The visual interface of "comprehensive design"

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design history, visual communication desing, data visualization

The purpose of this article is to gather and analyse the visual appearance and interface of "comprehensive design" within different historic, social and cultural contexts. As elaborated by R. B. Fuller in 1949, the "comprehensive designer" is "an emerging synthesis of artist, inventor, mechanic, objective economist and evolutionary strategist", who is to synthesize the knowledge produced by various fields of science and tries to bring balance to the world. The notion of comprehensive design can be seen as a way of designing in regards to and across both small and large scale design activities that perceive the world as an interconnected system. As to answer how this notion was visualized, the article will analyse the interfaces of "comprehensive design" including May's New Frankfurt, Fuller's "World Game", Bonsiepe's Cybersyn project and Archigram's projects which seem to have high relevance in the contemporary efforts in designing a new type of sustainable city.

1 Introduction

Ever since Richard Buckminster Fuller conceived the concept of "comprehensive designer", there was a debate regarding the needs and possibilities of design intervention within the social and natural context, be it design of products, product systems or communication interfaces. This debate was and still is pointing towards the sustainable scenarios of human living within the environment, precisely as Fuller described.

The issue of visual communication, however, rarely was a part of this debate, in spite of the fact that information process is of vital importance for any type of approach to comprehensive design which tends to see problems to solve within the broader scope of physical, social and cultural scales. As throughout the sixties he was developing the concept of the "World Game", sometimes referred to as the "Logistics Game" (Krause & Lichtenstein, 1999, pp. 468-481) even Fuller was well aware of this, perhaps because of the overwhelming development of information technology. In this concept the essential idea was that in order to harmonize human impact to natural environment an extensive interdisciplinary information platform is needed as to make actors/citizens more aware of the global impact of singular acts.

Looking from contemporary perspective of global communication networks there is an interesting point of view

opening as to understand better what was the role of communication and information design within the concepts which promoted comprehensive approach even before Fuller's and after it? Following the idea of the "knowing consumer" (Whiteley, 2002, p. 97) which was coined throughout the years following the initial efforts by The Independent Group in Great Britain, is it not the very communication process which was in the centre of comprehensive design activities with the aim to explain and promote ways of consumption different than those established within the frame of mass-scale economy? It seems of interest to look upon the seminal design ideas of comprehensive type and bring to light their communication and information design aspects. This will presumably give more in-depth insights onto the possibilities to bring about the change in real social conditions, as seen by some of the most serious comprehensive design concept makers.

In order to analyse these visual interfaces, which are understood as representations and conveyors of information on both print and digital media, we turn to different means of these representations that are related to the idea of comprehensive design like posters, brochures, signage, digital visualizations and installations.

2 Comprehensive design in the Early Modern

2.1 The Deutscher Werkbund and the Weissenhof estate

As R. B. Fuller noted in his text published in 1949, the comprehensive designer is a "synthesis of artist, inventor, mechanic, objective economist and evolutionary strategist" (Fuller, 2001, p. 243), who is to approach the challenges of the modern world in an interdisciplinary way, tackling the issues at hand simultaneously in a broader, more comprehensive and holistic way. This kind of approach can be recognized within the activities of the German organization of artists, applied artists, architects, critics, industrialists and entrepreneurs – The *Deutscher Werkbund* – founded in München in 1907, with the aim of restoring the nation's culture and economy by connecting the arts and the industry (Campbell, 2015). In contemporary terms, one could say that the activities of the *Werkbund* were aimed at a kind of social, cultural and economic sustainability that was manifested in the ideas of standardization, rationalization and efficiency. To that end the *Werkbund* organized exhibitions, with the most important ones being the Köln exhibition in 1914, and the Weissenhof exhibition in 1927 called "The Dwelling". The latter, overseen by architect Ludwig Mies van der Rohe, included the building of an entirely new housing estate, near the city of Stuttgart, that would satisfy the needs of the "modern man", and the "modern way of living", in the period following the

destruction of both material and immaterial culture in World War I. The exhibition comprised of a new housing estate with single family houses, apartment buildings, and row houses, built with new materials and technologies following the concepts of standardization and rationalization, fully furnished interiors and equipped with household appliances (Pommer & Otto, 1991). It showed the beginning of a new style and approach to architecture, building and housing, and was to become the forerunner of the International Style and the Modern Movement, which advocated the use of new materials (concrete, steel and glass) over traditional ones, the use of new technologies in building – mass produced houses, flat and clear (clean) surfaces devoid of all ornaments (along the line of standardization and rationalization).

As to see in what way these notions of "modern living" were communicated, one can turn to the poster of the exhibition made by the German abstract painter Willi Baumeister, who was in charge of all the printed materials for the exhibition, including the exhibition stand signage (Pedde, 2014). It shows the "traditional" home cluttered with ornamented furniture and ornamented interiors, crossed out in red with the question – "How should we live?" in script type – undoubtedly and clearly indicating the break with tradition and the past. The lower part of the poster gives a hint as to where to find the answer – "The Dwelling. The Werkbund exhibition" written in capital sans-serif red typeface. The poster, as well as other printed materials, such as labels (stamps), envelopes, postcards and brochures, have the features of the New Typography movement – where the "modern" was visualized in terms of sans-serif typeface, abundant use of whitespace, asymmetrical layout, and the use and application of new media - the photograph, which in turn correlates with the new architectural style (or architectural formalism, as criticized by some authors) of the early modern.

2.2 The New Frankfurt project and Ernst May

Another account of the comprehensive approach can be recognized in the New Frankfurt project led by Ernst May, German planner and architect, who was a strong advocate of efficiency, standardization and rationalization in building. As such, he was also present at the Weissenhof exhibition in the experimental/technical section, where he demonstrated the new technology of prefabrication applied to architecture (Pommer & Otto, 1991). The New Frankfurt project was also a social housing project developed from 1925 to 1930, a construction of a city with fourteen new settlements and fifteen thousand (!) housing units, fully equipped with furniture (Heynen, 1999; Benton, 2008; Henderson, 2013), like the ones in Weissenhof, with the edition of the standardized kitchen – the famous Frankfurt kitchen. It was set to reconcile the massive need for affordable

accommodation in the aftermath of World War I. It was, as Henderson stated, "a utopian ideal embodied in the word 'new'", that was a key concept of the German democracy (Henderson, 2013, p. xix).

The "visual interface" of the project included the design of a new signage system for the city, based on Paul Renner's and Ferdinand Kramer's sans-serif typeface, also related to the New Typography movement – *Futura* – issued by the Bauer Type Foundry in 1927 (Smith, 2005). It was a version of *Futura* designed by Hans Leistikow for mass-production, and named the "City Font", as it was used for all visual communication projects related to the city. This was no coincidence. May formed the Office for Graphic Design headed by Leistikow, through which all the city publications went to get approval for use, according to May's aesthetic scheme (Henderson, 2013, pp. 466, 479).

The New Frankfurt project was accompanied and supported by an array of propaganda material in different media, including film, exhibitions, radio broadcasts, and print. The most important of which was the monthly magazine *Das Neue Frankfurt*[1] (DNF; in 1932 renamed to Das Neue Stadt – "The New City") (Figure 1) devoted to contemporary questions in the "new way of living": namely planning, architecture, housing, transport, modern design (both graphic and product design), art, applied art, film, photography, even sport, and was set to „include every domain that is relevant to the designing of a new unified metropolitan culture" (Heynen, 1999, p. 46). It was to show how the modern man should live and function.

1 *Issues of the Das Neue Frankfurt magazine published from 1926 until 1931 are available in digital form at: https://digi.ub.uni-heidelberg.de/diglit/ neue_frankfurt.*

Figure 1 Das Neue Frankfurt covers (Verlag Englert und Schlosser).

It was founded by Ernst May and issued from 1926 until 1933. In the first two years it was published unregularly (a total of 7 issues were published) with the subtitle: "Monthly questions in urban planning". From 1928 there were 12 issues printed per year, some of which were double issues. The journal changed its subtitle in 1928 to "Monthly magazine for the problems of modern design", in 1929 to "International monthly magazine for the problems of cultural redesign", and finally in 1932, it changed to "The New City – international monthly for architectural planning and urban culture".

The design of the *DNF* (Figure 1) was in great deal created by the Leistikow siblings, Grete and Hans, and the "Weissenhof designer", Willi Baumeister (Henderson, 2013; Pedde, 2014). Until 1931, Hans Leistikow was chief designer, and designed all the typefaces for the *DNF* (Gantner, 1930, p. 202). Grete and Hans designed the cover and typeface for the magazine, using, as in the case of the Weissenhof visual communications, the new typography visual language. Most of the photographs were made by Grete Leistikow. Given the information in the *DNF*, most of the covers and designs from 1928 till 1930 were made by both of the Leistikow siblings, and all 12 issues from 1931 are signed by Baumeister who introduced a slight change to the cover design. The *DNF* was designed using a standardized layout where the designers consistently employed a photograph (or collage and photomontage) in the 2/3 lower area, combined with sans-serif text in capital letters, and the 1/3 upper area was mostly restricted only to the issue number. In some cases, the two areas were connected with the use of the same colour, making the design more unified. The use of "functional" sans-serif fonts, that enhanced legibility, reflected the notion of efficiency in visual communication. It was the counter part of the new "abstract architectural language" that broke with the past "in favour of a democratic and universal ideal" (Henderson, 2013, p. xix).

3 Comprehending the world as a system

3.1 Archigram and techno-optimism

The context surrounding Archigram is set in the post-World War II reconstruction period that was characterized by the Cold War years, the Space Race and a strong belief that modern technology would have a key role in resolving the issues that burdened the post-war generations. It is also the time of new optimism, and the rise of the growing of both consumer and pop culture. And Archigram spoke this language using the iconography of consumer freedom, choice and popular culture in the most literal way.

Archigram[2] was a neo-avant-garde (sometimes referred to as radical) group of British architects who refused and countered the "sterility" of the modern movement, and envisioned new futuristic architectural worlds and concepts. These concepts were mostly built on paper, "not on the ground" (Sadler, 2005). They were published and disseminated in a total of "nine and a half" volumes of the journal *Archigram* issued from 1961 till 1974. One of the signature architectural types of the group were futuristic self-regulated megastructures – adoptable, responsive, movable, flexible, open-ended, expendable ("throwaway architecture"), and mass-produced. During the late 1960s the group drifted more to the immaterial aspects of architecture, seeing and depicting architecture more as information, as cybernetic interface, creating a sort of Ambient Intelligence that is applied in user-driven intelligent environments (Yiannoudes, 2011; Yiannoudes, 2016). Rather than instructing people on the (one) way they should live, Archigram offered, through concepts of changeable, dynamic and interactive environments – a pluralism of ways that could be, using cybernetic systems, tailored by and to the needs of the people by their active involvement. In such a way, architecture would not be planned, but chosen (Sadler, 2005).

Peter Cook's Plug-In City from 1964, with its "meccano-like iconography" (Sadler, 2005, p. 19), depicts the early concepts of the group, which reflected on the early modern and the notion of "machines for living". But in contrast to the early modernist, the Plug-In City evokes the concept of unfinished architecture and cities, and reveals the heart of the machine, its "hardware" – infrastructure – that was conceived as being replaceable, i.e. when outdated or not needed anymore, it could be plugged-out, like parts of a computer. By mid 1960s, soon after the Plug-In project, but in a way referring to it, the group scaled down from megastructures to "kit-of-parts" (like "pods" and "capsules", evoking the fascination with space technology) enhancing the idea of relationship between the interchangeable elements of a non-fixed architecture (Sadler, 2005, p. 98). When speaking in terms of sustainability, what comes to the fore is this idea of abundant, "plenty", unlimited resources, rather than, and in contrast to "scarce" or limited, the former being propagated by the early postulates of consumerism culture of endlessly fulfilling the crave for more.

With the advances of technology, Archigram turned from "hardware" to "software", i.e. to the "connection point between the system and the system user – interface, the most delicate of architectural boundaries" (Sadler, 2005, p. 121), which is clearly depicted in Cook's „Metamorphosis: Sequence of Domestic Change" (1968), that traces this turn from material to immaterial.

3.2 The "World Game" – "How to make the world work"

Seventy years have gone by since Richard Buckminster Fuller published his text "The Comprehensive designer" where he brings to the fore the concept that a designer should be aware of the implications of his actions in a more broader sense. To Fuller, design was more than an artistic approach to the mundane, it was a science, and this idea encouraged him to declare the World Design Science Decade 1965-1975. He changed the concept of efficiency from affordable in terms of monetary and time aspects (cost-efficiency), to the notion of limited natural resources and energy (Fuller, 1969), a few years prior to the Club of Rome's publication "The Limits to Growth" (Meadows, Meadows, & Behrens III, 1972), thus widening the semantics of the concept of efficiency to include ecological sustainability in contemporary terms.

 Along the lines of the systems theory approach, Fuller sees the world as an interconnected, integral whole, whose system is highly affected by even minor changes in linked sub-systems. Fuller's World Game, or the Logistics Game, proposed (but rejected) for the Montreal World's Fair exhibition in 1967, was to visualize this idea of interconnectedness, and "make the consequences of decisions transparent to all", it was an "exploration of more-for-less uses of our resources" (Krausse & Lichtenstein, 1999, pp. 464, 479). As Fuller puts it, he grounded his idea on the confidence that the people had in the reliability of the computer and automated instrumentation (Krausse & Lichtenstein, 1999, pp. 472-473). Although it was never set up for the exhibition as Fuller imagined it to, the "World Game" was presented through World Game workshops and seminars in the USA, Canada and England. The first seminar took place at the New York Studio School of Painting and Sculpture in the summer of 1969 where the students worked on different scenarios that might fulfil the world's population need for electrical energy and food supply (Fuller, 1971).

 As conceptualized for the exhibition, the players of the game, i.e. citizens, students, or exhibition visitors, are invited to contribute to the improvement of the standard of living of all the earth's inhabitants by strategically distributing resources, energy, population, etc. Their decisions would be visualized, "in real time", on the football filed sized Dymaxion World Map which was to be connected to, and supported with data by a large computer, applying and turning "big data" into "a body of knowledge" that can have relevant implications in the "real environment" and for the total world. Information (like world conditions, resources, needs, desires, etc.) was conceived of being visualized by a number of mini-bulbs placed on the surface of the map that would light up in accordance with the states and changes in the data base (inventory), dynamically turning on and off as to reflect the current (re) distribution of resources (Krausse & Lichtenstein, 1999). In this way,

one could visually grasp in one snap-shot, the "big picture" and the effects of this redistribution upon the total environment.

3.3 The Cybersyn Project

3 The project is also described in: Beer, Stafford (1975). Platform for Change, New York: John Wiley & Sons; Beer, Stafford (1995). The Brain of the Firm, New York: John Wiley & Sons.

Like the former projects, *Cybersyn*[3] was a means of achieving social and economic change through the implementation of the newest technology, in a way following Fuller's "Wold Game" conceptions of gathering data on resources and their balanced redistribution. The name *Cybersyn* comes from the terms "cybernetics", the science of communication and control, and "synergy", defined as the interaction of organizations to produce a combined effect greater than the sum of their effect. It was a network of computers that were meant to regulate and advance Allende's attempt to transform the country's economy from capitalist to socialist, and keep track of the nationalized industry. Allende wished to achieve this transformation in a democratic and peaceful way, and tried to involve the workers in the decision-making process (much like in Yugoslavia's self-management), and *Cybersyn*, he believed, would enable him to do this.

The man behind the *Cybersyn* project was Stafford Beer[4], a British cybernetician who came to Chile in 1971, upon the invitation by Chilean engineer and government employee Fernando Flores, to demonstrate this "unprecedented tool for economic management" (Medina, 2006, p. 571; 2011). It was conceived on the Viable System Model and was to transfer economic data, in real-time, from the industry to a central computer, located in the Operations room, a sort of a command centre, that would serve to visualize the data, make it more understandable, and facilitate the decision-making process. The Opsroom was one of the four sub-projects[5] of *Cybersyn* that were curtail for the overall working ability of the project.

5 Other sub-projects: Cybernet, Cyberstride, Checo. (Medina, 2006: 587).

The Opsroom, the "environment for decisions" (Beer, 1995, p. 181), here understood as the interface of the whole *Cybersyn* project, soon became its icon, the one image most connected to *Cybersyn* (Figure 2). It was designed by an interdisciplinary group of experts and students, led by industrial designer and a former professor of the School of Design (*Hochschule für Gestaltung*) in Ulm, Gui Bonsiepe. It was at the Ulm School of Design that Bonsiepe first came to learn about cybernetics. After the School closed down in 1968, Bonsiepe moved to Chile where he taught design at the College of Applied Arts at the University of Chile (that had no formal industrial design program), and the School of Engineering of the Catholic University. His students, from both the industrial and graphic design field, worked on the design of the Opsroom as members of the State Technology Institute's (INTEC) Industrial Design Group (Medina, 2011, p. 111).

Figure 2 Project: Opsroom of the Project CYBERSYN. Industrial Design Group INTEC 1972/1973. Photo: Gui Bonsiepe. With permission of the author.

As the project ended with the death of Allende in a military coup, the Opsroom was built only as a prototype in Santiago in 1972, after the blueprints made by the Industrial Design Groups. It was a polygonal room equipped with screens (Datafeed) upon which projections of the state in the industry, in form of flowcharts, icons, photographs and graphs would be visualized (Beer, 1995, p. 269). A great deal of the designers' preoccupation was focused on ergonomic aspects of the design – from the best viewing angle, use of colour and type size to enhance legibility, to big buttons of the ECO-CONTROL CHAIR. The chairs (and screens) were made out of white fiberglass softened with orange cushions. It was far beyond and detached from any other environment seen in Chile. The rotating ECO-CONTROL CHAIRS were designed to seat government officials (men), who did not have skills as typist (women), so the arm of the chair was designed according to this vision – with big buttons for "big hands" (Medina, 2006, p. 590). In a way it contrasted in terms of modern design and modern society, as the room was made for men, and excluded women – by design.

The extent to which the chairs were designed is illustrated in the design specifications, where it is noted that there should be a hand rest with ashtray, and surface to put tea-cups on the left side, and on the right, an integrated inclined panel with buttons (INTEC, 1972). The user-centred approach to design of the room, on which Beer insisted, is evident in his statement that it "should

not be thought of as a room containing interesting bits of equipment but as a control machine comprising men and artefacts in symbolic relationship" (Medina, 2011, p. 88).

The Cybersyn project was a one of kind, utopian effort to bring economic flourishment, sustainability and social justice (one might see this as questionable given the relationship toward women), by means of technology. With the military coup in 1973, and the inability to understand the project and its potential beneficial results, the room was dismantled and the project abandoned.

4 Conclusion

Traditional relation between architecture, urban planning, product design and visual communication was not rarely challenged throughout the cultural modern movements within the context of industrial modernization. The phrase "from spoon to the city" coined by Ernesto Nathan Rogers points well to the aims of key actors, be it architects, artists or designers, to define more comprehensive method to address the problems of society conditioned by mass scale economy (Rogers, 1946). Communication models to promote this upgraded versions of traditional architectural or design approaches were developed along the path of new thinking on material and symbolic interventions within the industrialized environment, as it was shown through some examples in the article. However, not all of this attempts to broaden the scope of creative process were successful, be it from economic or ideological unsustainability reasons. Stepping out from one and entering to another discipline was often risky and not without a significant challenge from the audience.

Looking from contemporary – technologically based – perspective, the efforts to establish a more comprehensive way to create for the humans meant the insight into the human creation too, as to understand better the real needs, unconditioned by social or commercial point of view. Visual communication and information design have had a very important role within such efforts, which, perhaps, needed an expertise of Otto Neurath type as to be more appealing to wider audience which they targeted. A sort of "visual education" notion or "international helping language" (Neurath 1936, pp. 17-22) might have helped the various "comprehensive design" innovative concepts in reaching the audiences better. The information technology as a contemporary "helping language" is perhaps the coding instrument to obtain the comprehensive goals of today and tomorrow. If so, by all means this new fusion of modernist ideas and computing power to communicate must be created with humanization of technology in mind.

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