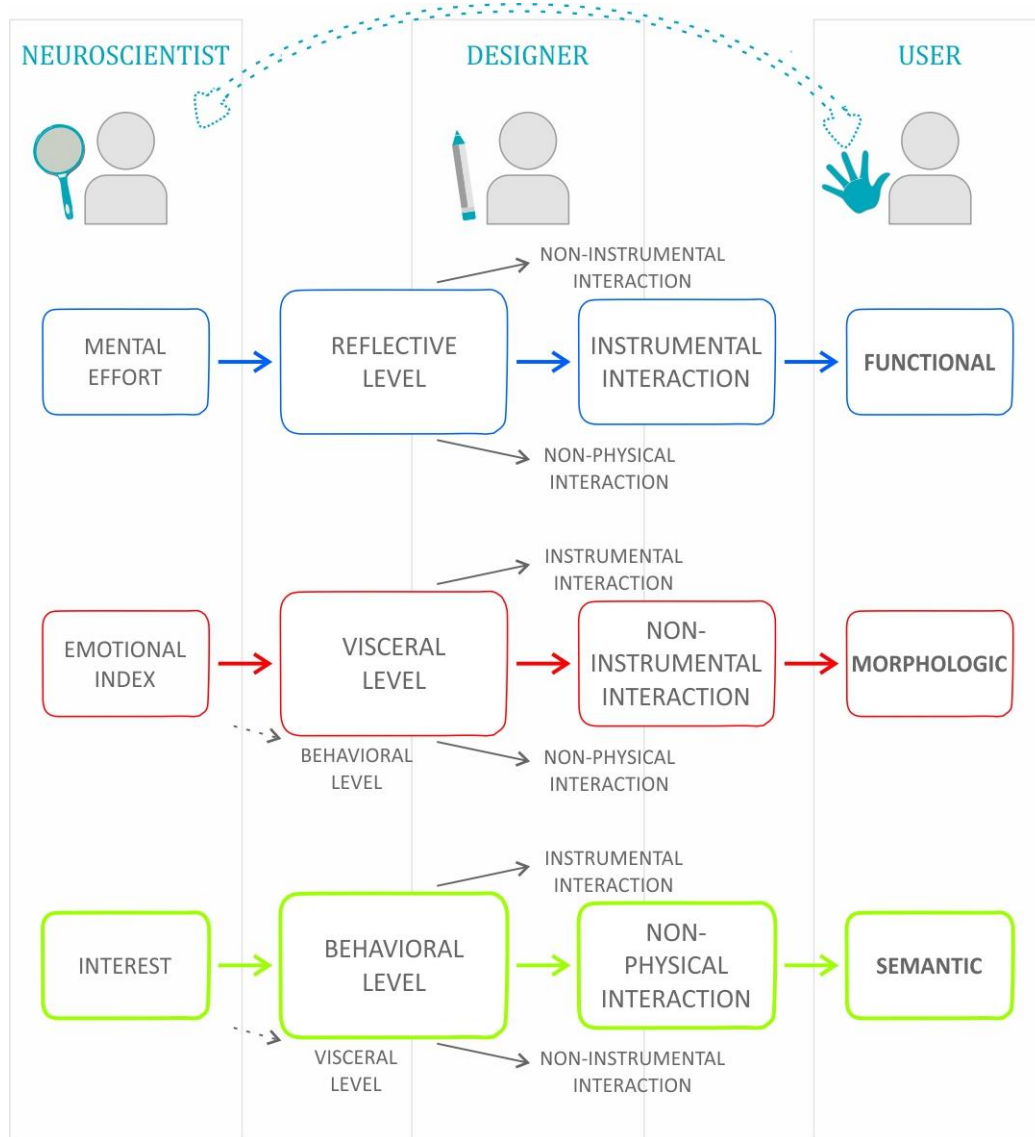


Figure 1. Alpha Matrix. We assigned each neurophysiological index to a specific level of Processing (Norman). Furthermore, based on researches about the user-product Interaction conducted by Desmet and Hekkert, we considered each level of Processing as more relevant for a specific level of Interaction. The user-product experience, and the process of cognition, are phenomenon that occur holistically: subdividing them into phases can be reductive, but we adopt this approach following previous researches. Our ambitious goal is to link Cognitive Neuroscience with the practice of Design.

Cards

With the aim to translate the Alpha Matrix in an operative tool for the practice of Design, we defined the tool called Cards. With the latter, we try to interpret neurophysiological data from the designer's point of view, interpreting the measured user experience with the neurophysiological approach. Briefly, the Cards are divided into three groups: each group is a guideline to help the designer to interpret one neurophysiological index. Specifically: the Cards named M1-M2-M3-M4 are for the interpretation on the Emotional Index data; the Cards named F1-F2-F3-F4 are for the interpretation on the Mental Effort data; the Cards named S1-S2-S3 are for the interpretation on the Interest data. The content of the Cards is detailed in the PhD Thesis of the Author (Paoletti, 2019). Starting from the product-stimulus, we identify the relevant aspects, and assign them to the three indices. In this way we propose an operative tool, in the form of method Cards, with which the designer can play to alter, both positively and negatively, one or more neurophysiological indices by leveraging on the aspects of the product. Assigning aspects of the product to a specific index involves a certain degree of simplification.

The design experience suggests that the three levels may have blurred borders, which is why some aspects of the product are outlined with a dashed line in Figure 2. We cannot exclude them but at the moment we cannot scientifically defend their motivation. This represents one of the limits of experimentation.

How to use the Cards

The tool called Cards aims, as said, to support the designer in the interpretation of the neurophysiological data measured during the

human-product interaction. The goal is to better understand the user's cognitive and emotional response, with the final goal of designing a product that holistically meets the requirements of Ergonomics. As described, the results of an experiment conducted with tools and methods of Cognitive Neuroscience consist of neurophysiological data synthesized in three indices: Mental Effort (ME), Emotional Index (EI), Interest (INT). These three indices are detected and recorded during all the phases of interaction with the product:

- *both in the phases in which the use is involved and in the phases in which there is only observation;*
- *both in the phases in which the non-instrumental interaction (Desmet and Hekkert, 2007) does not provide touching, both in the exploratory phases in which manipulation without use is provided;*
- *both in those phases in which the user has the stimulus physically present and when instead, the stimulus is proposed in the form of memory.*

Typically, the Cards are used in the step in which Cognitive Neurosciences have detected the data of the human-product interaction and have summarized the data in the three indexes. The designer who wants to implement the user experience, by modifying the product, must therefore have the tools to interpret these indexes. Based on the latter, it is crucial to assign the value of each index to the exact moment of the interaction in which it was measured. In fact, the data of the same index, but detected at two different times (for example one while an instrumental interaction occurs and the other one during a non-instrumental interaction) will give very different information to the designer. Information that should be expected are not specific results but

general trends, as described by Bridger (2017). On these trends, the designers will make design choices related to their experience and design practice, modifying the product. This new product will serve as a new stimulus for new neurophysiological measurements, made by experts in Cognitive Neurosciences, with their specific tools and methods. At the end, the data, expression of the response elicited by the modified product, will validate the improvement of the design as well as support the subsequent implementations of the product. As mentioned, the data must be analyzed step by step and interpreted according to the phase during which they were measured.

There is therefore, not one single method to use the Cards: this depends both on the specificity of the product/stimulus and on the designer's choices. In fact, the Cards are a support tool to designers, although it leaves room for designer's personality and sensitivity. For example, the designer can choose to analyze one of the three indices based on which is the most indicative of a disadvantageous interaction: if for example ME and EI are acceptable, the designer can choose to improve the product on INT and use the Cards S1 S2 S3. This approach poses the following criticality that can be overcome by constructing a congruous case study: who can say what is a value of INT, or a range of values, that identifies a satisfactory user-experience, for that type of product? Only a congruous number of experiments can give an answer. For instance, what is the congruous value of EI for a hammer? And again, at what stage is the value of EI more representative, how to consider the user experience as a whole considering all the EI values? Only a series of experiments can refine the method.

For what we have seen in the experiments carried out before, for example, if the EI values measured before the user utilizes the

product are lower than those measured after use, from that point of view it can be inferred that the user experience was positive. Each index must be interpreted on its own, at each phase of interaction. In fact, the positive results of an experience can be linked to the achievement of the purpose in a particularly easy way, to a tactile stimulation particularly pleasant during use, to the sound that the product emits during use and so on. The Cards help to think about which aspect of the product may be susceptible to improvement, but the choice of where to operate and how to do it remains at the designer's experience.

Simulating the use of the Cards, for example the designers who see the product eliciting particularly inconvenient values of EI, will have to use the M1 M2 M3 M4 Cards and ask the questions proposed in those Cards (hereunder we present 2 real applications of the Cards to real stimuli). The purpose of these questions is to guide the designers in reasoning that can lead them to identify aspects of the product that potentially elicited that specific neurophysiological data, in that specific phase.

The tools of Cognitive Neuroscience must be complemented with the already known tools, such as semi-structured interviews. Sometimes the Cards suggest comparing the measured data with the information gathered in a verbal manner. Based on the questions posed by the Cards, designers can make their own design choices. Relying on their own design experience, designers start to formulate design changes to improve the product, with the aim of changing the neurophysiological data for the benefit of an improvement in the quality of the interaction. As mentioned, only the collection of suitable case studies can give a valid range of reference value, for that specific product/stimulus.

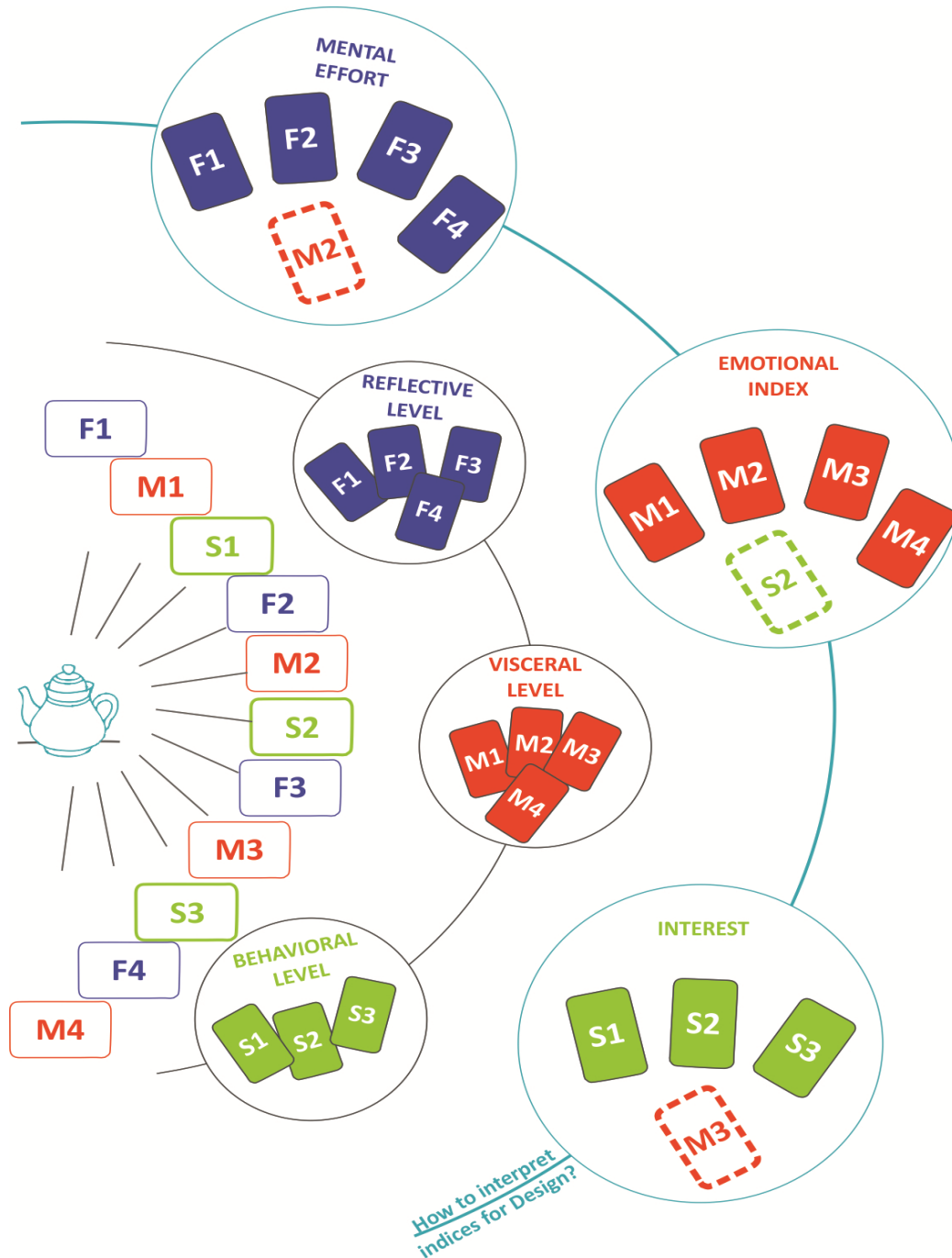


Figure 2. Starting from the product, we identify the relevant aspects, and assign them to the three indices. In this way, we propose an operative tool, in the form of method Cards, with which designers can play to alter, both positively and negatively, one or more neurophysiological indices by leveraging on the aspects of the product. Assigning aspects of the product to a specific index involves a certain degree of simplification. Indeed, experience suggests that the three levels may have blurred borders, which is why some aspects of the product are outlined with a dashed line.

Cards Application

Following we describe how we applied the Cards to interpret the neurophysiological data, from the perspective of the designer. Neurophysiological measurements have been performed in the labs of BrainSigns, a spin-off company in Sapienza University of Rome. The stimulus has been a pouch and a spout-pouch, as illustrated in Figure 3 and 6. They are depicted with illustrations rather than real photos because the experimentations can only be shown partially for confidentiality reasons. Below we illustrate, both for the stimuli 1 (pouches) and for the stimuli 2 (spout pouches), the interpretation of two of the three neurophysiological indexes through the ALpha Matrix and the Cards. Due to the nature of the stimuli, we expected the INT values to be very weak. We show the interpretation of the EI values for the pouches and the interpretation of the ME in the spout pouch.

Cards Applied for the Stimulus 1

The stimuli 1, the pouches, have been analyzed proposing three similar pouches: the product 1A, 1B, and 1C (Figure 3). The three pouches don't have significant differences in dimension, weight, geometry, while they differ for the nature of their content in terms of density (but similar smell) and differ for the material that affects the transparency of the package. The stimuli elicited different values of EI during the instrumental phases (Figure 4): we show how we used the ALpha Matrix and the Cards to interpret the neurophysiological variations during the instrumental phases, specifically where the user needed to tear the label off and dosage the inner content in a given container. As seen, the relevant aspects to the Emotional Index are the M1, M2, M3, and M4.



Figure 3. The stimulus 1 has been a pair of pouch packaging. The two stimuli, respectively 1A and 1B, are depicted with illustrations. The experimentations can only be shown partially for confidentiality reasons. Therefore, we use illustrations rather than photos. The stimuli 1A and 1B have similar dimension, weight, geometry and inner content, with the same densities. They have different transparency/opacity. The stimuli elicit different EI values during the instrumental interaction of dosing the inner content. By applying the Alpha Matrix and the Cards, we interpret decreasing of EI values as a conflict of messages conveyed by the sensory systems: specifically, a conflict between sight and sense of touch. The stimuli 1B and 1C have similar: dimensions, weight, geometry and opacity. They differ for the nature of the inner content: liquid in the stimulus 1B, and semi-liquid in the stimulus 1C. The stimuli elicit different EI values during the instrumental interaction of dosing the content. By applying the Alpha Matrix and the Cards, we ascribe the decreasing of EI values to a conflict of messages conveyed by the sensory systems, specifically the sensory systems of sight and touch.

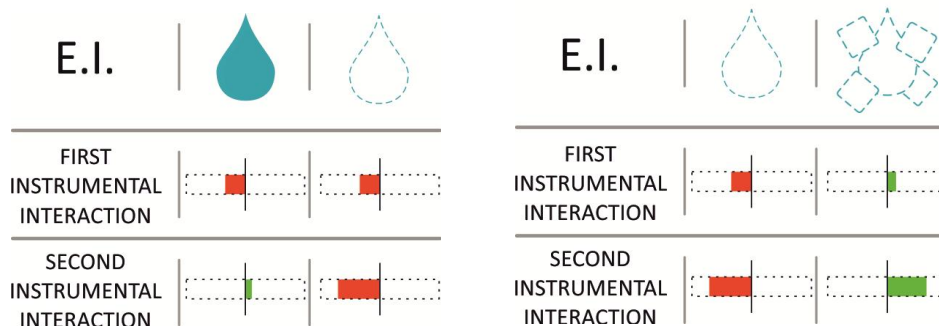


Figure 4. The stimuli 1A and 1B have elicited similar negative EI values during the first instrumental interaction of tearing the label off. On the contrary, they elicited different EI values during the second instrumental interaction, where the users had to dose the inner content. By following the Alpha Matrix, we used the Cards M1-M2-M3-M4 and we found the Card M4 to be the most suitable for interpreting. It highlighted a lack of consistency of the messages; specifically, the ones conveyed by the sensory systems of sight and touch. Such lack of consistency is the most probable reason of the variation of EI values. The stimuli 1B and 1C differ for the density of the inner content. Therefore, due to that different density, the haptic sensory system conveys different messages about the position of the content.

During one of the instrumental phases, the users must tear the label off to have access to the inner content. Both the stimuli 1A and 1B have liquid content; the information about the density of

the inner content is conveyed, respectively, by the sensory systems of sight and touch in the stimulus 1A, and only by the sensory system of the touch in the stimulus 1B. By adopting the Alpha Matrix, and following the Card M4-Consistency-of-Messages (Figure 5), we consider whether the package, in this specific phase we want to interpret, convey a consistent message. In fact, messages conveyed through the sensory systems should be consistent with each other otherwise the stimulus would be ambiguous and so not economically perceived.

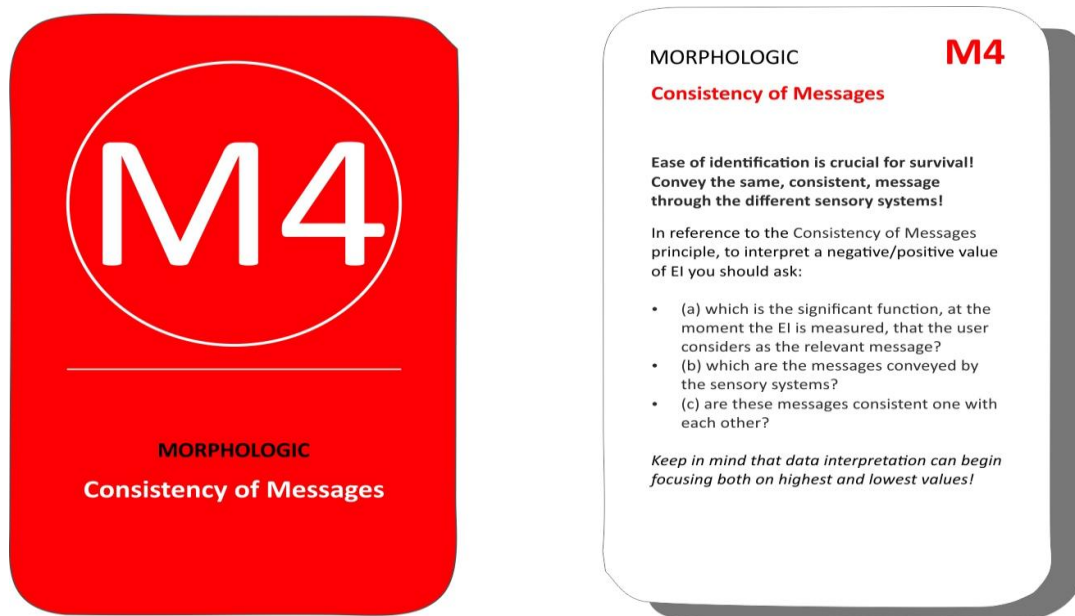


Figure 5. The card M4 – Consistency of Messages - emerged to be the relevant one to interpret the data we choose as the most relevant, and that can lead to an improvement of the product.

By following the Card M4, we focus the data interpretation on a specific area: the users can know whether the inner product is near the label that will be torn off, for both packaging. The cut near the label is the signifier that indicates where the action should be performed, so there is a conflictual message of 'dirtiness' due to the proximity of the liquid to the area of the label that will be torn off. It conveys a conflicting message of performing an action in a point of the package that can potentially get dirty and dirty the

users. The inner content is liquid in both of the stimuli, so it is more likely to spill and dirty the user. The user can reduce the potential dirtiness of the action by sending the inner content away from the label and the pre-cutted area, but this is not possible in stimulus 1B because of the opacity of the package. We thus consider this lack of consistency, among the messages conveyed by the sensory systems, the main reason for the different values of EI. The differences of EI in the instrumental interaction, between the stimulus 1A compared to the stimulus 1B, can thus be interpreted applying the AIPha Matrix and following the Card M4.

Unlike the ME index, the EI can have both positive and negative values, associated respectively with positive and negative emotions. In the first instrumental interaction, both the stimulus 1A and 1B elicited negative emotions. Both package designs could be improved to lead to positive values of EI. During the second instrumental phase where the users want to dose the inner content, the stimulus that has a transparent package elicits positive EI values, while the product that is not transparent elicits negative EI values. As a consequence, for this specific product and in this specific phase, we can interpret that the contact with the inner content correlates with the EI (in this case visual contact).

To verify if the contact with inner content correlates with the EI in that phase, we compared the neurophysiological responses related to the stimulus 1B to the one related to 1C. Both the stimuli have a non-transparent package, so there is no visual contact with inner content.

Stimulus 1C has a semi-liquid content, so the users can have haptic contact with it, more than in the liquid content of 1B. We interpret the positive values of EI during the second phase of the

instrumental interaction with the clarity of the message, conveyed by the touch sensory system. This message lacks the visual component, but the haptic component of the message can inform the user about the position of the content in relation to the opening cut. In fact, the stimulus 1C elicits positive values of EI both in the first instrumental interaction and in the second instrumental interaction.

Cards Applied for the Stimulus 2

The stimuli 2, the spout pouches (Figure 6), have been analyzed with two similar packaging, the products 2A and 2B. The stimuli don't have significant differences in dimension, weight, material, geometry, nature of the inner content in terms of density but they differ in smell. The two spout pouches that apparently look similar, elicited similar values of ME during the non-instrumental phases of interaction but different values of ME during the instrumental interactions, specifically during the unscrewing of the cap (Figure 7).



Figure 6. The stimulus 2 has been a pair of spout pouch packaging. The two stimuli, respectively 2A and 2B, are depicted with illustrations because the experimentations can only be shown partially for confidentiality reasons. The two stimuli slightly differ for cap dimension and grasping area beneath it. In the illustrations, the caps are coloured in cyan and depicted maximizing their differences, with the sole goal to make the pictogram easily understandable: the pictograms are then not in scale. At a first glance, the two spout pouches are similar, but they elicit different ME values during the instrumental interaction of unscrewing the cap. By applying the ALPHA Matrix, we followed the Cards F1-F2-F3-F4; therefore, we interpreted ME values as correlated with the Physical Constraint, as described the Card F2.

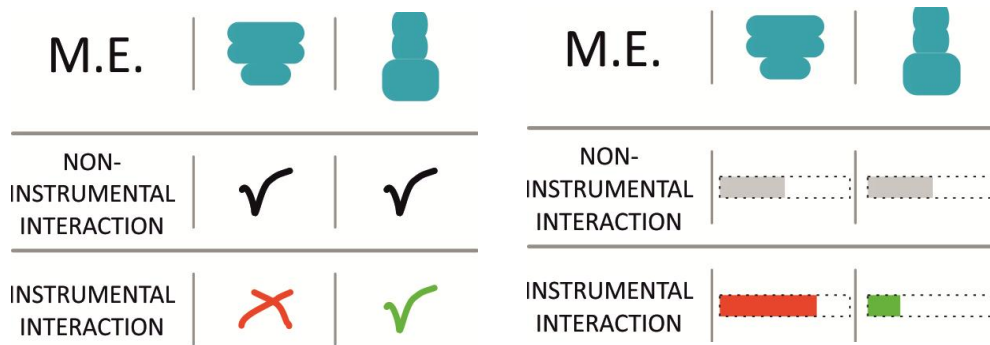


Figure 7. In the non-instrumental interaction, the two stimuli elicited similar ME values; it was expected since, at first glance, the two stimuli were very similar to each other. We can't say if values are appropriate to this specific stimulus: it would be necessary to build a wide case history to define a range of acceptable ME values during this specific interaction. As already reported, interpretation is strictly case-specific. The trend of the interaction, interpreting ME values. If the ME values increase after the instrumental interaction, we can interpret it as a positive feedback of the non-instrumental phase, but as a negative feedback of the instrumental phases.

By applying the Alpha Matrix, and following the Cards relevant for ME (F1, F2, F3, and F4) to interpret data, we focused the design analysis on the cap area. We found that the two packages differ in the cap diameter and in the height of the neckband. By following the Card F2 (Figure 8), we interpret the increasing of the ME in the stimuli 2A because of the Physical Constraint defined by the dimension of the neckband.

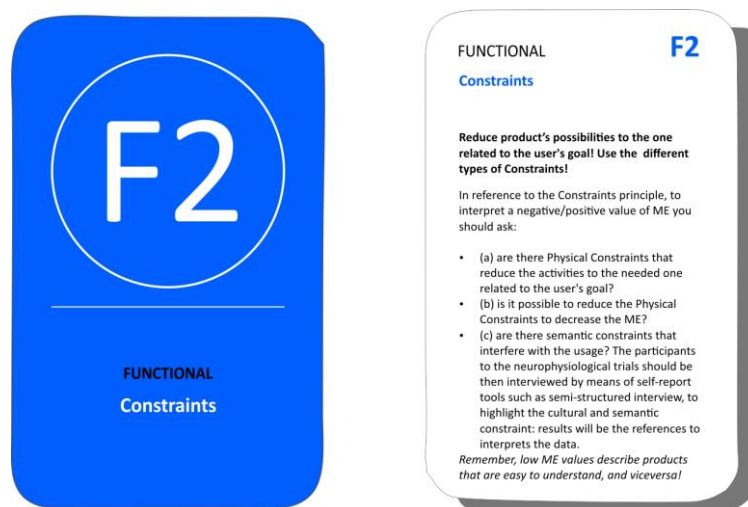


Figure 8. By applying the Alpha Matrix and following the Card F2 we interpret the increasing of the ME in the stimuli A because of the Physical Constraint defined by the dimension of the neckband.

During the non-instrumental phases where the users explore the product with no specific goal involved, the position and the dimension of the neckband suggest where to grab the product when unscrewing. The knurling on the cap is a Signifier that suggests where to grab to rotate and open the cap. The use is clear, no other activity is suggested; the Physical Constraints (Card F2) reduce the activities to the needed one for opening. For these reasons the ME during the non-instrumental phases is similar for the two stimuli.

Following the Card F1 (Signifiers / Affordances) we checked that the Signifiers, so the Affordances, are clear; following the card F2 (Constraints) we checked the Physical Constraints are adequate, therefore, the resulting Conceptual Model given by the product is clear. We can't say if the values of ME are appropriate or not, but they are similar to each other. It would be necessary to build a case history to define a range of acceptable ME values during this specific phase of interaction, specifically for this product because as said the interpretation is strictly case-specific.

Some differences in the ME emerge during the instrumental interaction. Following the information about the usage, received during the non-instrumental interaction, the users grasp the package in the only rigid point placed below the cap and, with the other hand, they unscrew the cap. This showed to lead to a partial overlapping of the fingers, during the interaction with the stimulus A. While during the non-instrumental interaction the Physical Constraints suggested the only rigid point to grasp the product from, during the instrumental interaction this area is not high enough. We consider this as the main reason for the higher ME in the instrumental interaction, in the stimulus A compared to the stimulus B. The application of the ALPHA Matrix and the Cards guided us in the interpretation process.

As already reported, we can't define a priori which ME values are appropriate for this specific product and this specific phase of interaction without a wide case-history. In interpreting by comparing two similar products, we can consider as positive if it elicited lower values of ME (in Figure 7 depicted with a green mark). On the contrary, we consider suitable for improvement a product that elicited higher values of ME. Furthermore, we can compare the ME during the different phases of interaction tracing the trend of the interaction.

Conclusion

In combining findings from the research field of Emotional Design with Cognitive Neurosciences, we depicted the ALPha Matrix and the Cards from a theoretical approach. In these Experimentations we verified that the ALPha Matrix and the Cards can guide the designers that want to interpret the neurophysiological data measured during the user-product interactions, to highlight areas of improvement.

By applying the ALPha Matrix and the Cards, we interpreted the trends that neurophysiological indexes depicted and interpreted them from a designer perspective. As mentioned, the interpretation method is highly stimulus-related and phase related. Therefore, by means of the ALPha Matrix and the Cards, we found for the specific phases described in stimuli 1A, 1B, and 1C, the transparency of the package was relevant in the instrumental interaction: it correlated with the EI associated to the density of the inner content.

Following the ALPha Matrix and the Cards to interpret the neurophysiological reactions to stimuli 2A and 2B, for the specific phases described, we found the height of the neckband under the

cap to correlate with the ME. We can then conclude that the tools of Cognitive Neurosciences can indicate the areas of improvement of a product design, highlighting trends of emotional responses. Design has the role of interpreting these responses and implementing the product, with the aim to eliminate or reduce, the criticalities that have emerged.

The goal of the Experimentations was to test the ALpha Matrix and the Cards, although this opens-up to future research such as verifying the specific trends. In future developments, the results obtained from the application of the Alpha Matrix and the Cards, and the product redesigned based on these results, should be re-validated with an experiment that measures the new neurophysiological response of the user. The data obtained using as stimuli the product as it was designed before the application of the Alpha Matrix (Product-ante), should be compared with the data obtained using the new product modified applying the Alpha Matrix (Product-post). This represents one of the future developments of the research. Moreover, once the tool has been validated, it should be applied in contexts in which the improvement of the quality of the user-product relationship not only leads to commercial advantages (increasing of sales) but also where the quality of the user-product relationship can affect more significant to the public to which the designer is working for (such as designing for the biomedical area).

Less has been done with the Interest index, which interpretation is the more cryptic one because during Experimentation 1 a semi-structured interview wasn't performed. In fact, it is the tool that can better measure the emotional response related to the subjective feelings that the product elicits. In interpreting the Interest Index, that we associate to the Semantic sphere, a self-report (like a semi-structured interview) is required. Furthermore,

in the experimentations there was a weak measure of the Interest data, due to the nature of the stimuli, which was in line with the expectations.

References

- Babbar, S., Behara, R., & White, E. (2002).** *Mapping product usability. International Journal of Operations & Production Management, 22(10), 1071–1089.* <https://doi.org/10.1108/01443570210446315>
- Cavanagh, J. F., & Frank, M. J. (2014).** *Frontal theta as a mechanism for cognitive control. Trends in Cognitive Sciences, 18(8), 414–421.* <https://doi.org/10.1016/j.tics.2014.04.012>
- Davidson, R. J. (2004).** *What does the prefrontal cortex "do" in affect: perspectives on frontal EEG asymmetry research. Biological Psychology, 67(1–2), 219–234.* <https://doi.org/10.1016/j.biopsycho.2004.03.008>
- Desmet, P. (2003a).** *A Multilayered Model of Product Emotions. The Design Journal, 6(2), 4–13.* <https://doi.org/10.2752/146069203789355480>
- Desmet, P. (2003b).** *From disgust to desire. In Design and Emotion (pp. 8–12).* <https://doi.org/10.1201/9780203608173-c2>
- Desmet, P. (2003c).** *Measuring Emotion: Development and Application of an Instrument to Measure Emotional Responses to Products (pp. 111–123).* Springer, Dordrecht. https://doi.org/10.1007/1-4020-2967-5_12
- Desmet, P., & Hekkert, P. (2007).** *Framework of product experience. International Journal of Design, 1(1), 57–66.* <https://doi.org/10.1162/074793602320827406>
- Gevins, A., & Smith, M. E. (2003).** *Neurophysiological measures of cognitive workload during human-computer interaction. Theoretical Issues in Ergonomics Science, 4(1–2), 113–131.* <https://doi.org/10.1080/14639220210159717>

- Green, W. S., & Jordan, P. W. (2002). *Pleasure with products: Beyond usability. (CRC Press, Ed.) (1st ed.)*. London: Taylor and Francis.**
- Harmon-Jones, E., Gable, P. A., & Peterson, C. K. (2010). *The role of asymmetric frontal cortical activity in emotion-related phenomena: A review and update. Biological Psychology, 84(3), 451–462. <https://doi.org/10.1016/j.biopsycho.2009.08.010>***
- Hekkert, P. (2006). *Design aesthetics: principles of pleasure in design. Psychology Science, 48(2), 157–172.***
- Jordan, P. W. (1997). *The four pleasures - Taking human factors beyond usability. In From Experience to Innovation. Tampere: Finnish Institute of Occupational Health.***
- Jordan, P. W. (1998). *Human factors for pleasure in product use. Applied Ergonomics, 29(1), 25–33. [https://doi.org/10.1016/S0003-6870\(97\)00022-7](https://doi.org/10.1016/S0003-6870(97)00022-7)***
- Jordan, P. W. (2005). *Designing Pleasurable Products: an introduction to the new human factors. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki. <https://doi.org/citeulike-article-id:381870>***
- Klimesch, W. (1999). *EEG alpha and theta oscillations reflect cognitive and memory performance: a review and analysis. Brain Research. Brain Research Reviews, 29(2–3), 169–95.***
- Norman, D. A. (2013). *The design of everyday things. New York, NY, USA: Basic Books (AZ).***
- Norman, D. A. (2015). *Designing Emotions: Pieter Desmet. THE DESIGN JOURNAL, 6(2), 60–62.***
- Paoletti, A. (2019). *Design and Neuroscience: For an Evolution of Product Design Tools, from UCD to UX. Sapienza University of Rome.***
- Vecchiato, G., Cherubino, P., Maglione, A. G., Ezquierro, M. T. H., Marinozzi, F., Bini, F., ... Babiloni, F. (2014). *How to Measure***

Cerebral Correlates of Emotions in Marketing Relevant Tasks.
Cognitive Computation, 6(4), 856–871.
<https://doi.org/10.1007/s12559-014-9304-x>



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THE STRATEGIC AND SUSTAINABLE VALORIZATION OF CULTURAL AND NATURAL HERITAGE FOR THE TOURISTIC FRUITION OF EMERGING AND DEVELOPING COUNTRIES

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The Cultural and Natural Heritage is a relevant value that must be taken into account, mainly if we consider its positive potentialities for the Sustainable Development. Even though these potentialities are obvious, new relevant design opportunities are possible in the fields of tourism valorisation, for example: new solutions for the sustainable fruition of cities and parks, new services for the educative tourism, new experimental design approaches, etc. The paper shows the results obtained from a research study on the theme of touristic valorisation of Cultural and Natural Heritage, with an application in the emerging countries. It combines the Design for All (DfA) approach for the analysis of end-users and for the design of touristic fruition solutions; and the Disability & Case Management (D&CM) approach for the evaluation of end- users' needs and for the realization of inclusive networks and work plans..

Keywords: *Cultural and Natural Heritage • Valorization, Design for All • Disability & Case Management • Tourism fruition • Emerging countries.*

Introduction

The theme of touristic valorization of Cultural and Natural Heritage has acquired a strategic importance both in its economic impact and for occupational and social ones (Lupo, 2008). The Heritage is an element with its own ethical values; it is historical proof to be preserved for next generations, and it inspires local identity.

In this scenario, the discipline of Design works with multidisciplinary actions, using strategic approaches and sustainable solutions (Marano, 2004).

Often, an aspect that isn't taken into account concerns the quality related to the sites' fruition: the removal of cultural and physical barriers is no longer sufficient to satisfy the needs expressed by all end-users. Their diversity (psycho-physical, cognitive-perceptive and behavioral-cultural) is not considered.

For those sites that have a touristic vocation, but also for those that can generate some livelihood economies for small and medium neighboring communities, a strategic sustainable approach for the valorization of Cultural and Natural Heritage is required. This can be made through an aware design approach about users and environment. Moreover, this reasoning is more evident if we consider the developing countries with a young touristic tradition, where the supply is directly related to the immediate fruition of the existing Heritage.

Aims

The paper aims to show the benefits gained from the adoption of the DfA and the D&CM in the field of touristic fruition in developing countries. Specific aims are:

- *Underlining how to use both design approaches for the touristic valorization of Cultural and Natural Heritage.*
- *Showing how to apply the DfA and D&CM as design strategies in emerging countries.*

Methodology

Using literature review and case study analyses, the paper is articulated in three phases, listed as follow:

- *The first phase describes the DfA and D&CM disciplinary approaches; potentialities, applicative specificity and strengths will be shown.*
- *The second phase describes how both approaches have been applied in a case study in Italy; it shows the obtained results in the field of Museum Heritage.*
- *The third phase extends and declines the achieved guidelines to the field of Cultural and Natural Heritage in developing countries.*

The DfA and D&CM approaches.

DfA is defined as "the design for human diversity, social inclusion and equality" (EIDD, 2004). It affirms that human diversity is a useful wealth and we must act according to it. This implies that the DfA approach not only is oriented to people with disability but, also, to all end-users that at different grades diverges from the users condition meant as "standard".

The DfA's aim is not only to allow to all the utilization of products, but instead considering human needs and aspirations as fundamental, it stimulates the participation and the integration of end-users in every aspect of social life (Accolla, 2009).

D&CM is a recent welfare-based (WHO, 1986; EU, 1997; UN, 2007; WMA, 2008) approach that, through the combination of different approaches, both medical and managerial, provides guidelines in the field of social wealth, human wellbeing and public responsibility.

It fosters a sufficient condition of health care among disabled people and those who interact with them. Its specific aims are: dealing with the issue related to disabled people and their families; enabling the networking of all institutions and stakeholders involved in a strategic approach to welfare; conveying disabled people's needs to existing services; implementing any action to promote the accessibility, also those at the urban scale; preventing any form of discrimination.

Relevant potentialities of both approaches are summarized in Table 1.

Table 1 Table layout. Captions for Tables are placed above.

Design for All approach	Disability & Case Management approach
<ul style="list-style-type: none">• It valorizes the human diversity.• It promotes social inclusion and equality.• It allows the ease and pleasant fruition for all end-	<ul style="list-style-type: none">• It manages and activates service networks and work plans.• It works on the improvement of protocols and health plans (ICF-based).

users.

- It doesn't marginalize (both physically and psychologically).
- It fosters the beauty.
- It is sustainable (in the social, economic and environmental dimension).
- Its aim is the improvement of the quality of life.
- It considers the autonomy, the physic capabilities, the perception, the process and the fruition of end-users, as relevant elements for the design brief.
- It analyses and evaluates people's needs.
- It promotes effective communication among stakeholders and networks.
- It deals with human health in the whole (holistic approach).
- It makes every effort to be competent in addressing the special circumstances that affect people.
- It evaluates personal beliefs and biases about people who have special problems.
- It understands the range of people to the challenges associated.
- It enables to be self-aware about identify differences.

The DfA and D&CM approaches in the touristic valorisation of Museum Heritage: the case of "Progetto Musei Accessibili®" in Italy

The "Progetto Musei Accessibili®" (tr. Accessible Museums Project) started in 2012 from the results obtained within a Master Thesis in Architecture (Barcarolo, 2011). The scientific results obtained from the Thesis have been intended as the beginning of the Project. The project is managed by the Tetra Paraplegic

Association of Friuli Venezia Giulia, financed by CSV-FVG; the Friuli Venezia Giulia Region, and supported by some local Foundations and the provinces of Gorizia, Pordenone, Trieste and Udine.

The Thesis has proposed three actions, listed as follow:

- ***The definition of an updated and completed list of the museums of Friuli Venezia Giulia Region (Figure 1). This has been done through a data collection and a cross-checking of 23 sources.***
- ***The construction of a survey (both paper and online) called "Data sheet for the upgrade of museums' accessibility" in which are contained the following information:***
 - a) Data statement of the Museum;***
 - b) Museum's accessibility level;***
 - c) Inquiry on the available enabling tools for the fruition of the museums;***
 - d) Inquiry on the available collections in the museums.***
- ***A mathematic formula (so-called "U.I.A": "Unique Indicator of Accessibility") that provides a set of criteria for understanding the overall impact, perceived by users, in the museum accessibility (Figure 2).***

'Design Research by Under 40 Researchers'

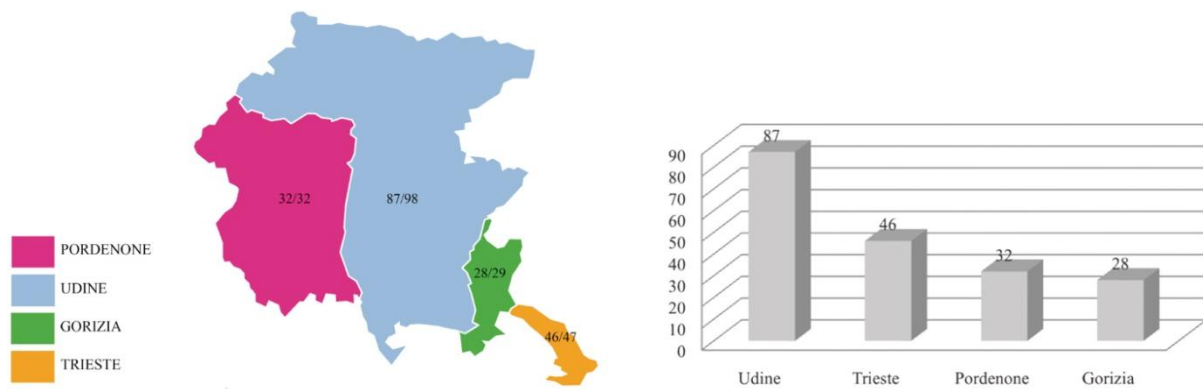


Figure 1 Museums map in the Friuli Venezia Giulia Region (Source: Barcarolo, 2011).

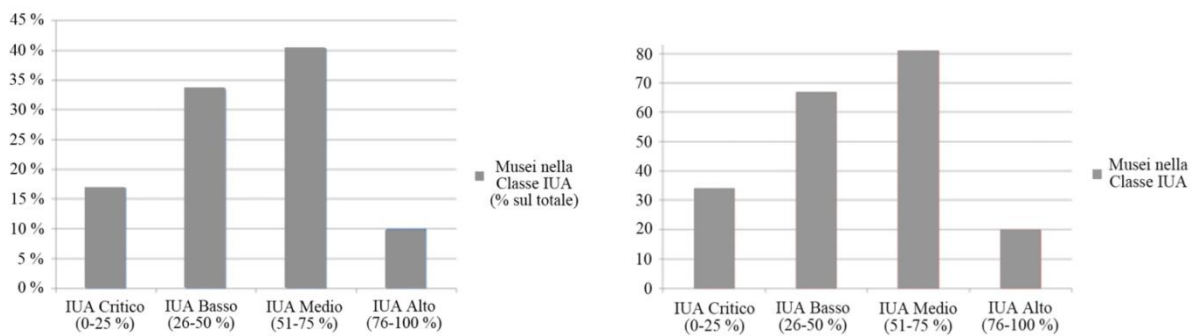


Figure 2 U.I.A. data of Friuli Venezia Giulia Region (Source: Barcarolo, 2011).

The aim of "Progetto Musei Accessibili®" has been to provide to all communities, a map of all museums of Friuli Venezia Giulia Region. It also provides a detailed description of the accessibility in the museums and integrates rules for implementing the project sustainability over time. The project has taken into account not only physical disabilities, but also those sense-perceptive, in order to valorize the human diversity, promote social inclusion and equality.

Relevant results obtained from the application of DfA and D&CM approaches are:

- **The creation of a stakeholders network with the aim of sharing human, economic and data resources (already held by public and private authorities, universities, NGOs, etc.).**
- **The indication and the sharing of project phases; this is in order to start sustainable actions for valorising the various work plans.**
- **The design of an informative database for the data management.**
- **A training plan for the designers (volunteers) that have provided the overall data collection and its implementation.**
- **A detailed map of private and public museums of the Friuli Venezia Giulia Region (later the map was completed with a quantitative data assessment).**
- **The establishment and the online publication of a public database in order to allow the inclusive fruition by all stakeholders (Figure 3).**
- **The implementation of a website to facilitate the fruition of all obtained data (Figure 4).**
- **The development of a protocol for further implementations with new data.**



Figure 3 Public online database of the "Progetto Musei Accessibili®": homepage. (Source: turismoaccessibilefvg.it).



Figure 4 Public online database of the "Progetto Musei Accessibili®": a page shown in all its length (the whole web page is split in three screens). (Source: turismoaccessibilefv.it).

The obtained results have provided a clear vision of all existing museum Heritage in the Friuli Venezia Giulia Region. They have also allowed to verify the various difficult conditions concerning the accessibility and they have also allowed to identify the correct solutions to be adopted by museum directors to optimize the overall accessibility in their buildings. According to what D&CM suggests, the network of associations has generated awareness among people, museum institutions and government departments on the issue of accessibility, and on the relevance of involving end-users in the museum fruition.

The results of both DfA and D&CM approaches in the "Progetto Musei Accessibili®" are synthetically resumed in the Table 2. Table 3, shows the specific recommendations (guidelines) for the touristic valorization of museum Heritage in the Friuli Venezia Giulia Region.

Table 2 Specific results obtained from the adoption of both DfA and D&CM approach in the "Progetto Musei Accessibili®".

Design for All approach	Disability & Case Management approach
<ul style="list-style-type: none"> • It valorises the human diversity. <ul style="list-style-type: none"> - <i>The database was built to allow the museum fruition of all end-users (it considers sense-perceptive and physical disabilities).</i> • It promotes social inclusion and equality. <ul style="list-style-type: none"> - <i>All stakeholders have participated in the decision phase and in the implementation of all tasks.</i> - <i>Roundtables with designers and museum directors have been done.</i> • It allows the easy and pleasant fruition for all end-users. <ul style="list-style-type: none"> - <i>The website is an open-content platform for sharing information.</i> - <i>The database is available "to All".</i> • It is sustainable (in the social, economic and environmental dimension). 	<ul style="list-style-type: none"> • It manages and activates networks of services and work plans. <ul style="list-style-type: none"> - <i>The project has activated a complex and exhaustive network among stakeholders.</i> - <i>The work plan was built considering stakeholders' involvement and their willingness.</i> • It analyses and evaluates people's needs. <ul style="list-style-type: none"> - <i>The survey has been created according to the user-centered design approach.</i> • It promotes an effective communication among stakeholders and networks. <ul style="list-style-type: none"> - <i>The relationships among stakeholders have been carried out through daily online communications.</i> • It addresses human health in the whole. <ul style="list-style-type: none"> - <i>The end-users' physical and</i>

-
- *The project fosters the economic sustainability through periodic updates (both monetary and informative).*
 - *Zero-CO₂: the entire project is based on internet-based technologies.*
 - **Its aim is the improvement of the quality of life.**
 - *Early obtained results have demonstrated that the fruition quality in the museum is increased.*
 - *The database and the website are available 24/7.*
 - **It considers the autonomy, the physic capabilities, the perception, the process and the fruition of end-users as relevant elements in the design brief.**
 - *The database and the survey contain useful information for end-users' fruition (it can be also used to provide tangible solutions to the museum accessibility).*
 - *cognitive conditions have been taken into account during all project's time.*
 - **It evaluates personal beliefs and biases about people who have special problems.**
 - *A survey aimed to understand end-users disabilities has shown real problems and aspects to be taken into account in the web design phase.*
 - *The usability tests on the website have shown that any disabilities listed in the survey have been dealt with dignity.*
 - *Any disabling condition has been dealt with according to ICF and medical documents.*
 - **It enables us to be self-aware about identify differences.**
 - *The website allows end-users to understand which museums have physical barriers (it enables people to understand their possible problems during the fruition).*
-

Table 3 Design guidelines for the touristic valorisation of museum Heritage (Friuli Venezia Giulia Region).

Design Guidelines

- **Preparatory phase**
 - *Involve end-users and designers in the process of development (participative approach and common moments of discussion).*
 - *Set a common work plan in which all stakeholders can work and in which each contribution is recognized (planning feedback tools, monitoring actions, mail lists, help contacts, etc.).*
 - *Plan the PCM document (declare the aim, all intermediate tasks, all deliverables, etc.).*
 - *Plan an effective promotion plan (not only for direct stakeholders, but also for children, the elderly, etc. All interested stakeholders must be taken into account).*
 - *Understand the target of end-users (their capabilities must be taken into account).*
 - *Make the project sustainable as much as possible *.*
 - **Implementation phase**
 - *Collect and share data for further analysis and tests*.*
 - *Make invisible the intervention (be aware to design a product-service "for All" and not only for disabled people).*
 - *Using graphic fonts, styles and layouts to allow for the high readability from small screens or PDAs*.*
 - *Create accessible contents (make the right visibility to all relevant parts, hide useless ones).*
 - *Provide separate spaces for end-users and for workers*.*
-

- **End Phase**

- ***Set an effective communication plan (using media marketing and social bookmarking)*.***
- ***Make periodic "user trials" in order to verify the effectiveness of the proposed solutions**.***
- ***Create attention among stakeholders and extend the network of friends**.***
- ***Stimulate the right involvement among stakeholders and end-users (recording feedbacks)**.***
- ***Analyse the achieved data to understand how to prevent errors and how to provide further implementations**.***
- ***Verify the sustainable impact of all solutions (on the economic, environmental and social dimension)**.***

*** Partially implemented.**

**** Not implemented or under development.**

Toward a definition of a set of design guidelines in the sites of Cultural and Natural Heritage in developing countries

Emerging countries have an enormous potential in terms of Cultural and Natural Heritage, such as: ancient cities, villages, mountains, lakes, food cultures, human traditions, languages, national parks, etc. In such countries, the valorization of Heritages is an opportunity of development, if we consider both the economic benefits gained from the new forms of tourism, and if we consider the positive impacts in marketing, job employment, wealth and social growth.

Starting from the results obtained in the "Progetto Musei Accessibili®", an early applicative extension and declination of its achieved guidelines will be proposed in emerging countries (Table 4). The aim is not to show all possible achievable guidelines, but rather it is important to demonstrate how the DfA and the D&CM approaches can be applied within the theme of touristic valorization of Cultural and Natural Heritage in emerging countries. The proposed strategic design guidelines for emerging countries can also stimulate reflection on how it is possible to plan awareness strategies for enhancing the touristic attractions of these countries.

Table 4 Strategic design guidelines for touristic valorization of Cultural and Natural Heritage in emerging countries.

Design Guidelines

- **Preparatory phase**
 - *Involve end-users and designers in the process of development (participative approach and common moments of discussion).*
 - **Involving foreign end-users and local ones to take part in the project through win-win approaches.**
 - **Stimulate the attention on the real problems, rather than strengths, for underlining all relevant criticalities.**
 - **Enabling foreign people to understand the project aims (provide multi-lingual and multimodal solutions to create involvement: videos, viral campaigns, etc.) and underlining its value among local stakeholders.**
 - **Demonstrate to local people, or foreign tourists, how to actively participate in the project and provide them**
-

with the right tools to express their judgements (when people understand what they can do, or what they cannot do, they are more collaborative and empathically involved).

- ***Set a common work plan in which all stakeholders can work and in which each contribution is recognized (planning feedback tools, monitoring actions, mail lists, help contacts, etc.).***
 - **Pay attention to the multicultural diversities of end-users: provide a right system to give and gain feedback (using images, links, status improvement, emoticons, or other audio-visual forms of feedbacks).**
- ***Plan the PCM document (declare the aim, all intermediate tasks, all deliverables, etc.).***
 - **Make the PCM document available in many forms and in many languages, in order to provide the right information and make aware all stakeholders of their role.**
- ***Plan an effective promotion plan (not only for direct stakeholders, but also for children, the elderly, etc. All interested stakeholders must be taken into account).***
 - **Plan collaborative local actions where everyone can play a recognizable role.**
 - **Conceive multiple forms of self-promotion (for children, for elders, etc.) because tourism is different at every age and the attraction is based on the empathy and on the cultural-emotive suggestions.**
 - **Inspire local people to join in the project (it could be a new form of economy that can start new job employment – as a self-promotion form of their**

Heritage).

- ***Understand the target of end-users (their capabilities must be taken into account).***
 - **Consider the real target of touristic stakeholders (understanding own local limits and potentialities; try to convert the limits into potentialities).**
- ***Make the project sustainable as much as possible*.***
 - **Consider local strengths and valorise the local resources (employers, raw materials, industry, etc.) in order to start local low-print environmental, social and economic actions.**
- **Implementation phase**
 - ***Collect and share data for further analysis and tests*.***
 - **Use the appropriate communicative tools, the right forms and the right languages.**
 - ***Make invisible the intervention (be aware to design a product-service "for All" and not only for disabled people).***
 - ***Using graphic fonts, styles and layouts to allow for the high readability from small screens or PDAs*.***
 - **The devices and the solution must be created following the criteria of inclusive and accessible design (products or services must be really used by all end-users).**
 - **Understand the new technologies with which people can share "in-real-time" multimodal information; allow in the most comfortable way, the environmental fruition.**
 - ***Create accessible contents (make the right visibility to all relevant parts, hide useless ones).***
 - ***Provide separate spaces for end-users and for workers*.***

- **Do not discriminate against any end-users, instead make them able to understand where is their right and safe place.**
 - **End Phase**
 - ***Set an effective communication plan (using media marketing and social bookmarking)*.***
 - **Consider the various cultures (language, religion, gender, age, etc.) of people involved in the fruition of the sites, their scopes (leisure time, education, scientific research, etc.) and their attitudes (physical or cognitive effort required, skills, etc.).**
 - **Enable the sharing of contents, the positive appreciation, etc. through codified marketing-based tags that identify the specific site (create self-branding).**
 - **Spread information as much as possible to create awareness. Later use the same process for consolidating the image created.**
 - ***Make periodic "user trials" in order to verify the effectiveness of the proposed solutions**.***
 - ***Create attention among stakeholders and extend the network of friends**.***
 - **Create partnerships with other sites or events; stimulating the sense of belonging among tourists and local people; foster the plan of new journeys in the same area, to visit new installations or a new event related to the same place.**
 - ***Stimulate the right involvement among stakeholders and end-users (recording feedbacks)**.***
-

- **Generate new multicultural friendships based on the same interest to the Cultural or Natural Heritage.**
 - **Activate a right campaign of branding that identifies – worldwide – only that place or that Cultural or Natural Heritage.**
 - **Analyse the achieved data to understand how to prevent errors and how to provide further implementations**.**
 - **Verify the sustainable impact of all solutions (on the economic, environmental and social dimension)**.**
 - **Understand if there are some errors in the implementation phase (errors in the application of plan) or in the preparatory phase (errors in the understanding end-users).**
 - **Monitoring the impact of the activities among local people directly or partial involved in the valorization activity.**
 - **Understand how the valorization is well accepted in nearby regions and try to limit self-destructive actions gained from local competitors.**
 - **Understand the grade of resilience of the local context to the valorisation actions.**
-

From strategic design guidelines to product design guidelines

Starting from the strategic design guidelines before achieved, a further step in the definition of a proper sustainable design strategy of valorization concerns the conversion of such guidelines into product ones. This is due to the fact that the level of strategic design approach could appear difficult for designers that couldn't be able to understand how to apply this complex

vision. The aim of this phase is to demonstrate how the whole design approach that combines DfA and D&CM can be further developed till the design level of products and systems.

For example, the guideline "Stimulate the right involvement among stakeholders and end-users (recording feedbacks)" listed in the Table 4, allows to conceive some design applications, as it is shown in the Table 5.

Table 5 Possible product design applications for the Valorisation of Heritage.

Generate new multicultural friendships based on the same interest to the Cultural or Natural Heritage	Activate a right campaign of branding that identifies – worldwide – only that place or that Cultural or Natural Heritage
<ul style="list-style-type: none"> • DfA-oriented communicative services that, through the use of enabling mediums (videos, signs, etc.), promote the exchange and the encounter of people. • Inclusive services for the building of networks for the fruition "for All". • Accessible services and products that allow and enable cultural exchanges. • Educative services, places and products that allow physical-perceptive 	<ul style="list-style-type: none"> • Flexible products that, through the visit experience and the encounter with people, become combinable, sharable, etc. • Icon objects to express the sense "I was there". • Educative objects for the aware learning of visited places. • ICT services aimed to record emotional images, own experiences, fascinated stories of visited places. • Products locally made for an

encounters.

- Enabling services that improve the perception and the visibility of local cultures.

aware self- promotion based on the sense of "made in".

For the remaining product design guidelines, it will be necessary just apply the same process for conceiving the other product and service design solutions.

Conclusions

The results obtained from the study have demonstrated the real applicative potentialities of both the described approach in the definition of a new design method applicable to the theme of touristic valorization of Heritage.

In the "Progetto Musei Accessibili®" of the Friuli Venezia Giulia Region, the combination of the DfA and the D&CM approach has allowed for the production of a set of specific and useful design guidelines for the valorization of museum Heritage. Specifically, the results of the project have been: an open-content database, an online public web platform and a data collection that shows the grade of accessibility of all the existing museums in the Region.

The applicative demonstration proposed in emerging countries on the theme of touristic valorization of Cultural and Natural Heritage has allowed the identification of new detailed and innovative design guidelines for the start of and implementation of an effective touristic self-promotion that considers "all" end-users. This case has demonstrated that the application of both approaches can be truly considered as a new and useful method to

implement the current design practice on the theme of Heritage valorization.

Acknowledgments

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References

- Accolla, A. (2009). *Design for All: Il progetto per l'individuo reale. Milan: Franco Angeli.***
- Barcarolo, P. (2011). *Studio di un percorso museale multisensoriale tra scultura e design. Kabuki Museum, presso Palazzo Ricchieri a Pordenone. Unpublished Master thesis in Architecture, Udine, University of Udine.***
- European Institute for Design and Disability. (2004). *The EIDD Stockholm declaration. Adopted at the Annual General Meeting of the European Institute for Design and Disability in Stockholm, Sweden, the day 9 of May 2004.***
- European Union. (1997). *Convention for the protection of human rights and dignity of the human being with regard to the application of biology and medicine: Convention on human rights and biomedicine. Adopted in Oviedo, Spain, the day 4 of April 1997.***
- Lupo, E. (2008). *Beyond localism, looking for sustainability: Designing "typical knowledge" active-action. In Proceedings of the international conference: Changing the Change Design: Visions, proposals and tools. Turin: Allemandi.***
- Marano, A. (Ed.). (2004). *Design e ambiente: La valorizzazione del territorio tra storia umana e natura. Milan: POLI.design.***
- United Nations. (2007). *Convention on the rights of persons with disabilities. Adopted in New York, USA, the day 30 of March 2007.***
- World Health Organization. (1986). *The Ottawa charter for health promotion. Adopted at the First International Conference on Health Promotion in Ottawa, Canada, the day 21 of November 1986.***
- World Medical Association. (2008). *World medical association declaration of Helsinki (sixth revision): Ethical principles for***

***medical research involving human subjects. Adopted at the 59th
WMA General Assembly, Seoul, Korea, October 2008.***



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Alessia Brischetto is a designer and fixed-term researcher (RTDa ICAR/13 - Industrial Design) at University of Florence (UniFI). Following a Master's Degree in Design at the Faculty of Architecture of the University of Florence in 2010, she earned her PhD in Architecture, major in Design, in 2015, with a dissertation entitled: "Social Inclusion in the sector of Learning Technologies: the Universal Design approach". With the aim of improving the potential inclusive strength of the ICTs in learning environments, one of the main objective of the PhD thesis was dedicated to the careful assessment of the contribution coming from the disciplines of the Universal Design and Design for All. She is teaching Product Design, Ergonomics & Design and holds the Everyday Object course at Tongji University (since 2016).

Since 2010 she has been working in the research group of Laboratory of Ergonomics and Design (LED) of DIDA - Department of Architecture (UniFi), where she conducts several teaching and research activities involving mainly product design, Ergonomics in Design and Usability of industrial products, with particular reference to the approaches of the Human-Centered Design and Inclusive Design. She took part to European Project titled "Intermodal bike: multi-modal integration of cycling through product and process innovations in bicycle design", and other projects and collaborations with many private companies (Whirlpool, Roller Team & Caravan International, Segis, Techogym, Ariete, Brunello Cucinelli etc.), and institutions.

She has also taken part in several national and international research projects and collaborated with public administrations and important companies. To date, her research activity focuses mainly on the field of Ergonomics for Design, usability of industrial products and Inclusive Design.

PLAYGROUND DESIGN: AN EVALUATION TOOL FOR THE CREATION OF INCLUSIVE PLAY EXPERIENCES

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Playing in its widest meaning involves physical, sensory and social/emotional aspects. With this in mind, designing play equipment as much as possible integrated throughout and inclusive is of great social importance but also a challenging issue, especially due to the complexity of variables intervening between product requirements and user capabilities. The research work presented proposes a novel methodology for assessing the level of inclusion when designing play experiences. A cross-correlating tool based on accessibility standards and disability descriptors was developed and validated with on field experiments and interviews. This approach allows to get an immediate feedback and reliable information on the level of inclusiveness of any type of game equipment and user disability. With the final aim of designing inclusive play experiences, the developed cross-correlation tool was also exploited for supporting the creation of novel design concepts of sensory/cognitive play, which are here presented.

Keywords: Universal Design • Inclusion • playground • disability • sensory play.

Introduction

Playgrounds are historically known as places where children interact each other on different levels by experiencing and sharing multiple and diverse recreational experiences in a safe and comfortable environment. Physical, cognitive, communicative, social/emotional, and sensory interaction are the most relevant dimensions involved during playing. Inclusive playground design is therefore oriented to improve and integrate all these human dimensions with the aim to guarantee to any child the right to play with other peers regardless of any impairment and discrimination (King & Newstead, 2017) (Casey, 2010).

Community policies and global market are nowadays increasingly oriented towards the adoption of a wide range of customized solutions in support to universally inclusive play opportunities. For instance, many playgrounds are equipped with wheelchair accessible routes, transfer points, ramps, seat or basket swings, balancing bars, sensory play, nature-inspired areas and many other. With regards to sensory plays, they are considered an important element of a play space, as allow stimulating simultaneously several ability levels (i.e. tactile, auditory and visual interaction), particularly for those children with Autism Spectrum Disorder (ASD) and sensory disabilities. There also a variety of further accommodating solutions, equipment and services, which have been designed for a wide range of abilities, activities and offer several benefits. A comprehensive classification about the range of plays divided by age groups and type of activities is displayed in Figure 1.

'Design Research by Under 40 Researchers'

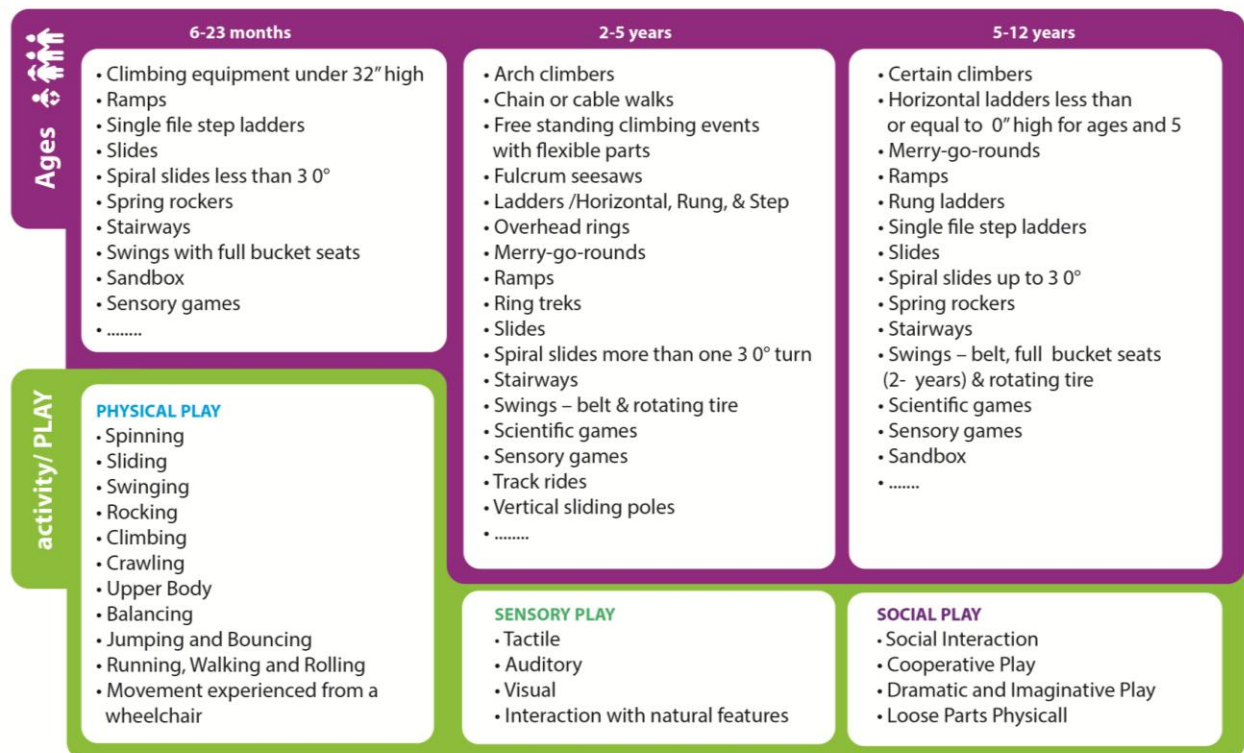


Fig. 1. Play activities as classified by age groups and types of play (physical, sensory and social)¹

Thus, whenever considering play experiences the individual elements should be designed according to the principles of Universal Design (UD) and best practices. Through the engagement of children, parents, and related experts the final expected outcome should be aimed at creating equal play opportunities, positive interaction and collaborative socialization. However, despite the significant efforts, the current available solutions do not meet entirely inclusive requirements, especially for children with cognitive or physical constraints. With this perspective designers have to face with the evaluation of several

¹ **Inclusive Play Design Guide.**

<http://www.accessibleplayground.net/wpcontent/uploads/2016/05/Inclusive-Play-Design-Guide-LowRes-2.pdf>.

US Consumer Product Safety Commission: Public playground safety handbook. Government Printing Office (2010). <https://www.cpsc.gov/s3fs-public/325.pdf>.

elements whenever designing an inclusive playground facility or an individual play. From a research standpoint, the design steps are more strictly focussed on the identification and the analysis of user needs, user abilities, user product-interaction, product requirements and environmental factors. The many groups involved in promoting and delivering inclusive design solutions, from community policies to strategic planning should be taken also into account (Dong, 2015) (Clarkson & Coleman, 2015).

The representative sketch displayed in Figure 2 illustrates and summarizes all aspects to be considered. A crucial point is undoubtedly related to outline an integrated analytical strategy in order to output appropriate designing solutions and satisfy user needs throughout, by considering a plurality of physical, cognitive and social conditions. As a matter of fact, the Inclusive Design Cube, which was initially proposed for understanding the link between product demands and user capabilities, was reformulated in the area of playgrounds by adding the social dimension (Clarkson et al., 2003)(Siu & Wong, 2017). Within such a framework the main goal of the present research is to design inclusive play elements for:

- *enhancing the children's abilities on the basis of an attentive analysis of user needs*
- *fostering socialization and collaboration between disabled and non-disabled children;*
- *promoting communication among relatives and children, even in the presence of early disabilities.*

Using a purposely-developed cross-correlation tool, which helps designers to get immediate information on the level of inclusiveness, four designed concepts of play (GERDY, GOLI, SID

and DINO), developed by the LED laboratory (University of Florence, Italy), are presented.

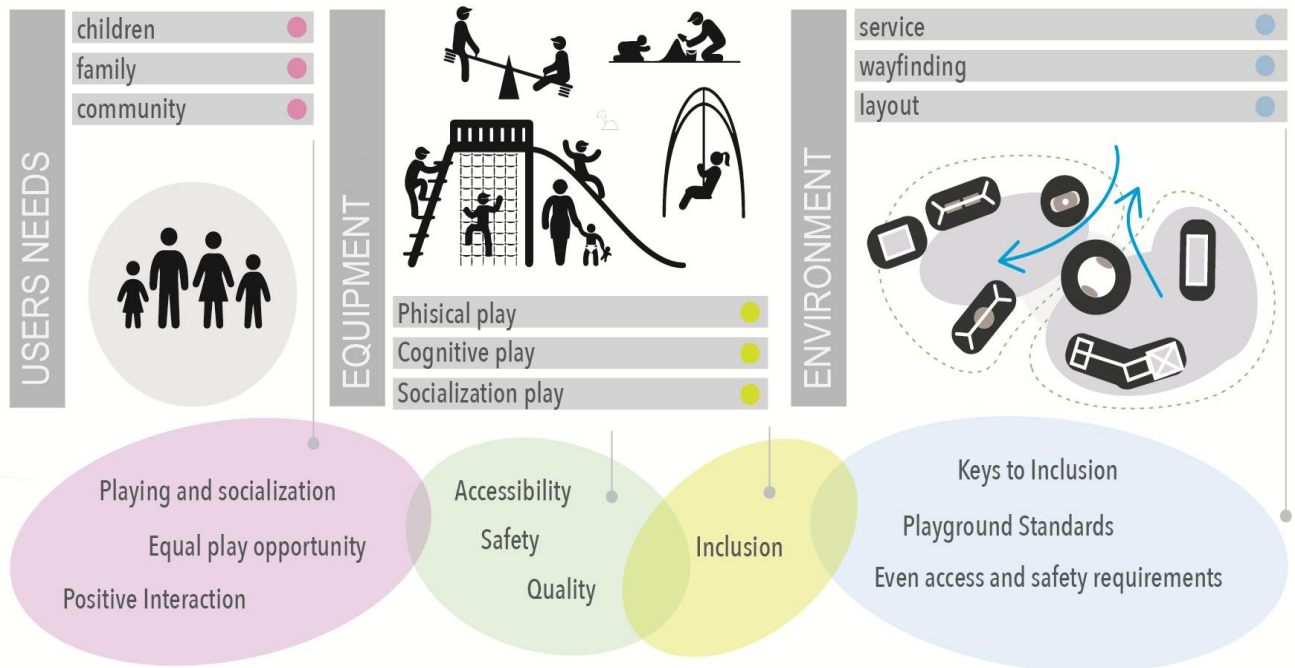


Fig. 2. Key components for an inclusive playground design

2 Research methodology

To get preliminary information on playgrounds (i.e. dimensional and safety requirements, inclusion parameters, layout, type and quality of equipment) European and American regulatory standards were analyzed². Among the most accredited guidelines one may find: Me2: 7 Principles of Inclusive Playground Design™ (Christensen, 2010), Inclusive play design guide by Playworld,

² ASTM F1487-11 - Standard Consumer Safety Performance Specification for Playground Equipment for Public use.

ASTM F1292-09 - Standard Specification for Impact Attenuation of Surface Materials within the Use Zone of the Playground Equipment.

EN 1176-1 : Part 1: General safety requirements and test methods

EN 1176-2 : Part 2 -3: Additional specific safety requirements and test methods for swings

EN 1176-3 : Part 3: Additional specific safety requirements and test methods for slides

Let's play Toolkit³ and public playground safety handbook (Stanton et al., 2017).

Focus groups and several interviews are usually performed on to collect information about user needs, play activities, product requirements and environmental factors. These information together with the use of ICF taxonomy are used for evaluating the level of user exclusion. The classification of Figure 1 was useful for evaluating the types of play equipment installed on playgrounds and on market worldwide and to draw and plan the user needs analysis phase. Generally, for estimating the level of exclusion the following steps revealed to be essential: (1) understand the tasks when using a product within its operating environment; (2) define a specification for and collect data of a new population based on user capability; (3) calculate levels of product exclusion and difficulty; and (4) present such data in an accessible and useful way (Langdon et al., 2015) (Elton & Nicolle 2010).

To cross-correlate all the gathered information, a smart evaluation tool has been created and validated. It allows to put immediately in relation children's abilities to tasks required during play activities. The ICF classification, the international standard to describe and measure health and disability, is used for evaluating the product exclusion and the type of disability⁴. The ICF provides a tree-like classification of body function and disability composed of three lists called Body Functions, Body Structures and Activity and Participation. Furthermore, to classify contextual factors, it offers another two lists called 'Environmental Factors' and

³ *Rick Hansen Foundation, Let's Play Toolkit. Creating Inclusive Play Spaces For Children Of All Abilities Retrieved from <https://www.rickhansen.com/Portals/0/WhatWeDo/SchoolProgram/RHSPAdditional/AccessiblePlay/LetsPlayToolkit.pdf>*

⁴ *World Health Organization 2001. Retrieved from <https://www.who.int/whr/2001/en/>*

'Personal Factors'. Each domain is structured into chapters where each item can have up to four levels of depth. Thus, the ICF offers about 1500 descriptors in its taxonomy (Blasco et al., 2014).

As an example, Figure 3 shows some of the reliable disability descriptors which were selected for assessing exclusion when practicing play activities.

The disabilities taken into consideration were those corresponding to the highest levels of impairment, thus between 96 and 100% of the ICF functions qualifier. This choice was adopted to consider the most extreme level of the exclusion scale (low capability).

The level of interaction between the game and the group of users analyzed were assessed through the systematic analysis of individual games (i.e physical, sensory and social plays). For each test and sub-task identified were analyzed the levels of potential interaction, referring to specific users' physical, cognitive and sensory conditions (Clarkson et al., 2015)(Hollnagel, 2012). As an example, Fig. 3 correlates the macro-tasks of the traditional swings and of sensory games, with the level of interaction required to accomplish a specific task (Physical, Cognitive, Social).

The cross-correlation between macro-tasks and the levels of capability, as quantified by ICF descriptors, allows assessing the degree of user exclusion when performing play activities. The exclusion was evaluated in relation to the following items: (1) the user, (2) the product, (3) the environment or context (4) the activities and tasks that constitute the interaction over time.

3. Tool for assessing play inclusiveness

The developed tool displayed in Figure 3 provides an immediate feedback on the level of inclusiveness of any type of game equipment. As an example, the degree of exclusion of 5 games, namely 4 different types of swings and a sensory game, is shown. In the case of the swing evaluation, the analysis of the related tasks (i.e. access, swinging, descending phase) shows the need for support activities by an accompanying persons, especially in the presence of the physical disabilities shown in the first four lines of the Figure 3. In the case of limited or complete body functions disability (upper / lower limbs, wheelchair users), the participation of an accompanying person is strictly required for the transfer and / or for assistance activity. During the swinging phase (a.2), if there are children with severe visual and cognitive impairments, assistance and physical contact with an accompanying person is needed. However, the level of exclusion for wheelchair-bound children which cannot be transferred on remains high.

The cage swing (play in the third column) designed for children in wheelchairs, is certainly accessible for them but turns out to be a dedicated solution that excludes the participation of other children in the game activity. Moreover, these systems are dangerous and require block systems to prevent improper use of other children.

For children aged between 2 and 5 years, to increase the level of socialization, it is recommended the installation of solutions that allow the activity of swinging together with parents. Some solutions are the double seat, with the possibility of looking at each other, or the types of swing implemented with child restraint systems equipped with a backrest and side supports and safety front panels.

Therefore, the results of cross-correlation show that the most suitable swing is the shape of a basket, especially regarding the issue of socialization. This type of swing offers play opportunities to children with disabilities, who can sit or lie down, swinging alone or with other children.

For what concerns the sensory games, always illustrated in figure 3 (column 4), it has been found that they make it possible to work simultaneously on several levels, so as to better satisfy inclusion. These games help children to become aware of their senses and develop them further. These aspects are therefore of fundamental importance for the growth of cognitive, tactile, sensory-motor, social and linguistic abilities. A further positive aspect of sensory games is also due to the interaction between parents and children, as there may be cases in which the parent may reside in the disabled condition.

'Design Research by Under 40 Researchers'

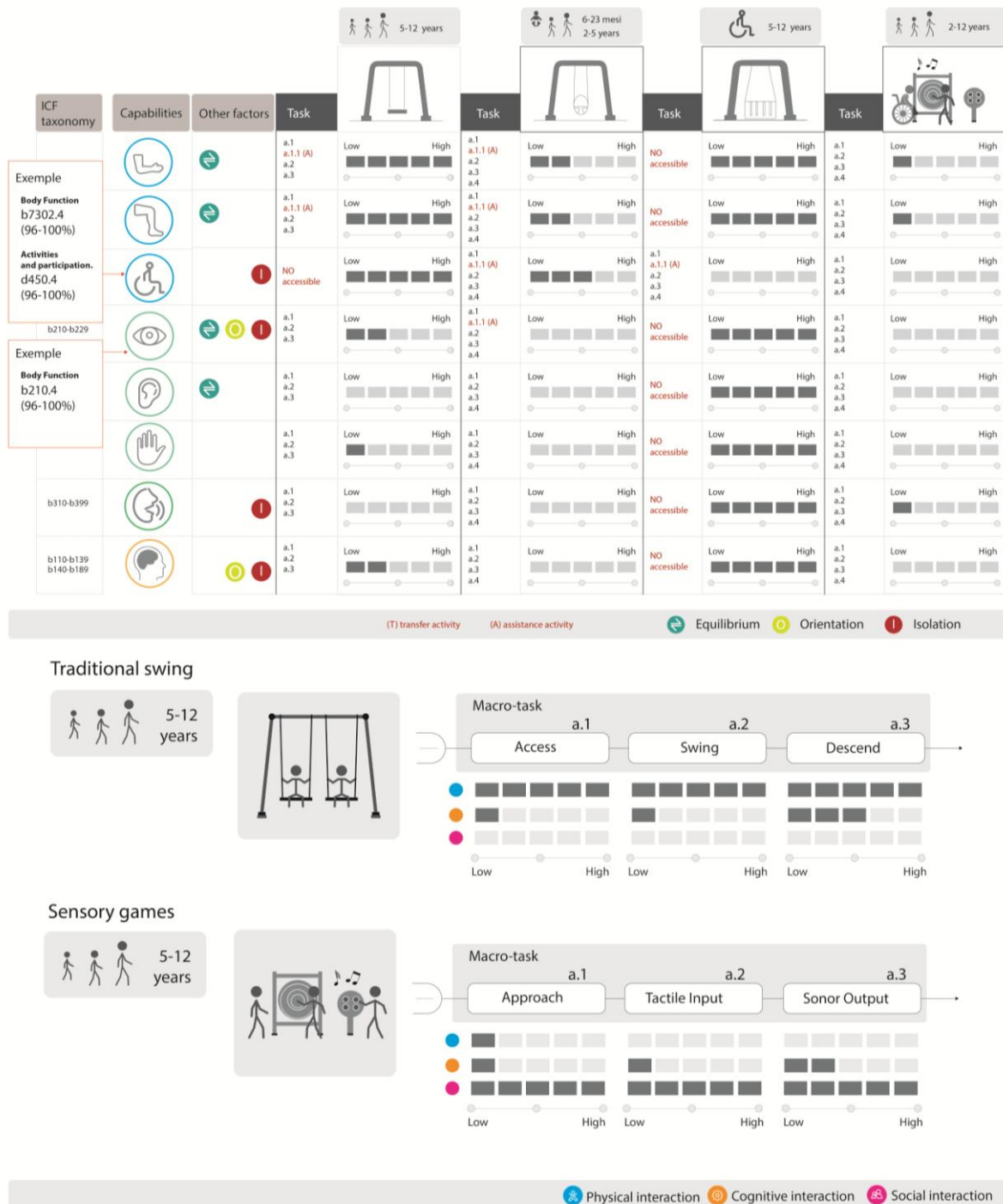


Fig. 3. Cross-correlating tool showing the different types of interaction and tasks required when using traditional swings and sensory games. Age group considered 5-12 years. At the bottom, cross-correlation diagrams illustrating the matching phase between macro-tasks and degree of user exclusion/inclusion (Brischetto, Tosi & Rinaldi, 2019)

In the category of sensory play we also find sound games. In this type of games, the attention must be paid to subjects with cognitive and / or autistic disabilities. These subjects may be bothered by such games, so it is advisable to use not too high sound tones or to place, where possible, elements / materials that act as acoustic isolators. According to published studies (Muñoz, 2009) (Kaplan, 2018), almost half of the children with ASD try to move from a safe and controlled place to a more open areas. In the absence of places to shelter, half of these children tend to get lost (Gilmore et al., 2018). Therefore, solutions with shell structures or small houses may be more suitable in cases of ASD. In fact, these last solutions can have a double function, the first one concerns the possibility for ASD subjects to isolate themselves in order to observe the environment. By doing so, they can decide the most opportune moment to open up to relationships and any socialization activities. The second reason concerns the need of these subjects to identify in these structures a safe place and protection.

Another fundamental aspect for ASD subjects is to look for playgrounds that have a wide pathway around the playing area. The perimeter path is often requested by ASD children because it offers a quiet space away from the game action. It may therefore be useful to install protection systems, such as houses, tunnels or domes, near the perimeter areas. Another disturbing factor for ASD children, and in general for all children, is the presence of saturated and bright colors of the games. In addition, the flooring is important to allow the child in a wheelchair to easily reach the game and make any task required by the game. The child in a wheelchair must be able to approach the game effectively and perform the necessary actions. Moreover, the possibility of using the game by children of different height must be provided.

Usually, these games are used for learning activity, in a fun and engaging way. For instance, some fundamental notions of dynamic physics, optics and other categories of scientific knowledge can be learned. In particular the latter category of sensory games gives an active role to the player who, depending on the game, can act individually in collaboration with other players.

4. Design inclusive play experiences: the "ALL Play Together" project

The cross-correlation tool above-described revealed that play stimulating the sensory channel are the most suitable to get universally inclusive solutions and an elevated degree of socialization. Moreover, it allowed getting useful and immediate information on the types of equipment and level of interaction. Accordingly, this knowledge base supported and powered the creation of design experiments and concepts, which were carried out in collaboration with young designers.

The "All Play Together" project proposes types of play that offer many opportunities for children to feel alive and to learn in a relaxing environment. Although the planned activities may seem simple to avoid situations of failure, they have an intentional progressive difficulty. The usefulness of this method was to stimulate children to face with their skills and their senses in order to compensate the type of disability.

The "All Play together" project contains five categories of games: sound games, cognitive panels, play tables, sensory games and physical games. The inspiration for the design of cognitive panels was taken from the "puzzles". This type of games allows you to perform challenging activities that offers many benefits, such as developing fine motor skills, hand-eye coordination and memory.

The aim of these games is to improve cognitive development, as it helps children to improve imaginative strategies and to work toward a goal. In order to make these types of games accessible to children with intellectual and/or visual disabilities, tables have been designed with two surfaces, one of which is rotating and, through illustrative drawings on the surfaces, children can create a series of formal compositions. This is the case of GERDY, the concept of Figure 4 illustrating a series of round tables that encourage socialization and require a low level of muscle activity of the upper limbs. The upper rotating plate stimulates the child to find the correct combination in order to compose the body of the character to be assembled. Friendly shapes engraved on a wooden panel with the use of bright and attractive colors were created.



Fig. 4. GERDY cognitive panel. Designer: Kiana Kianfar (Project supervisors: Alessia Brischetto and Francesca Tosi)

A further cognitive game shown in Figure 4 is GOLI. It is an interactive panel characterized by four levels of difficulty, which can be overcome with the possibility of multiplying the action on the same objective. The child exercises the recognition of shapes and colors and tries to free the path to put the mobile birds in right colored location. Finally SIB and DINO (Figure 5 and 6), two cognitive panels.

SIB is a type of a play inspired by the cause-effect games and is dedicated to autistic children. Thanks to the use of hands, this game emits sounds that allow you to perceive the cause (turn) - effect (noise) that manifests when interacting with it. SIB offers the opportunity to exercise hand-eye coordination and sensory exploration. The child who comes into visual contact with another child (eye contact) socializes with it and with others. Accessibility for children in wheelchairs and also for young children has been studied. Children, regardless of their age and abilities, can interact with the side elements, as they slide on a series of tracks.

Finally, DINO is a sensory game that offers a tactile experience to children, especially for those with visual impairment. Its structure allows for the accommodation of several children at the same time, which can communicate each other and talk about their feeling by touching the panels with different textures and colors. Its shape can recall different types of animals, leaving the imagination free. Its tubular structure can be raised up from the ground and connected with other play-structures.

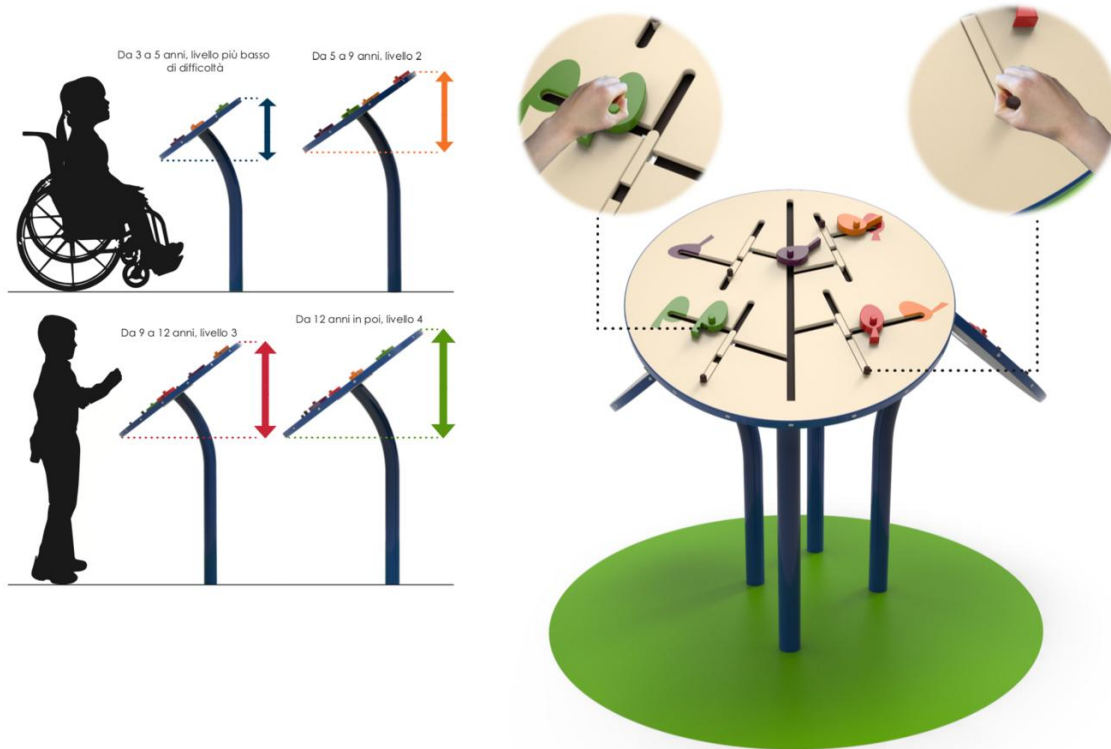


Fig.5 GOLI System, cognitive panel. Designer: Kiana Kianfar (Project supervisors: Alessia Brischetto and Francesca Tosi)



Fig.6 SID (top) and DINO (bottom) Systems, Designer: Kiana Kianfar (Project supervisors: Alessia Brischetto and Francesca Tosi)

5. Conclusions

The research activity herein presented focusses on the inclusive playground design giving more emphasis to sensory/cognitive play, as allow stimulating several ability levels simultaneously (i.e. tactile, auditory and visual interaction), promoting functioning development, valorizing individual diversity and collaborative socialization. Due to the complexity of variables intervening between product requirements and user capabilities, a smart cross-correlation tool was developed. The latter embeds and correlates most of the regulatory standards, systematic evaluation procedures and design best practices, aiming at facilitating and making more comparable and objective the

qualitative evaluation of play inclusiveness and accordingly, the development of integrated and inclusive design solutions. The proposed method proved to be also useful for assessing personal and environmental factors and supporting the design process along the whole working flow, from the methodological side to creational. Four sensory/cognitive systems, named GERDY, GOLLI, SID and DINO, were designed, optimized and evaluated according best practices and criteria of inclusion suggested by the cross-correlation tool.

With the aim of promoting inclusive play experiences, future research activity will be focused on testing the approach presented here on a larger population, in order to get more accurate qualitative observations regarding peers behavior in play activities.

References

King, P., & Newstead, S. (Eds.). (2017). *Researching play from a playwork perspective*. Taylor & Francis.

Casey, T. (2010). *Inclusive Play: Practical Strategies for Children from Birth to Eight*, SAGE Publications.

Dong, H., McGinley, C., Nickpour, F., Cifter, A. S., & Inclusive Design Research Group. (2015). *Designing for designers: Insights into the knowledge users of inclusive design*. *Applied ergonomics*, 46, 284-291.

Clarkson, P. J., & Coleman, R. (2015). *History of Inclusive Design in the UK*. *Applied ergonomics*, 46, 235-247.

Clarkson, J., Dong, H., & Keates, S. (2003). *Quantifying design exclusion*. In *Inclusive Design* (pp. 422-436). Springer, London.

Siu, K. W. M., & Wong, Y. L. (2017, July). *Opportunities for inclusive play in densely populated cities: an analysis of the human factors in Hong Kong play space*. In *International Conference on Applied Human Factors and Ergonomics* (pp. 314-324). Springer, Cham.

Christensen, K. M. (2010). "Me2; 7 Principles of Inclusive Playground Design". Retrieved from <https://www.gametime.com/me2>

Stanton, N. A., Salmon, P. M., Rafferty, L. A., Walker, G. H., Baber, C., & Jenkins, D. P. (2017). *Human factors methods: a practical guide for engineering and design*. CRC Press.

Langdon, P., Johnson, D., Huppert, F., & Clarkson, P. J. (2015). *A framework for collecting inclusive design data for the UK population*. *Applied ergonomics*, 46, 318-324.

Elton, E., & Nicolle, C. A. (2010). *The importance of context in inclusive design.*

Blasco, R., Blanco, T., Marco, A., Berbegal, A., & Casas, R. (2014). *Needs identification methodology for inclusive design. Behaviour & Information Technology, (just-accepted), 1-36.*

Clarkson, P. J., Waller, S., & Cardoso, C. (2015). *Approaches to estimating user exclusion. Applied ergonomics, 46, 304-310.*

Hollnagel, E. (2012). *Task analysis, why, what and how. Handbook of human factors and ergonomics, 4, 385-396.*

Brischetto A., Tosi F., Rinaldi A. (2019) *Playgrounds for All: Practical Strategies and Guidelines for Designing Inclusive Play Areas for Children. In: Di Bucchianico G. (eds) Advances in Design for Inclusion. AHFE 2018. Advances in Intelligent Systems and Computing, vol 776. Springer, Cham*

Kern, P., & Wakeford, L. (2007). *Supporting outdoor play for young children: The zone model of playground supervision. YC Young Children, 62(5), 12.*

Kaplan, M. (2018). *Ten tips for choosing a playground for a child with autism, iPlaygrounds. Retrieved from <http://iplaygrounds.com.au/ten-tips-for-choosing-a-playground-for-a-child-with-autism/>*

Muñoz, S.A. (2009). *"Children in the Outdoors." London: Sustainable Development Research Centre. Retrieved from http://www.heritagecouncil.ie/content/files/children_%20outdoors_commissioned_report_26mb.pdf*

Gilmore, S., Frederick, L. K., Santillan, L., & Locke, J. (2018). *The games they play: Observations of children with autism spectrum disorder on the school playground. Autism, 1362361318811987.*



Letter from the Chairman's Desk By Sunil Bhatia PhD

In philosophy, this period of modernity has been approached from various angles of vision, including the revolt against tradition in the Enlightenment, the idea of legitimacy, the rise of technology, progress, a new form of economic organization, etc. Modernity carries the construction, destruction, and reconstruction and does not follow the sequence rather it acts its own ways in random. The core of modernity is the crystallization and development of mode or modes of interpretation of the world not the precipitation of solution. It has inbuilt character of dissatisfaction that led to mental exercise not for survival but beyond that.

Entire population of the world is migration and moved in search of food, safety or something that has yet to establish the reason of migration and sometime they kept remembering their home means were once living with specific groups and majority of time connect to new home and they mingled to such level that even it faded away from their memory that they are migrant . Is it migration modernity? Is migration inbuilt character of new thought mix with destination that create unimaginable new called modernity? Is modernity has questioning and rejecting the prevailing practise character? Is modernity promotes forgetfulness or enhances mindfulness of humans? Our time great thinkers has another hypothesis that migration was responsible of mutation of different genes for designing better new genes for survival was in fact first step of modernity. Was it deliberate attempt of mutation or by products of something else? Why do I

say something else because a new theory surfaced and old theory buried under somewhere and it might be possible that we have not yet explored to that level where exact reason of migration can be explained. Attempt of better survival was not modernity but modernity might have characteristics of better survival.

I am starting from mythological narration that has left permanent imprint in our mind and we live under that influence .Adam covering of private parts with fig leaf in paradise was not modernity but it was artificial necessity of creating out of nothing. Why did there was an attempt of covering the private parts when there was no one to notice in paradise? I consider entire clothing industries were not for modernity but it was unwanted exercise of covering the body when there were no harsh vagaries of weather. Where ever environment was harsh and need protection that place I can understand the requirement of second skin. Whether covering with dead animal skin or living in cave or standing under shade of tree or something else was for survival not for modernity.

Taking a bath on other side was an attempt in direction of modernity because it helped in meeting the unseen and unknown challenges of harming elements for humans and it was search of best possible solution in available resources. Ancient people in very early stage of life have realized that sitting on ground invites some problems to their bodies and it was associated with dust that was external factor in their bodies. They designed various best possible techniques of keeping it away from the human body. They jerked body to deflect the possible dust or even used striking of hands that allowed to separate dust because of inertia were in practise. That concept of inertia was not known but jerking or striking made the dust to separate from body was prevailing. Some people even experimentation of removing the dust that was

with undefined harmful elements by exhaling sudden burst of air from the mouth might be modernity. Later on they found soaking or dipping in water made the dust soft and dissolved, that later turned to bathing. I have noticed in animals that they use paw for clearing the ground for sitting not to keep the dust away but to get the moisture of ground for coolness.

Concept of bath among ancient people was in practise without knowing that was moving in the direction of modernity. Another practise might be prevailing to segregate the meat from skin of hunted animals were act of modernity. They might have realized eating skin or hairs was difficult to digest and it was much harmful that might be proving reason of death. Even at the time of climbing of the tree either for protection from attacking animals or for fruits their minds was under the influence of modernity. The way they select the branch that could bear their body weight and helped in climbing was marvellous practise of modernity. Once they found themselves at that spot where no branch could bear their weight and attacking animal was closing for killing and death was inevitable made to act in different manners under specific situations for survival that action was not modernity?

Use of laying long leaf or bunch of leaves on ground was an attempt to create barrier for harmful elements of grounds hiding in dust was in fact of modernity or using the heap of straw as mattress was a real attempt of keeping away from the bad effects of dust. Extension of barrier later proves to be reason of design of cot, bed, chair and table or any platform or roof. Later on idea of horizontal barrier was made vertical and it was called entrance door. It was initially designed with stone for covering the cave for barrier but took the shape of door in modern house.

Ancient man journey for modern man began initially with relying on limited to his physical strength for survival by killing enemies.

At some moment found helpless in facing the enemies and out of frustration killed their enemies with stones was great step of modernity where clubbed their internal strength of judging of lifting and throwing with external elements of stones for creating artificial super power for dominating the others strong living beings. The ultimate power came by discovering fire and learnt the fire management that tool established human superior to all living beings and found his survival on strong foot and others at slippery ground. That concept of fire management proved biggest tools for modernity. No one has made human superior it was the human that has proved superior to all by fire. Till today every living beings are aware about consequences of fire but do not know the management and left with no option but to live in scare or become victim of fire.

Later they imitated the nature and afterward collected water either by joining palm in shape of cusp or noticed walking on mud left a footprint able to retain water and led to design of terracotta for future use was the real attempt of modernity. That era modernity was for making survival better. Adding of fig leaf was not an attempt of survival nor was an attempt for modernity .It is my opinion that animals hormones for sexual needs activates in specific times or it is seasonal and during that time it forces for intercourse for progression of generations. That was the reason naked or exposed body parts of animals were covered or exposed was immaterial for sexual attractions. Man on other side was not governed with specific times or influence of season for sex rather it is always at the back of the mind and activate in no time, so all the time exposed of sex objects made lowering their sex desire and idea of covering with fig leaf came for making curious and this exercise was an attempt treated as modernity. That modernity thought of covering of body later helped in proving real

dynamo for progress of the society but invited uncalled matter of exploiting human body in very cruel manner.

Discovery and management of fire was taking central space in primitive human life because of two main reasons. One fire was use for light and it helped in conquering fear of dark night by designing torch or lamp and another was heat for designing for peaceful purpose for cooking or for scaring or destroying others by designing weapons. Beauty was that they designed fire application in such a way it should have enough capability to destroy the desired objects but not to harm the user. The design of torch was with one end with burning fire and other end at that distance for holding not to harm the holder. That meeting the specific objective with complete safety not to harm the user added new dimension in thought of modernity. Avoiding of accidents of fire that may harm the user was real step toward modernity. Natural light was life and sense of confidence where dark was synonymous with fear and fire gave a tool to dispel dark. He was no more fearful with fire but could fear others with it. They realized that tinder catches fire quickly but sustaining fire was slow where other side thick log catches slow but sustainability of fire was high. How come idea of design of wick by rolling with palm of cotton took shape is still mystery but and who has guided that vegetable oil has burning nature could be extracted from tiny mustard seeds? Is it first use animal fat for oil? The ultimate design of earthen lamp of burning oil by using wick for light surfaced. Was wick copy of tinder for catching of quick fire and sustainability of log was introduced by dipping one end into oil and other out of oil for burning? This earthen lamp gave new modernity that led to nuclear power. Every time modernity was changing with life style .

My grandmother told me that majority of cooking was with fire and it was roasting with direct or indirect heat or frying or boiling or concept of pasteurizing that were needed fire . To keep the fire available round the clock they used to hide the burning coal or log under ash for simmering and whenever fire was needed they take out burning coal by uncovering ashes. In case it did not have proper strength of reigniting fire they used to borrow from the neighbours or in case neighbours fire was in same condition they used to visit near religious place where sage kept the fire burning round the clock and everybody was free to borrow from that place. Their life activities were around availability of fire and management was really difficult. Design of match sticks was miniature of primitive design of torch brought new freedom and no more occupied in keeping fire not to die added new dimension in modernity. It has brought great revolution in the mind set of our time people by no more dependent on others but free, independent and ignites fire with wish. I really appreciate the design of safety match sticks where they divide main components in two areas, one with sticks head and other at outer surface of match box and fire spark will come after striking the sticks head on outer surface. That was small idea but added new dimension in safety concept. That was real attempt in modernity and later proved major reason in attempt of moving for nuclear family. I feel any attempt that makes humans free and less dependent on system is real modernity. That freedom facilitates in experimenting new thoughts for making life better and with ease of meeting real objective of modernity.

Ancient people found hunting of food was uncertain so attempt of making it more certain by devising tactics of lowering failure for killing the animals without allowing to escape was an act of modernity .They initially relied on physical strength then used

external devices for location of hiding animals with disturbing by physical objects like sticks for keeping themselves out of reach of attack at safe distance or for killing by striking or creating sound for confusion or trapping by fall into pit or some other means was an attempt of survival along with modernity. They did their best to make it uncertain of hunting to certainty but at one point it proved stagnant and shifting from looking for more reliable and certain path of acquiring foods was designed by agriculture that was a new concept that established man different from primitive humans and a new chapter of modernity was added.

Contribution of peaceful progress of human was really initiated by woman but her weak physical strength compared to man made the psychological corrupt person and she could not get her due recognition. Earlier single source of the foods was on killing of animals that was possible with the combination of physical strength and elements of cruelty. Where design of agriculture foundation was laid on move along with nature with compatibility was major shift that laid the actual foundation of modernity. Every time central idea was action of violence of killing for food could not be abandon that was with complete negative energy of hatred by eliminating other for own survival could not be replaced in absence of better peaceful livings not to kill . Real contribution of modernity came by woman as man lost hope of achieving by sheer physical strength and accumulated layers of negative energy made helpless as failed in hunting. Man realized that power has not taken to that level where he could feel better in hunting. A new era was beginning where physical strength was no more central theme but it slipped to associate category and that emancipated the woman in group. Gradually society turned to low violence and less on physical strength and woman were gaining moment of assets as this arrangement was suiting with her basic

characters. Woman gaining position has created new norms of violence and protection of her gaining momentum generated new modernity associated with her .

Concept of peaceful living with protecting but avoiding thought of harming others took the humans to different height of modernity. The moment thought to protect the agriculture fields by fencing that expressed their thinking of avoid harming others but not at the cost of their safety. That concept of boundary for protection by products was foundation of ownership. It was obvious in nature for identification of ownership so a support system started developing by mentioning landmarks and what we called address in modern time. Establishing the items with identity was nothing but noun of grammar in establishing the development of concept of address. Idea of address changed the face of humanity and modernity. Once accumulation of nouns led to define its purpose of function that turned out to be verbs and who was performing defined the genders. Address further revolutionized the mind by designing the basis of language. Language endorsed the right of ownership and it turned to communication channel where ancient people were not only relying on body language but designed the verbal communication. Earlier in absence of language was body language of expressing their wishes. Animals still live to that level of body language and even chirping of birds communicate to others that I am owner of this territory for gathering foods and man moved beyond that. Violence surfaced when ownership was challenged otherwise peace was prevailing most of the time.

Those animals living in herd always protect the pregnant female animals or young child by surrounding and ready to sacrifice old for sake of progression of better genes. That idea made the humans to protect the female at any cost and support her made the society evolved in different manner. The major shift from

hunting to agriculture natural inbuilt character was unlike in fighting for meat of hunted animals was relax and believed in philosophy of let live and other lives gave enough time and by products of it was gossiping that moment his communication channel grew and helped in understanding the sensitivity of others added new thought of no more cruel for survival rather thought of inventing ways for peaceful livings and domestication of animals was next level of modernity .I do not know how they tamed the wild animals to such levels that their genes governed to live under the humans. Horse, buffalos or cows or elephants or fox that later turned to dog has more physical strength but refused to attack humans. A new form of cruelty surfaced in modern time it took the shape of human slave. I called misguided modernity that led to human slave practise. Possessing of humans or animals ruined the mind as well proved brake for modernity. A free will was contributing more compared to slave mentality. That idea helped in abolishing the slave practise .Their attempt of proving superiority by colour of the skin or race ruined the designing of evolving better society and that practise is still prevailing in the mind of modern person. If you scratch the skin of present man of any part of the world will witness the same character of proving superiority is still prevailing by claiming one or another factors. Humans are born lethargy and optimize the performance by spending minimum energy that was the dynamo of the progress. That search of optimization demanded movement that was against lethargy but step of looking for ease comfort and better avenues was in fact complying with lethargy and move out of it called progressive mind. Other side those stayed back in lethargy in static manner wherever we were we will progress and those were also progressive in given circumstances. Both were striving for better lives but means were different. No one was sure whose

contribution was more who were adventurous or laid back in same conditions. Concept of agriculture was supporting static and hunting was for dynamism. Each group created their own modernity.

Our ancestors took certain decision that proved beneficial in certain circumstances and that same decision created more danger in future or even wiped out another ideas. I do not know it was trial and error or series of accidents that have shaped our minds. No one for sure can say that it was our internal capability or external forces like scarcity or natural calamities were harsh that forced for looking for safer place or out of simple curiosity did experiment that end up creating something from the resultant combination. I believe it is in human in built nature of shame, guilt, anger apart from positive energy that channelized the negative energy given us new dimension and responsible for human progress for modernity. It surfaced as people preferred staying in same place and it was obvious of meeting of same people was responsible for such emotions. In fact these emotions were first step of laying the foundation of society that was not anywhere in the mind of primitive people but these forces were gradually dragging in that direction. A new form of modernity was germinating and new evil forces were emerging. Why did some commit suicide in failure in personal or anticipated gain and it was so strong that motivates to make non existence? Is suicide ancient practise result out of negative energy and it is passing from one generation to another? Is it because of humiliation or result of failure drive some mysterious force within us was guiding for mutation of genes of choice of specific genes of another humans?

Common people modernity is different from specific class and designing of comb was an attempt of modernity but designing fire

crackers was initially for exhibiting the mastery in art of controlling fire as wished and gradually it turned out for entertainment and it was not required but someone floated this concept that later proved biggest harm for civilization by designing warheads with nuclear .Common people realized of benefits of washing the vegetables and cutting with knives. Cutting of vegetables was necessity helped in increasing the surface areas for even heat as well fast cooking added new dimension. But idea of washing vegetables to clean from unwanted elements that was harmful to digestive system was real modernity. Frying in oil has not given modernity but took us to next level of cooking for better food management. Journey of direct cooking to indirect heating cooking has revolutionized the food management but man was not considered in direction of modernity. Preservation of food for better shelf lives was an attempt of modernity and somewhere types of cooking was not designed for progress of modernity but for safety, protection of food from spoil for better survival but later on proved different techniques has enhanced the food shelf life . How come idea of domestication of animals for use in transportation struck in the minds of ancient people and designed the method in such a way that led concept of jet level transportation in our times. Every period was at one time modern and the problem this presents, if there is one, was never wholly absent. That character has helped in progress in search of solutions. Biggest challenge surfaced after framing of questions and failing in finding the proper solutions in their lifetime. They thought question should not die and it should pass to next generation in hope they might solve in future .That thinking took the modernity to a new platform of caring with values for others and devised techniques for keeping question burning by paintings, performing arts , folk tales and folk music.

The real modernity surfaced with the design of bicycle that was self sustaining and need the physical strength by peddling by user with interface based on common intelligence. Earlier transport was needed some external animal power for movement .Majority of people were benefited with design of transport of bicycle where man's external force was required for movement and no need to maintain as we do in animals but completely relied on health of an individual user. Power is the most important constituent of modernity. Earlier man could not afford to maintain horse or other animals for cart but bicycle was with less maintenance and now visiting long distance was not possible with earlier transport means. Introduction of ladies bicycle has revolutionised the society and taken to next level of modernity. The moment attempt to accommodate all by designing such products that were preventing others from use because of bad design in fact was real modernity. The moment side stands for cycle was designed and replaced the traditional stand where pulling the cycle for carrying the weight on stand to rest on side by tilting. I consider ladies bicycle was the beginning of new era where considered the woman anatomy while designing. Man do not feel awkward by stretching leg upward for sitting on seat for peddling but same was not expected from woman and removal of horizontal bar from the frame without compromising with strength of bicycle for easy movement of leg for setting on seat with no need to stretch as man was marvellous design. That simple design has given the opportunity to woman go out of the house .Later design of road added further in better transportation. Track is natural where ever humans tread and it is nothing to do for survival as well for modernity. Looking at road or highways or flyovers is nothing but extension of tracks and it is not modernity but helping the transportation. Road discipline made our action well organized

and added new dimension of modernity in our thought process. The moment follows the left hand rule or right hand rule for road discipline that simple idea has given us new progressive thought of modernity.

The last evolution in human was crawling to standing and separation of thumb from fingers changed the face of modernity that was not witnessed in past. That has buried various prevailing modernity with new change circumstances and that chapter lost somewhere in oblivion and added new pages in new book of modernity. Cutting of nail was an attempt of modernity but painting of it was not modernity. Cleaning of teeth by miswak sticks or our time with tooth paste and brush was modernity. Hair cut was an attempt of lowering the unnecessary wastage of time for management of long hairs and it was shift from tying of hair that was earlier considered modernity to next level of progression in modernity. A coastal person faces strong wind all the times so prefer long hairs with tying rather cutting of hairs. Small hairs with strong winds give headache because of constant movements of hairs. Combing was not modernity it was necessity but tying in different styles or cutting of hairs was modernity for enhancing aesthetic sense. Design of knot is necessity but designing of ladder out of knot is modernity of scaling high. Torturous walking on rough terrain was experienced by all and avoiding and protecting from harmful effects was not modernity rather it was necessity but to design the shoes was in different style for comfort and ease without compromising with real objects of protection from bad effects of terrain was an attempt of modernity. Design of pant shirt or salwar kameez or any dress for covering the body was not modernity but it was for lowering manmade social embarrassment but design of underwear or bra to hold the specific body parts not to disturbed or hinder the

prospects of work was modernity. It might be required to cover the body for meeting challenge of vagaries of weather as we witness in cold or hot climate or coastal or mountaineering or plain and it might be modernity . In my opinion design of house or attempt of living in caves was for survival and it was not for modernity as we witnessed in igloo for protection from cold or design of hut from scorching heat or rain. It has given the concept of safety and more freedom from weather conditions.

Why did our ancestors focus in achieving their goal with perfection? As and when they performed wrongly and correction was required they devised techniques of glue, nails, knots and threads , stitching by designing needle with threads that was unimaginable by any living beings and many more to take back of earlier original shape or desired shape added absolutely new modernity. They also designed the tools for achieving their objectives for shaping the items according to their need. Joining and cutting laid the foundation of design of modern surgery and it not only helped in modernity but cured from many illnesses. This idea of cutting and joining gave us design of wheel and proved biggest tools of our movements and helped in expanding our boundary of observation for learning. Can we imagine modern world without wheel? Wheel is integral part of our life .Conversation of rotation to linear as we witness in movement of screw and linear to rotation as in cart, automobiles was next level of modernity and it established that mental strength has power and man thought of understanding the accidents to systematic thinking for meeting objectives was ultimate step in progress of modernity.

The individual does not go by the dictates of societal traditions. Design of arrow from the branch of tree was attempt for modernity and in metal age design of axe was an attempt for

modernity not for survival. Marvellous design of catapult was real modernity where they learnt the art of throwing stones toward objects in organized manner with precision. Design of earthen pitcher for storing potable water was for modernity but design of knives was initially for survival weapon and later for making work easy for cutting to meet the design objective was modernity. Use of sticks for killing and safety was for survival and it was not for modernity. Using number of sticks for load bearing as pole was in direction of modernity as we saw in building roof erection on number of arranged poles. Similarly use of sticks for locating of animals by their movement was modernity but killing with the same sticks was not modernity. Running in defence or for attacking the enemy was survival natural instinct and race or wrestling or boxing cannot be modernity.

Humans are evolved biologically in similar manner everywhere and have certain traits like laughing or crying or feeling hunger or pressure of easing exist in everyone. These universal behaviour can be understand but how come designed products by human are spread in the world in absence of communication channels like we enjoy in our time. Idea of agriculture or cooking or design of broom etc observed carefully found that it has evolved in almost same era with same techniques in different parts of the world that was no way connected with no means. They plough; use the seed, watering along with manure for growth and segregation of fruits look like copy of one another has more similarity and came to human lives almost in same time. Why do idea of covering of body by designing clothes or combing after the design of comb that is more a less similar in the design strike to human minds and solution was exactly similar. How can it be possible that people think alike for solution of problem living in isolation and in absence of communication channel? It means thinking process is

almost similar in everyone. I have noticed in best actors of any country act in almost similar fashion and it appears one actor is copying another or imitating one another rather fact is they have never met or seen their acting skills or not even heard their names. It means modernity is universal traits and search of solution has almost similar pattern and only difference is some area may strike the solution early and others will achieve later with here and there slight differences. In my opinion that higher level of conscious minds act and think similarly so solutions of similar nature of problem look alike.

Modernity was changing its face so new problems were emerging .Earlier modernity was helping survival in some occasion, then design of agriculture changed the face of it from cruelty to taking a new path for living with peace where cruelty slipped to hibernation but it never faded from the mind and surfaced as and when something did not suit their objectives till today . Majority were thinking what we had and what it should be like. That thought of corrective for improving according to what they felt should like, that concept took to next level of modernity. Ancient people were struggling for their survival by imitating the nature for their own benefits but thought of improvement added new dimension to modernity. It was clearly reflective in action of painting of their body or in modern times make up for corrections of defects of features or decorating with flowers or leaves and later on thought to design the garden or parks not like jungles in nature. This was the era where modernity was moving along with nature with corrective measures. Worst is yet to come when modern people used the exploitation of nature for their gains and did exploration of oil, extracted the coal and designed the dam and even devised techniques of threatening the civilization by designing nuclear bombs. At present modernity is at sea saw and

hanging on edge of time and passing from most crucial time it may collapse any moment and entire civilization will be wiped out from the earth.

Concept of ownership took us another level of modernity. No one was self sufficient for satisfying their needs so idea of sharing surfaced that was entirely different to what was at the time of hunting where powerful was first satisfying hunger with hunted animals and left over was eaten by others . It was not sharing but living with mercy of powerful for food of killed animal but new concept associated with ownership for share voluntarily was making its presence. Agriculture helped in living peacefully in community and sharing was possible with tool of exchange for surrendering right of ownership in favour of others was laid on most convenient tool in given circumstances was barter where mutual voluntarily participation was encouraged but high scope of dissatisfaction was inbuilt so conflict was obvious. In attempt for lowering conflict in group by introducing by concept of precision and it should be error free was thought. That led to designed of measurement for exchange of tangible items. Method of using handful or standard size basket or other designed pot and later it took the form of weight measurement surfaced to make the exchange error free. It was the first step for introduction of standard. Intangible like service was still under the effects of conflicts of dissatisfied exchange and conflicts turned out to be so cruel that result was horrifying outcome of slavery to that extend that one generation after another was working for service for repay. Human mind designed the concept of currency for exchange of items as well for rendering services and it was considered best arrangement for exchange of tangible as well intangible items. With this idea society of error free was designed for modernity but it created new problems for society. Low error

free society gives the new confidence to modernity so to their people for peaceful livings. Till today no better alternative has emerged to replace the aged old concept of currency for supporting peaceful living with low error free. Whatever bad consequences of currency in absence of better option forced us to live with aged old modernity that has blocked the growth for development of modernity. People thought to progress and found technology was only way to bypass the blocked modernity because of currency. Technological modernity was not improving the human material but given push to modernity to come out of stalemate due to currency. That short term of introducing the modernity due to advancement in technologies later on proved disaster for human values. This currency concept biggest advantage was that it was understood by everyone and helped in horizontal growth among masses but vertical growth for improvement was completely missing.

People generally preferred to live low barbaric life with the invention of design of agriculture compared to killing with haunting. Method of living with peace was still struggling and yet to establish where cruelty was condemned by majority. People minds were gradually moving along with peaceful design of agriculture and wished to live in status quo rather disturbance that was effecting but beyond their understanding scared but no solution in sight made them felt helpless .That lack of knowledge was effecting and many more factors contributed but no way to not get out of its influence created Black magic. Foundation of black magic was laid with all mysterious unseen or natural forces that were disturbing but no way to control it. Some people were able to form the questions but in absence of answers thought sublimation to that unseen that was omnipotent and omnipresent and it strikes anywhere in such a manner defeat was inevitable

generated the concept of all mighty power. It was universal experience by everyone so every group created a concept of divine powerful who cannot be defeated and presence is everywhere , a sacred book describing something related to all mighty that has complete knowledge and divine music was the exercise to keep the question burning in hope of solution by future generations . One of the off shoot of black magic established religion by one of the section of group. There was dispute of gender of all mighty so logic of man is physically powerful than female in group established its gender.

Another group were framing the questions with whatever prevailing knowledge for understanding the reason of strike of unknown forces that was disturbing the humans and struggled for solutions made them to open the layers of mystery. That attempt led to unexplored world that was not earlier experienced by in past. Black magic off shoot later turned out to be area of rational thinking and physics, chemistry and many more subjects surfaced. They devised the techniques of brain storming, debates, seminar and conference in search of collective solutions for unsolved mystery .This has created new form of modernity that was never witnessed in human history.

Those who sublimate to unseen forces and who were struggling for finding the reason of it turned to be new ground of conflicts and hamper the growth of modernity. Accusation and blame game was so powerful that no one hesitates in killing other for proving superiority. That conflict was shaking the basic foundation of group laid by our ancestors to live in peace. To avoid the challenge of groups for clashing for proving superiority that has hampered the growth of modernity and to a new effort to make the society error free without conflicts were thought where

dominance of any one was ruled out that gave another form of modernity.

People no more dynamic and prefer to stay in place where they could fulfilled livelihood gave a new concept of modernity .Earlier change of group and no loyalty for anyone but focussed on own survival was main objective but other groups refusal to entertain the new unknown members in group and that too for sharing of foods created a new dimension to be loyal for live in one group. That was the forces generated feelings of acceptance of hierarchy and respect the others who really needed support. Other side it is natural for flaunting the rules in human led for foundation of society .Progression of society created unwritten laws and expected everyone to abide and flaunting created guilt or social embarrassment .Social embarrassment has contributed a lot for different types of modernity and was next level after evolution of man and designing of agriculture. Concept of love hate, loss and gain and accumulation of wealth created a new hierarchy among humans. People were treated according to their status and role of contribution of group for progression. These concepts laid the wrong modernity in group and replaced the earlier aged old wisdom of everyone as an individual contributing for group but sharing of benefits was not linked with status . That wrong precedence of criteria of status took us to old system of haunted time of powerful enjoyed more privilege in group for satisfying hunger first and left over by rest . There was new modernity that has created adverse efforts in progress and everyone internal wish to be powerful where physical strength was diminished and other avenues to prove were open. Introduction of privilege and deprived in society created new form of modernity in humans. In modern days that concepts was so much grounded that it led to

world war not for survival , non heroic and to prove others we belongs to specific superior race or group.

I am thankful to Prof Emilio Ross of Italy for accepting invitation for Guest Editor and made this issue truly international. His passion is real motive and driving force that is missing in most of the people in current generation and execute the project with complete satisfaction is his great asset. I appreciate the Guest Editor who understand the value of job assigned to them. I really enjoyed working with him and learn a lot from him.

LAMBERT Academic Publishing has published book "Design For All, Drivers of Design" author Dr. Sunil Bhatia of Design For All Institute of India and it is available on www.morebooks.de one of the largest online bookstores. Here's the link to it:

<https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1>

This book is dedicated to our esteem readers, contributors and well wishers.

With Regards

Dr. Sunil Bhatia

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June 2019 Vol-14 No-6

Design for all specialist consulting public and private sector how to expand their innovation capacity and add value by deep understanding of people-centered design approach and qualitative research. Trainer on how to use human diversity to create social inclusion and develop sustainable solutions. Experienced coach, passionate opportunity developer and visionary.



Ivelina is the founder of Design for all Bulgaria Foundation, which is part of Design for all Europe. She is also the co-founder of Service Design Network chapter Bulgaria, member of Global Service Design Network. She is currently Research Associate at the Helen Centre of Design at the Royal College of Art in London. Ivelina has a vast experience in delivering training for professionals, business and non-government organisation on how to use design for social good and life improvement. Her projects include research in access to health information, creating a space for social innovation, conducting research for the first tourist wayfinding system in Sofia, Bulgaria, consulting inclusive playground, consulting technology Startup Company developing robotic devices for people with paraplegia and many more.

July 2019 Vol-14 No-7

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and large companies and organizations. Proactive entrepreneur in

new trend media, creating the first Film Animation Festival, first

cyber café, first 100% visual magazine and first ECO friendly shop

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Design Studios Coordinator, Member of the Research in Design

Committee at Universidad Finis Terrae, Design School. O yeah! Did

I say I'm doing a PhD in Design in Buenos Aires at the same time?



August 2019 Vol-14 No-8

Mugendi K. M'Rithaa ,Transdisciplinary Industrial Designer/Educator/Researcher with a passion for Afrika, Design and Innovation.



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Sunil Bhatia

Design for All

Drivers of Design

Expression of gratitude to unknown, unsung, unacknowledged, unmentioned and selfless millions of heroes who have contributed immensely in making our society worth living. Their design of comb, kite, fireworks, glass, mirror even thread concept have revolutionized the thought process of human minds and prepared blueprint of future. Modern people may take for granted but its beyond imagination the hardships and how these innovative ideas could strike their minds. Discovery of fire was possible because of its presence in nature but management of fire through man made designs was a significant attempt of thinking beyond survival and not

doubt this contributed in establishing our supremacy over other living beings. Somewhere in journey of progress we lost the legacy of ancestors in shaping minds of future generations and completely ignored their philosophy and established a society that was beyond their imagination. I picked up such drivers that have contributed in our progress and continue guiding but we failed to recognize its role and functions. Even tears, confusion in designing products was marvelous attempt and design of ladder and many more helped in sustainable, inclusive growth.

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From Principles to Practice
Second Edition

Edited by
Sheryl E. Burgstahler
Foreword by Michael K. Young



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This second edition of the classic *Universal Design in Higher Education* is a comprehensive, up-to-the-minute guide for creating fully accessible college and university programs. The second edition has been thoroughly revised and expanded, and it addresses major recent changes in universities and colleges, the law, and technology.

As larger numbers of people with disabilities attend postsecondary educational institutions, there have been increased efforts to make the full array of classes, services, and programs accessible to all students. This revised edition provides both a full survey of those measures and practical guidance for schools as they work to turn the goal of universal accessibility into a reality. As such, it makes an indispensable contribution to the growing body of literature on special education and universal design. This book will be of particular value to university and college administrators, and to special education researchers, teachers, and activists.

SHERYL E. BURGSTAHLER is an affiliate professor in the College of Education at the University of Washington in Seattle, and founder and director of the university's Disabilities, Opportunities, Internetworking, and Technology (DO-IT) and Access Technology Centers.

"Sheryl Burgstahler has assembled a great set of chapters and authors on universal design in higher education. It's a must-have book for all universities, as it covers universal design of instruction, physical spaces, student services, technology, and provides examples of best practices."

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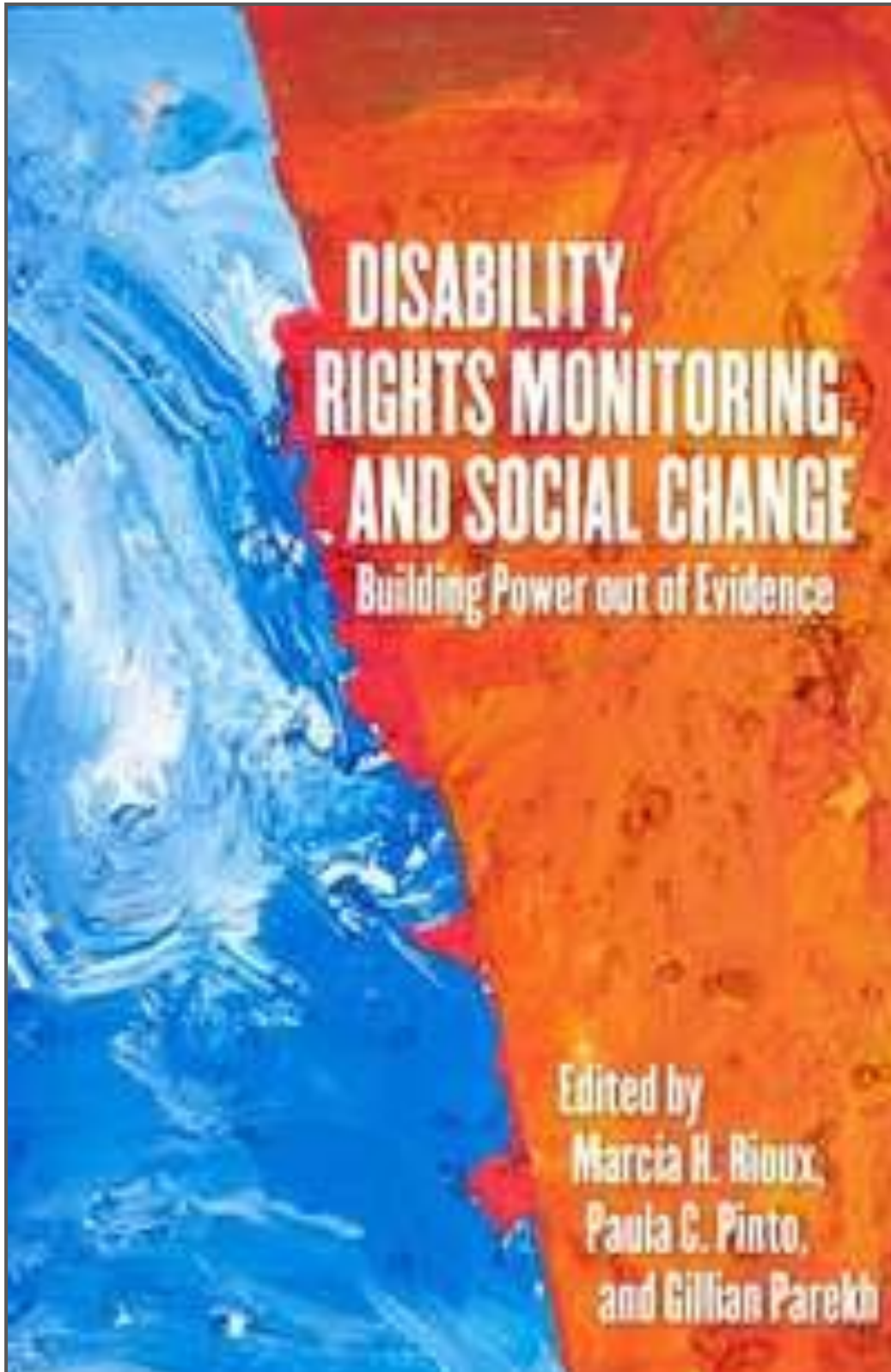
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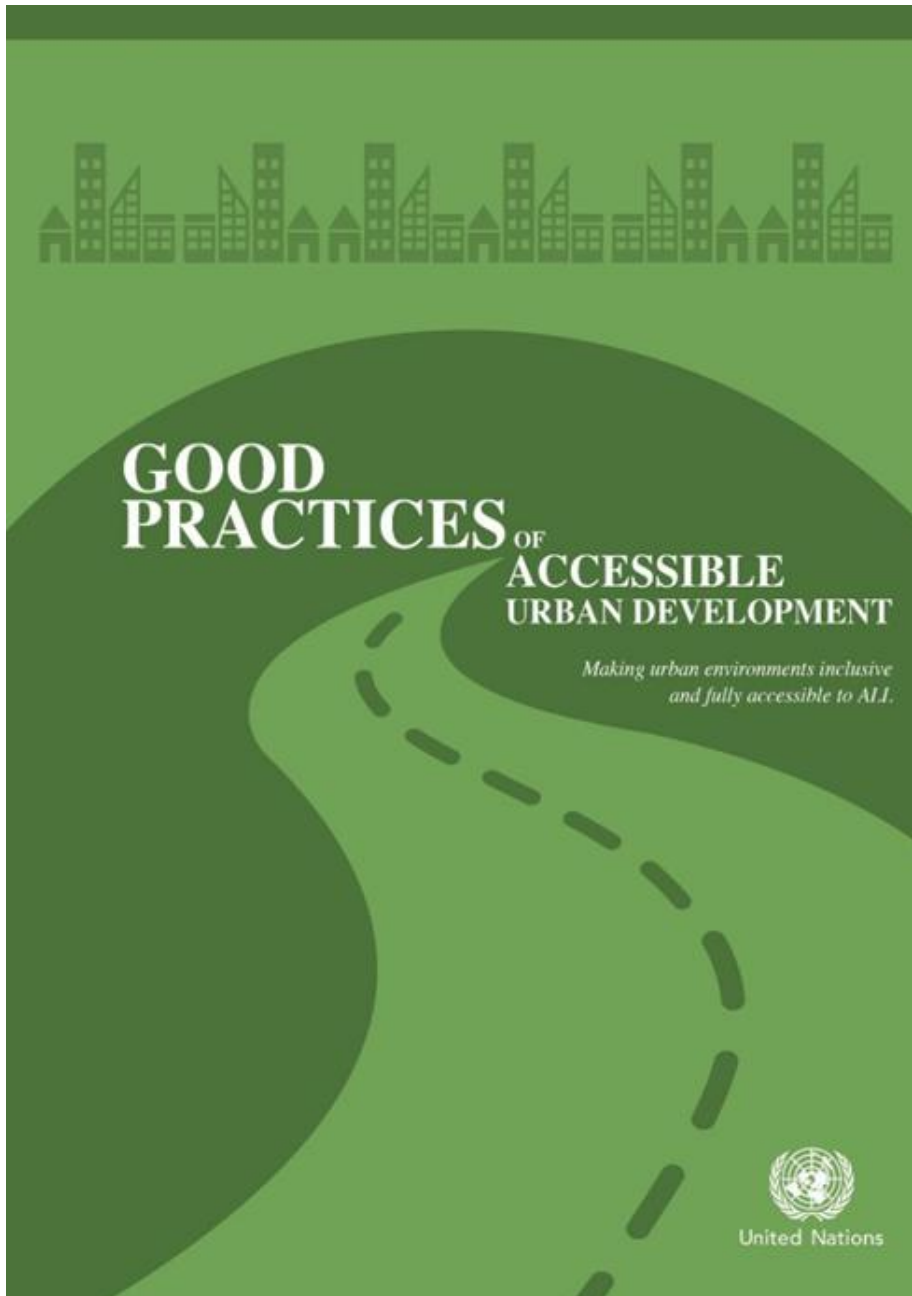
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How Leading Global Companies Improve their
Bottom Line by Employing Persons with Disabilities



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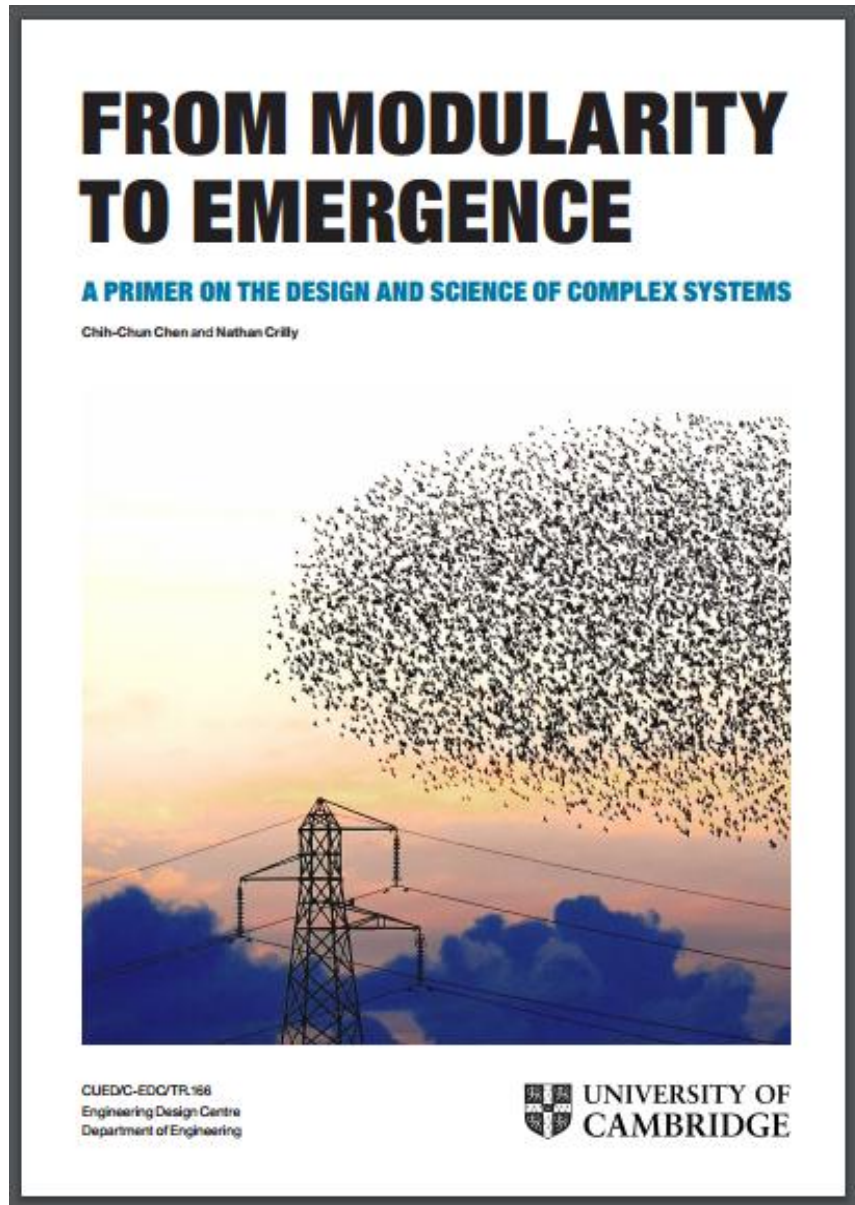
In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible urban development".

The publication provides case studies of innovative practices and policies in housing and built environments, as well as transportation, public spaces and public services, including information and communication technology (ICT) based services.

The publication concludes with strategies and innovations for promoting accessible urban development.

The advance unedited text is available

at: http://www.un.org/disabilities/documents/desa/good_practices_urban_dev.pdf



Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, *'A Primer on the Design and Science of Complex Systems'*.

This project is funded by the UK Engineering and Physical Sciences Research Council (EP/K008196/1).

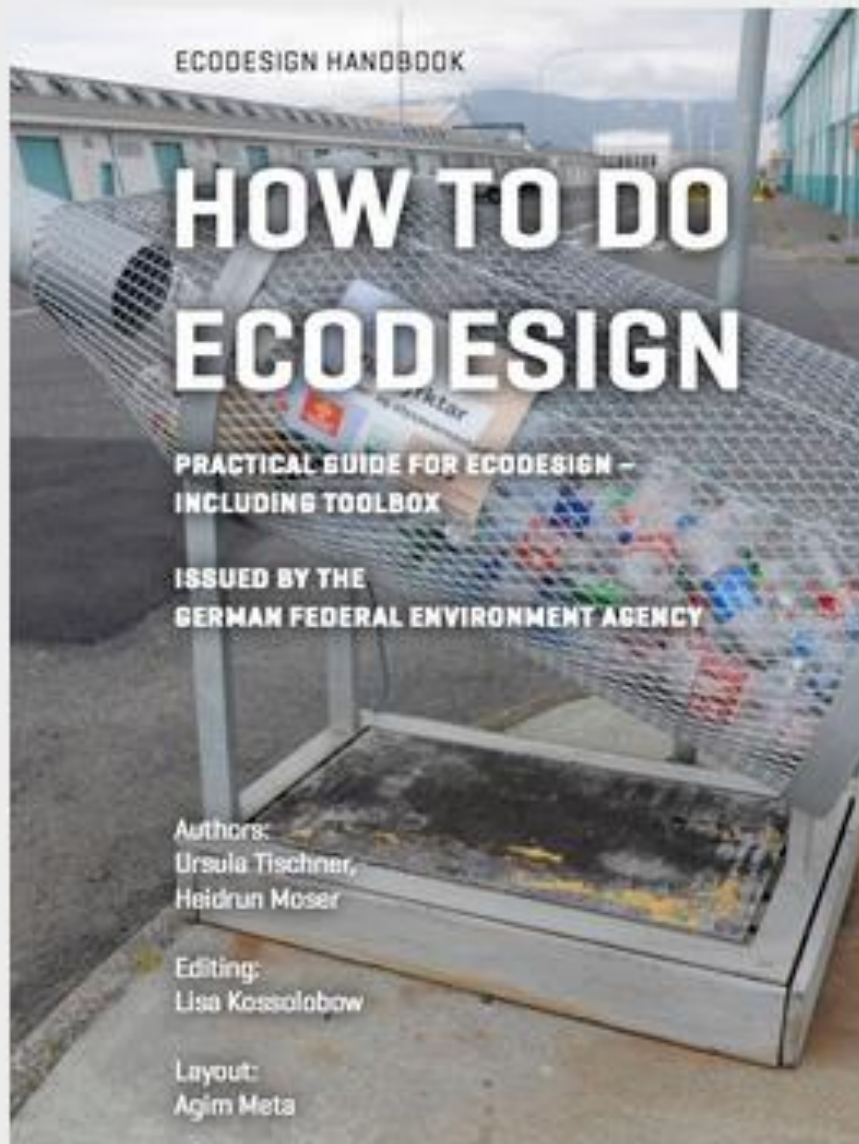
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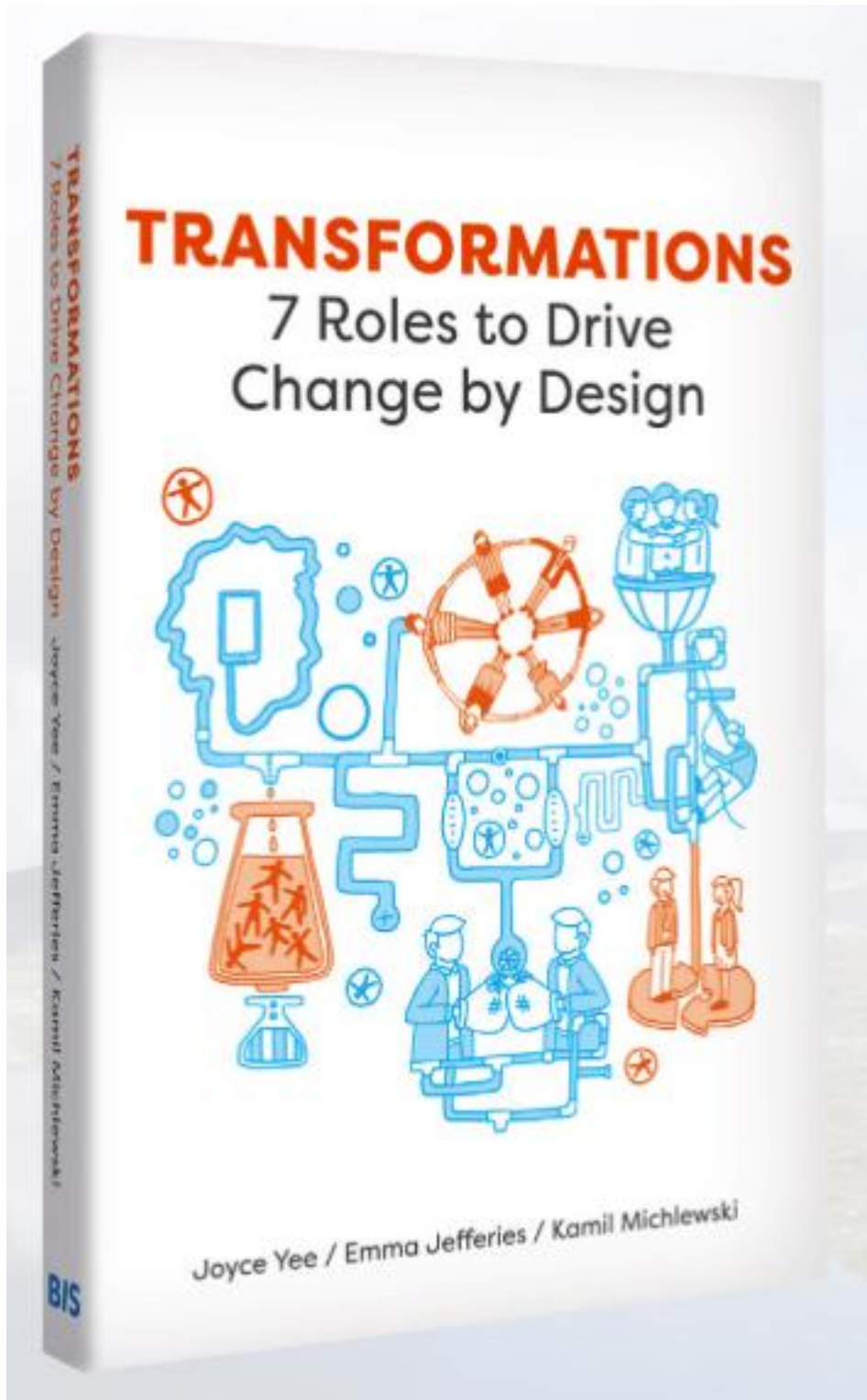


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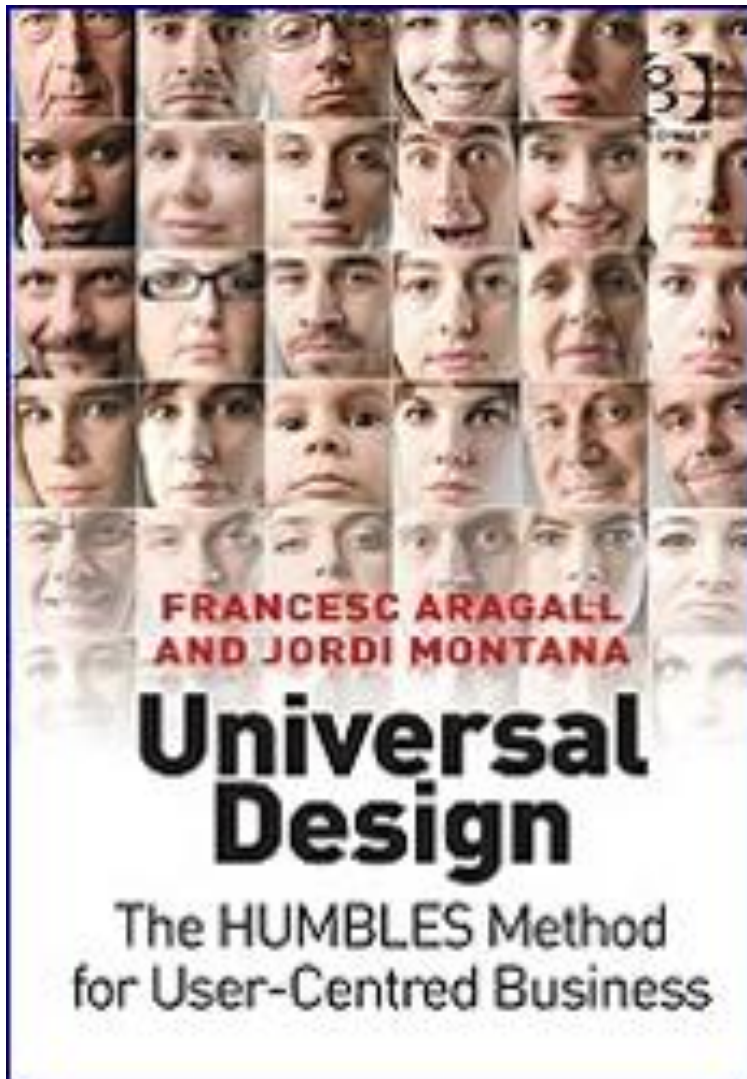
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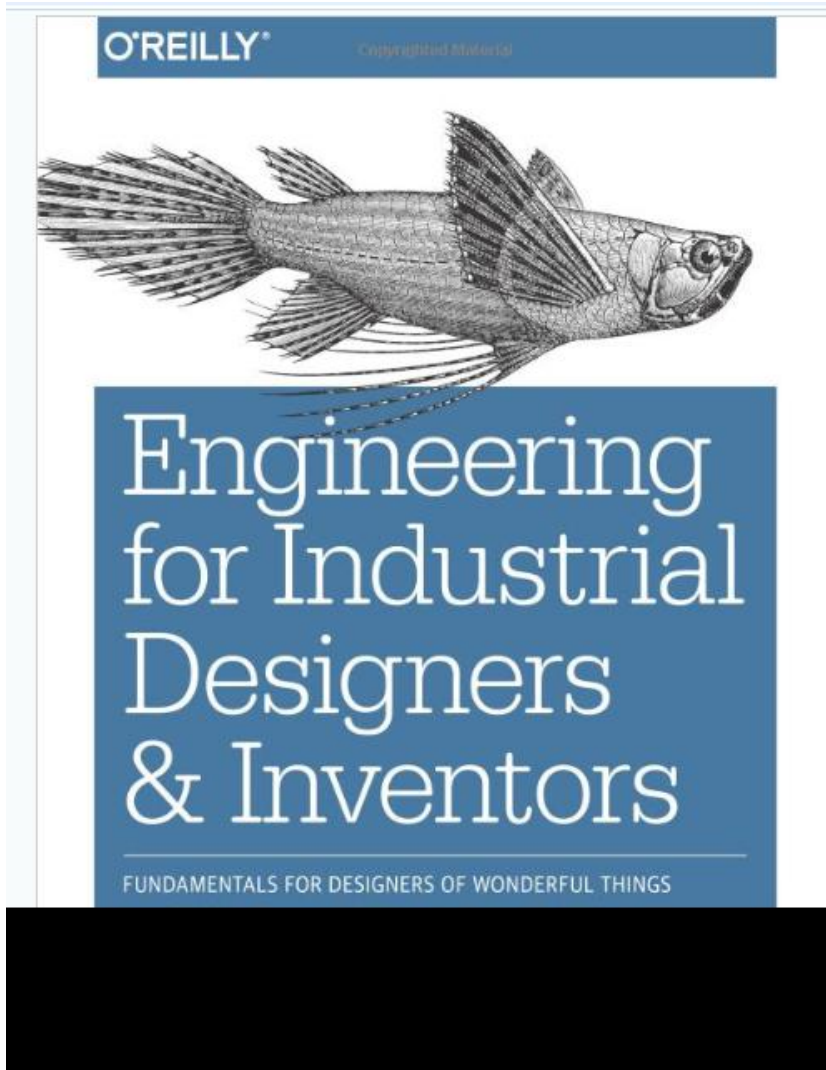




Universal Design: The HUMBLE Method for User-Centred Business



"Universal Design: The HUMBLES Method for User-Centred Business", written by Francesc Aragall and Jordi Montaña and published by Gower, provides an innovative method to support businesses wishing to increase the number of satisfied users and clients and enhance their reputation by adapting their products and services to the diversity of their actual and potential customers, taking into account their needs, wishes and expectations. The HUMBLES method (© Aragall) consists of a progressive, seven-phase approach for implementing Design for All within a business. By incorporating the user's point of view, it enables companies to evaluate their business strategies in order to improve provide an improved, more customer-oriented experience, and thereby gain a competitive advantage in the marketplace. As well as a comprehensive guide to the method, the book provides case studies of multinational business which have successfully incorporated Design for All into their working practices. According to Sandro Rossell, President of FC Barcelona, who in company with other leading business professionals endorsed the publication, it is "required reading for those who wish to understand how universal design is the only way to connect a brand to the widest possible public, increasing client loyalty and enhancing company prestige". To purchase the book, visit either the **Design for All Foundation website**



I have a new book that presents fundamental engineering concepts to industrial designers that might be of interest to you. This is the link:

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Write a paper for CHI 2021

July 18-20, 2019 at IIT Bombay, Mumbai, India

The influx of information technology is rapidly changing societies in Asia. Individuals and communities are adapting to and appropriating these technologies for their own purposes. As a result, there is a greater need for understanding research in these areas. Concomitantly, to support IT research in Asia, there is a need for capacity building and mobilization of researchers who work with humans, computers and their interaction.

ACM SIGCHI (<https://sigchi.org>) is the premier international society for professionals, academics and students who are interested in human-technology and human-computer interaction (HCI). ACM SIGCHI has been organising several conferences and events related to human-computer interaction (HCI). The CHI conference is the premier international conference of Human-Computer Interaction (see the latest edition here: <https://chi2019.acm.org>). In year 2021, the CHI conference will be organised in Asia.

Under this purview, ACM SIGCHI Asian Development Committee would like to increase its engagement with researchers and practitioners from Asia. We are organizing a summer school to support SIGCHI's goal of encouraging researchers from Asia. This summer school will enable Asian researchers to frame their research and take active part in the CHI research community. The venue of the summer school will be in Mumbai and the dates will be July 18-20, 2019.



News

1.

Indian languages were being neglected even in the world of fonts. Not anymore

Dozens of type designers and collectives are concertedlly creating fonts for Indian languages to address a deep disparity.



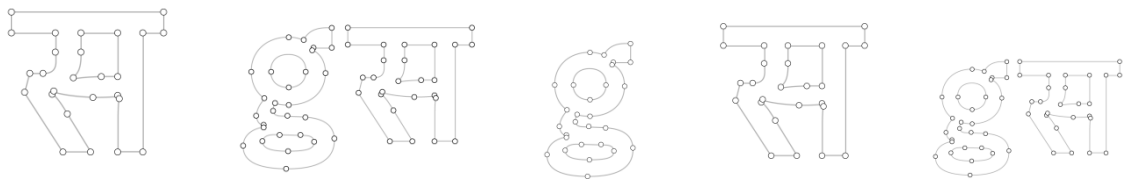
Peter Bilak likes to think of fonts as the voice of the text. They convey emotions and tone, just like voices – and just like voices, there are some fonts that are inherently better at communicating a message.

Bilak knows this universe of fonts, with their adjunct emotions, intimately. In 2009, the [Slovakian typeface designer](#) had co-founded Indian Type Foundry, the first company in the country dedicated to designing and distributing fonts. A decade on, the Ahmadabad-based company has many distinctions to its name: it developed the first-of-its-kind modern Devanagari font (Fedra

Hindi), and spearheaded efforts to create a humanist typeface that supports all Indian languages (Kohinoor) as well as a sans serif font covering 12 Indian languages (Akhand).

Its rise did not happen in a vacuum, though. Over the last decade or so, dozens of type designers and collectives have been concertedly addressing a deep disparity – the dearth of fonts for Indian languages. To them, it's important that in a nation as varied as India, there should be fonts to reflect the linguistic diversity.

"We don't realise [this] but [on everything from] bank forms to film titles, only English was being used because of the lack of suitable fonts in Indic languages," said Shiva Nallaperumal, a partner at November, a Mumbai-based graphic design studio.



Oli Devanagari.

Deep complexities

The origin of type design in Indic languages goes back to the history of print in India. Girish Dalvi, co-founder of Ek Type Collective and professor of design at the Indian Institute of Technology Bombay, says the earliest type foundry was Nirnay Sagar Press. Established in Bombay in the year 1834, the publisher of Sanskrit texts produced "hand lettering in Gujarati and Devanagari".

Innovations like those continued for a century and a half, but the production of modern Indic fonts began in earnest only after the proliferation of computers – and, more specifically, the internet.

A turning point came with the introduction of Unicode. A computing industry standard, Unicode attaches a unique number

to every written character – no matter what language or platform – making it possible for the first time to create a font in an Indian language that could be used and seen across platforms. Of course, fonts could be, and were, developed before, but they were system-specific: if you sent a text in an earlier Indic font, the receiver could see it only if the receiving system supported that type.

Previous



Fedra Sans. Image credit: Indian Type Foundry.



Fedra Sans. Image credit: Indian Type Foundry.



Fedra Hindi. Image credit: Indian Type Foundry/Facebook.

Those pre-Unicode fonts are today called Legacy Fonts. "They were very basic and not conducive to design intervention," said Nallaperumal. "The mastras were a bit off and you had to create 1,000 versions to make Devanagari work. Most software was created with Latin type design in mind and could not support complex Indian languages."

The complexity of writing systems in India still poses a challenge for designers. Every major language has its own structure and aesthetic that rarely translates into another language – a sharp contrast from the Latin script. "The structure of the Latin script is pretty straightforward and linear for the most part, where one letter follows the other, with an occasional diacritical accent mark thrown in," explained Kalapi Gajjar-Bordawekar, type designer and co-founder of the studio Universal Thirst. "But in the case of most Indic scripts, letter shapes transform based on context."

One instance of this is when a maatra is applied to a consonant or when two consonants conjugate to form a compound unit. Such transformations, says Gajjar-Bordawekar, aren't enabled on systems by default and "explicit instructions have to be included in the font files by programming all possible combinations, which is followed by a series of systematic tests on multiple computing environments and platforms to ensure that they function as intended. This process is time-consuming and requires specialised knowledge".

Mukta	Mukta	Mukta Malar	Mukta Vaani	Mukta Mahee
Mukta Malar ExtraLight	मुक्त एक्स्ट्रा लाईट	முத்த மலர் எக்ஸ்ட்ரா லைட்	मुक्त वाणी ऐक्स्ट्रा लाईट	मुक्त मणी ऐक्स्ट्रा लाईट
Mukta Malar Light	मुक्त लाईट	முத்த மலர் டலைட்	मुक्त वाणी लाईट	मुक्त मणी लाईट
Mukta Malar Regular	मुक्त रेग्युलर	முத்த மலர் ரெக்யூலர்	मुक्त वाणी रेग्युलर	मुक्त मणी रेग्युलर
Mukta Malar Medium	मुक्त मीडियम	முத்த மலர் மீடியம்	मुक्त वाणी मीडियम	मुक्त मणी मीडियम
Mukta Malar SemiBold	मुक्त सेमीबोल्ड	முத்த மலர் ஸெமி போல்ட்	मुक्त वाणी सेमी बोल्ड	मुक्त मणी सेमी बोल्ड
Mukta Malar Bold	मुक्त बोल्ड	முத்த மலர் போல்ட்	मुक्त वाणी बोल्ड	मुक्त मणी बोल्ड
Mukta Malar ExtraBold	मुक्त एक्स्ट्रा बोल्ड	முத்த மலர் போல்ட்	मुक्त वाणी ऐक्स्ट्रा बोल्ड	मुक्त मणी ऐक्स्ट्रा बोल्ड

Mukta family of fonts. Image credit: Ek Type Collective/Facebook.

The first known modern Indian fonts that supported two scripts – Mangal for Hindi and Latha for Tamil – were designed by RK Joshi,

who was an academic type designer, calligrapher and professor of type design at the Indian Institute of Technology Bombay. They were released in 2001 by Microsoft to support the Windows 2000 operating system, and were followed by custom fonts developed by the UK-based Tiro Typeworks for Vodafone Hindi.

Around the time Indian Type Foundry released the Devanagari font Fedra Hindi in 2009, Ek Type launched the first open source font family that supported Devanagari, Gujarati, Gurmukhi, Bengali, Tamil and Latin. It was called Mukta. "[It] being open-source ensured everyone could use it free, including students, which made it one of the most popular in the country," said Dalvi. Several independent Indian designers and studios were being commissioned around this time to create open source fonts to populate the Google Fonts library, an initiative that fed back into the trend by creating a resource of base fonts. The result: the development of more popular Indic type families.

Lack of information

Dalvi, who has a PhD in typography from the Indian Institute of Technology Bombay, has written extensively about "the decolonisation of script", and believes that the graphic design industry is burdened with a cultural hegemony in which even a popular script like Devanagari is marginalised. It is something, he says, that is easy to see in Indic language text with scattered English words. "The English word always stands out and is larger than the Indic language text with its two-storied system."

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Oli Devanagari font.

This was something that Satya Rajpurohit, the other co-founder of Indian Type Foundry, took note of when he designed Fedra Hindi to match the existing Latin Fedra. Ever since, his font families include a Latin variant of their own.

Independent Mumbai-based designer Aarya Purohit, who collaborated with Nallaperumal to create the Indic font family Oli, said, "Even in Indic fonts that are not developed in conjunction with existing Latin ones, the Latin metric weighs down on them considerably." In other words, there are several possible problems, such as a reduction in size of the Indic letters to fit the height of the single tier.

"While there are many books, online or offline, about Latin scripts, or even marginal scripts, such as Armenian or Hebrew, there is very little information about the shaping of Indic fonts," said Bilak. For Devanagari, the primary reference book – *Typography of Devanagari* by BS Naik – was published in 1971 and is barely relevant for the digital age. On other languages and scripts, such as Odia or Telugu, says Bilak, there is even less information.



Peter Bilak. Satya Rajpurohit.

"Young designers find the lack of information discouraging, and there are not many places where one can learn how to design functional Indic fonts," Bilak said. "There is also a lack of digital tools made for designing Devanagari [or other Indic] fonts." He is hoping to develop open source tools that will make the process easier.

Gradual improvement

Despite the hindrances and prejudices, there is consensus that in the last decade, there has been great improvement in quality

Indic fonts emerging from the country. To describe it as a boom would be ambitious, but it is undeniable that the pool has widened.

"It was Fedra Hindi that opened up the market in 2009," said Nallaperumal. "Suddenly every font was looking better."

Hitesh Malviya, a Baroda-based independent type designer, who has created fonts such as Kihim (inspired by Nasreen Mohamedi's art), says the technological advancement in design during this period also played a role. More than a decade ago, Indic fonts were primarily being designed by software developers who sold them as supporting products. "The platform they used could not support more than 300 characters and they had to fit all conjuncts within the glyph set. That was one reason we didn't have good quality Indic fonts since all major Indic scripts were not supported in the Unicode system."



Brahmos Devanagari. Image credit: Indian Type Foundry/Facebook.

As more designers waded into typography and more fonts appeared, design trends began getting reflected in them. The shift from generic fonts to design heavy, experimental ones was clear. Meanwhile, Rajpurohit's Indian Type Foundry, which has an illustrious list of clients, including Apple and Star Plus, created the first font marketplace in the country – fontstore.com.

The Indic type industry in India is still largely dependent on custom design projects, in which a brand identity is created using multilingual font systems. "The majority of work comes in the form of custom commissions from technology and media companies looking to expand their presence globally," said Gajjar-

Bordawekar. "These custom projects are usually large in scale with long development periods. They include multiple scripts in multiple weights and styles, often with challenging technological requirements due to continuous technological innovation."

All languages aren't made equal and there is greater demand for Devanagari, followed by widely-spoken ones like Bengali and Tamil. "Nearly 50% of my business in Indic fonts comes from Devanagari," said Rajpurohit. "For every 10 Devanagari licences we sell, we sell two Bangla and one Kannada."



Tulika. Image credit: Indian Type Foundry/Facebook.

While designers credit freely available open source fonts for collaborative possibilities, they are still cautious. "From economic point of view, designers refrain from entering the open type system," said Purohit. "The availability of free fonts keeps designers from being able to demand a fair price, something that isn't good for the industry."

Nevertheless, it is a good time for typography in Indian languages: the possibilities are endless and the Latin type market faces saturation. "There are at least four different cuts of Helvetica [the Latin font]," said Purohit. "In the Indic industry, there is still a lot of room for interpretation and conceptual originality."

Others agree that the globalised economy is driving large players to execute niche campaigns, all of which require well-designed Indic fonts. "The only way is up," said Gajjar-Bordawekar. "With continuous advancements in web-technologies and large software companies investing in emerging markets, the need to deliver a great experience to non-English speaking users will create a greater demand for high-quality, multi-script typefaces."

गूगल, इंटरनेट पर हिन्दी में खोज के साधन आजमाने के अनेक लाभ यहाँ

भावहीनता के झरने निकट सकती

जबकि कल्पना का रूप बदलता है तब तक अदृश्यता ही है। अतीत का स्मरण अतीत के रूप में ही रहता है। अतीत का स्मरण अतीत के रूप में ही रहता है। अतीत का स्मरण अतीत के रूप में ही रहता है।

ऑलीवेटी

ऑगमेंटेड रीलिक्विरीयन विथ ऑलन मकग्रा : कीप ब्रीथिंग इन रॉटर ड्रम

ब्रायन ड पामा

अतीत का स्मरण अतीत के रूप में ही रहता है। अतीत का स्मरण अतीत के रूप में ही रहता है। अतीत का स्मरण अतीत के रूप में ही रहता है।

स्वचीलिंग पिग

Oli Devanagari.

(Source: Scroll.in)



Programme and Events

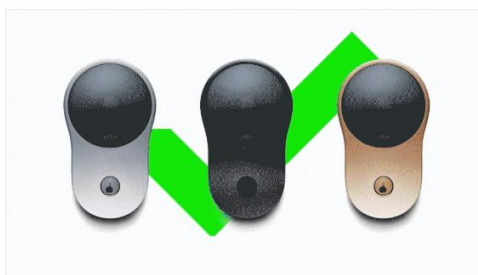
THE ANNUAL INTERNATIONAL BERKELEY UNDERGRADUATE PRIZE FOR ARCHITECTURAL DESIGN EXCELLENCE 2019

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ABOUT THE PRIZE
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Click on photograph for details.



THE SEARCH FOR EXCELLENCE IN DESIGN

Good Design Australia is calling for Australian and international entries to the 2019 Good Design Awards. Through the annual Good Design Awards program, we recognise and celebrate excellence in cutting edge design and breakthrough innovation. Entries close 28 March 2019.
[Find out more about the 2019 Good Design Awards here](#)

ENTER 2019 AWARDS

'Design Research by Under 40 Researchers'



NEW FOR 2019 - THE WOMEN IN DESIGN AWARD!

Good Design Australia is extremely proud to announce the new **Women in Design Award**, that will be presented as part of the 61st annual Good Design Awards.

The inaugural Women in Design Award seeks to recognise and celebrate women who have made significant contributions to the industry and hopes to encourage a more diverse and equal representation within the industry and leadership roles in particular within the design and creative industries.

The Selection Committee for this Award will comprise of Australian and international leaders in the design and creative industries. Confirmed Selection Committee Members include:

Liza Chong, CEO INDEX:Design to Improve Life (Denmark)

Margaret Petty, Executive Director of Innovation and Entrepreneurship UTS (NSW, Aus)

Sarah Weir, CEO Design Council (UK)

Claire Beale, Executive Director of Design Tasmania (TAS, Aus)

Eunjo Maing, Director / Head of D-TEC at Korean Institute of Design Promotion (Korea)

'Design Research by Under 40 Researchers'

Trish Hansen, Founding Principal Urban Mind (SA, Aus)
More to come...



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Global Challenges in Assistive Technology Research, Policy & Practice

August 27-30 2019 Bologna Italy

www.aaate2019.eu

Call for Papers

Basic research & Applied research
Special thematic sessions

Deadline for submission:
28 February 2019

Call for other contributions

Educational sessions
Policy sessions
Product and Prototype presentations
See website for deadlines

Conference topics

- ↓ Assistive technology (AT) for cognitive, sensory and motor disabilities
- ↓ AT service delivery systems, practices, quality and outcomes
- ↓ AT education, training and professional development
- ↓ AT in low- and middle-income countries
- ↓ Emerging and innovative AT
- ↓ Alternative and Augmentative Communication
- ↓ AT and social assistive robotics
- ↓ AAL, smart environments and IoT
- ↓ eAccessibility
- ↓ Universal Design
- ↓ Mobility and seating solutions
- ↓ Ageing and technology
- ↓ AT for rehabilitation
- ↓ AT, virtual and augmented reality
- ↓ AT, digital health and innovation in care
- ↓ AT in education
- ↓ Policy and social aspects related to AT

Don't work in isolation!
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'Design Research by Under 40 Researchers'



International conference on 'Designing for children' with focus on 'Play and Learn'

Saturday 7th to Sunday 8th of December 2019

Venue: VMCC, IIT Bombay



Spring Edition 2019 – Dateline New York



2019 Spark Design Awards Are All Underway

The Spark Awards are welcoming entries now. They include 10 general categories, with 2 student competitions and our brand new award for CleanTech Design. All of these awards have many sub-categories, so be sure to check them out at Spark:



2019 Awards

Student Design (Spring & Winter)
Product Design
Graphic Design
Health, Medical & Universal Design
Spaces & Architecture Design
Digital Design (includes UI, UX, IXO & HCI)
Mobility & Transport Design
Experience & Service Design
CleanTech Design

Note To Students & Educators

The 2019 Spring Student Awards are open and already receiving some cool designs. Standard deadline is coming up May 20th and the Late and Final Deadline is June 12. Join Us and tell your pals!

Advanced Course in Methods for Child Computer Interaction

DESIGNING EXPERIENCES FOR CHILDREN

May 13-14, 2019 | Indian Institute of Technology Guwahati

This two-day course in methods for Child Computer Interaction is a bespoke course that is built on over ten years of experience in delivering such content. The first version of it was a day long course in Zurich in 2003; which was then delivered, with adaptations, in 2004 in Maryland, US and Vienna, Austria and in 2005 in Rome, Italy and Boulder, US. In 2005, a week-long course was developed for the University of Tampere, Finland, that was later delivered in Zaragoza, Spain in 2010 and at the National University of Singapore (NUS) in 2011. Shortened versions of the same course have been delivered in Vancouver, CA in 2011, Austin, US in 2012, Toronto, CA in 2014, Seoul, Korea 2015, San Jose, US 2016, Mumbai, India 2017, Montreal, CA in 2018 and Trondheim, Norway 2018.

Professor Janet Read, who manages and runs the course, has over 15 years of experience in Child Computer Interaction. She is a main author of the 2008 text book 'Evaluating Interactive Products with and for Children, San Francisco: Morgan Kaufmann' and is the Editor-in-Chief of the International Journal of Child Computer Interaction.

EXPECTED TAKEAWAYS

Identify, and consider solutions for, the challenges of designing and evaluating technologies with and for children.

Become familiar with, and understand how best to use, the Fun Toolkit, MemoLine, Drawing Intervention, PETT surveys, and other child-centred evaluation methods.

Evaluate the advantages, disadvantages, and ethical challenges of inviting children to participate in design sessions.

Plan and organise a child-centred design or evaluation study.

RESOURCE PERSONS



JANET READ is a Professor in Child Computer Interaction. Internationally known for her work on designing and evaluating technologies for children as well as for her work on text input with digital ink.



GAVIN SIM is a Reader in HCI who has assisted with the course in Interact 2017. His specialisms in Child Computer Interaction are in the use of heuristics for evaluation and in long term UX evaluation.





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associazione italiana design
della comunicazione visiva

AIAP WOMEN in DESIGN AWARD

AWDA 2019 is open!

Aiap Women in Design Award — 4th Edition

AWDA, Aiap Women in Design Award, is the first global award dedicated to women in design, with the fourth edition of this biennial. Award opens to international women designers with a focus in visual communication design. In keeping with AIAP's extensive design research activities, the Award aims at acknowledging the contribution of women designers past and present.



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Job Opening

1.



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Forthcoming Events and Programs:
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