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# The HfG Ulm and Sustainable Design: a comparative analysis

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**Abstract:** This article presents a comparative analysis between ideas of the HfG Ulm and the contemporary understanding of Sustainable Design. The Ulmer institution, through an innovative curriculum, an articulated discourse and a significant set of projects, manifested an avant la lettre awareness of social and environmental issues. Through a series of case studies, the research looks at the School's approach to design problems, focusing on the design for transportation and systems. The purpose is to identify whether the concepts of Sustainable Design were present in these earlier developments. Considering the impact of its legacy, we propose the HfG as a predecessor of an understanding of design that, from its conception, is respectful towards the environment, seeks social equality and aims for society's improvement. A broader perspective will enable more accurate work in design projects with a Sustainable perspective: recovering valuable practices from the past to step purposefully into the future.

**Keywords:** sustainable design; hfg ulm; ulm school of design; design for sustainability

## 1. Introduction

The present work is an attempt to bring back ideas and approaches produced in the middle of the 20th Century at the HfG Ulm and contrasting them with contemporary Sustainable Design practices and discourses.

There is a neglected area, in present design discussions, concerning a historical acknowledgement of the HfG contribution to what is nowadays called Sustainable Design. Our work aims to broaden the current knowledge of the influence of the Ulmer institution in this area.

Mobility and transportation are key topics for sustainability. Transportation contributes to economic growth and trade opportunities, as a reliable and safe transport system helps to integrate the economy with the environment. Both people and goods need constant flow in order to operate, and an efficient transport system improves social equity, health,



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the connection between rural and urban communities, the exchange of resources, and more. Transport systems relate to more than vehicles. They involve access to services, environments where vehicles move, different types of vehicles according to different needs, and infrastructure to support all these systems.

In the 1967 Montreal exhibition, the school presented a panel with several vehicles and products related to transportation (Figure 1). To expand those cases, in several courses the students worked on vehicles (truck and bus bodies, utilitarian vehicles, affordable cars), road and traffic framework (lights, signals, gas stations), bus-related services (bus stops, shelters, ticket sales), among others (Figures 2, 3, and 4). Based on the facts mentioned above, and considering the HfG's concern for transport systems and logistics, a few of those projects were selected to be exposed in this article.



Figure 1 Exhibition panels from the Ulm School exhibit at Expo 1967 in Montreal, Canada. Photo: HfG-Archiv Ulm.



Figure 2 Gasoline pumps. Academic year 1964-65. Instructors: Gui Bonsiepe, Peter Raacke. Students: Franco Clivio, Horst Emundts, Peter Hofmeister, Verena Loibl, Thomas Mentzel, Alexander Neumeister, Edith Ross, Werner Zemp.

The following sections present a comparative analysis between information gathered from the *ulm journal* (published by the HfG in the 50s and 60s), the catalogue of the *Ulmer Modelle* exhibition (Hochschule für Gestaltung (Ulm, Germany) et al., 2003), and a contemporary bus shelter project developed and tested under sustainable design parameters, described in the *Routledge Manual for Sustainable Product Design* (Chapman, 2017).

## 2. The HfG Ulm and the design profession

Through the Ulmer texts and in the products developed at the School one can perceive these ideals: the betterment of the human life, consideration towards the user, minimisation of materials, honesty and transparency, innovation, simplicity, and links to the industry with aims to produce cooperation. Designers were presented as coordinators in the development of a product, from its conception to its final delivery to the client, assuming the responsibility of their practices (Hausmann, 2003; Rinker, 2003b). The designer's profile defined at the HfG Ulm was of an agent of positive change, in consonance with the definition provided by Simon years later, saying "everyone designs who devises courses of action aimed at changing existing situations into preferred ones." (Simon, 1996) This professional profile did not previously exist and had no place in the German industry when the school started operating in 1953. Only in the 60s, a handful of Ulm graduates inserted themselves in the industry and created some demand (Jacob, 1988).

Products designed at Ulm tended to present a long-life design; they avoided the addition of non-functional features and ornaments or decorations. Objects with the purpose of being consumed and discarded had no place in the school's programme (Bonsiepe, 2003).

This applied functionalism had its risks. The concept originated in the 40s, at a time of austerity when Germany had to reconstruct itself after the war's devastation. The economic situation improved in the 50s, by the time the school opened in 1953. Industry boomed, and it was the era of conspicuous consumption: after years of deprivation the wealthy wanted comfort and pleasure, and at this point, the HfG philosophy somehow failed to fulfil this need. There was no place for differentiated or individual wishes. Functionalism, can be perceived as "fitness for mass-production" (Jacob, 1988).

This tension between industry and social needs, in Jacob's words (1988), between "commitment to excellence" and "maximisation of profit", was an issue at the time the school was open, and it remains today, as addressed by several authors when speaking about sustainable design.

Some postures affirm that the work done at the HfG by students and teachers for big companies – such as the designs for Braun or Lufthansa – were targeting the idea of mass production rather than serving the public needs. However, work performed in the classes, where teachers gave the students the task of thinking on the public transportation services or the urban traffic, contradict these postures (Quijano, "personal communication", 2014). Nearly all these projects were dealing with the creation of services rather than a single object. An example was the ticket vending systems, which alleviated the job of the bus drivers by stripping them of the task of selling tickets. In the area of transportation, there was a heavy emphasis on social welfare and the community. A whole range of projects developed at the school were devoted to contributing to the public transportation services: from the design of urban trains to poster layouts with buses' timetables (Rinker, 2003a).

Placing *need* in the core of the design process leads to the optimisation of resources and puts human life as a central concern. By being resourceful in the usage of natural assets, we can lower the negative impacts of a product or service. Transportation, nourishment, shelter, education, health, communication, and energy are unavoidable areas of human activity and are needed by almost every community (Benjamin, 2017).

### **3. Reading the past with current Sustainable Design parameters**

Relevant texts from the *ulm journal* (Journal of the Ulm School for Design) published in the 1958–1968 period, accounted the practice at the school as well as the theoretical topics discussed at the moment. These texts will provide evidence for analysing both ideas and projects. Later articles by authors linked to the HfG (teachers, students, researchers) will provide additional perspectives and details on products developed during the time the school was functioning. Together with this evidence, the HfG-Archive provided information and facilitated access to prototypes and material used at the school.

To analyse and help identify the sustainability of products, we will use some methods and tools suggested in D4S (design for sustainability) approaches. These provide techniques for boosting an environmental observance in products, systems and services; they promote efficient energy use, encourage recycling, and consider all the social benefits related to

usability, fair-trade practices, and social responsibilities (Bhamra et al., 2013).

Benjamin (2017) explains how sustainable design methods have the goal of decreasing the negative impact of human activities on the environment. There are several degrees of sustainability, making it challenging to find a proper measurement, which will indicate whether we are successful in achieving the goal. The most popular assessment parameter is carbon dioxide reduction.

Among the numerous terms and methods that connect with the notion of SD, Benjamin lists the following:

- Green Design
- Eco-design
- cradle-to-cradle
- Design for the circular economy
- Environmentally Conscious Design
- Sustainable Product Development and
- Design for social innovation.

From those terms and methods, the following parameters can be derived:

- reusability
- renewability
- recyclability
- longevity
- emissions and
- multifunctionality.

Another important consideration is the *need*. Although the perception of need can be subjective and dependent on context, Benjamin suggests essential categories to meet human needs such as transportation, resources, education, textiles, healthcare, communication, shelter, agriculture, and energy. The way these needs are fulfilled and how the resources are applied to the purpose can vary, and this is where Sustainable Design can contribute to improving the equation (Benjamin, 2017).

In the following section, we discuss whether some Ulmer projects on the theme of transportation, transportation systems, and concurrently, the use of systems and modularity might contain a sustainable design approach. To pair the Ulmer projects with contemporary sustainable design examples, we examine the *D4S Bus shelter for London*, a sustainable project by Benjamin & Stedman. The project has been described in chapter 12 of *Routledge Handbook of Sustainable Product Design* edited by Jonathan Chapman as “A journey of two designers” (Benjamin, 2017).

#### **4. Ulmer developments and Sustainable Design examples**

“Over a span of two decades, good design, *el buen diseño*, *bel design*, and *gute Form* have

become more or less international trademarks of German design. The concept met its first serious challenge in the 1970s (critique of functionalism), and an even stronger one in the early 1980s (postmodernism). Nonetheless, many German businesses have applied its principles with considerable success". (Bürdek et al., 2015)

The Ulm School of design has developed some iconic products, mainly in the project groups where faculty and students worked with industry partners, that gave the institution a worldwide recognition. The Braun electronics line that became archetypical has even created a style with a name: *German Design*. Bürdek et Al. (2015) explain that Braun developed a formal design language that soon was converted into the standard associated with features such as practicality, rationality, low cost, and neutrality. However, the school also took care of essential topics for the development of a fair society. Quijano, HfG-Archive director until 2013, explains that the design of traffic systems is an example of this. In 1967 the school participated in the Expo 67 Montreal, invited as one of the world's eighteen best design schools. The exhibition panels taken to Montreal were on methodology and transport systems. At the time, the academic level at the school was high despite the institutional crisis it was undergoing. This exhibition gives evidence on the social interest of the school curriculum. It was not only the producer of the Braun Style, as their interests revolved around cities' development, transport systems and the problems arising from these matters. There was, at the time, a crucial concern about the transport expansion, in which design had an extensive responsibility that touched all disciplinary areas. These projects presented at the Expo did not belong to the school's commercial development groups that worked under industry commissions. The projects represented the work performed during the classes, given by teachers concerned with actual topics related to human needs and social development, far from the commercial interest of an electronics consumer brand (M. Quijano, personal communication, 2014).

Transportation is a central sustainability topic. Solutions on how people move from one place to another are a concern for big cities in all countries. These solutions are vital to environmental issues, as transportation is the primary source of carbon dioxide. Transportation not only involves moving people, but also raw materials and merchandise: 85% of which is not in factories or shops, rather travelling through routes, in ships or planes, or stored in warehouses waiting to be moved (Thackara, 2005). Global sustainability deals with the reduction of this impact through all means and strategies. In the HfG Ulm this concern was shown through the years, not only through the products portrayed at the Montreal Exhibition but through multiple projects such as the compact city car Autonova fam, the small utilitarian moped for a mobile grocery, truck bodies, traffic lights, street lighting, petrol stations and gasoline pumps, bus shelters, and others.

Sustainable Design discourages consumerism and promotes an environmentally friendly lifestyle, one that will encourage the improvement of human well-being. The lack of advertising at Ulm favoured an approach through a rational methodology related to science and opposed to consumerism (Bonsiepe, 1965; Maldonado, 1964).

In the 80s, Ecodesign was presented as an approach that was good for the environment and

economically feasible. Later, sustainable design included social issues such as equity and ethics (White et al., 2012). It is interesting to note how the Ulmer thinking went even further from those concerns, as part of the debate present at the school was social equity, and a social-democratic conception of equilibrating and redistributing social benefits, for example, through efficient public transportation. This connection represents a significant link between sustainable design and Ulmer thinking.

The following subsections present a comparison between transportation projects done in the context of the HfG Ulm and a bus shelter for the city of London, done in 2008 – considered an example of sustainable design. An extra subsection extends on the use of systems in the HfG Ulm and its relevance in the context of actual sustainability conversations.

#### *4.1 HfG Ulm Bus shelter for public transport*

In the 50s and 60s, means of transport experienced explosive growth. This development brought new complex demands for design, and those changes were reflected at the HfG. As a result, signalling system, cars, utility vehicles, truck bodyworks, subway and train wagons, and related objects such as petrol pumps, traffic lights and public lights started to be regular exercises at the School (Rinker, 2003a). Projects associated with transportation were carried out at the Building Department: bus stop shelters, ticket kiosks, petrol stations, parking lots and bridges.



*Figure 3 Bus shelter. Academic year 1967/1968. Instructors: Herbert Lindinger, Claude Schnaidt; students: Karl Gröbli, Jean-Claude Ludi, Richard Schärer, Michael Weiss.*

The bus stop shelter (Figure 3) was developed as a flexible system of independent structures – roof (steel and fibreglass) and sides – that allowed different combinations creating open and closed spaces, and granting the possibility of attaching companion items such as benches, rubbish containers, and others. The advantages of this design are the versatile configuration allowing for simple assembly with removable screws, as well as easy maintenance and transportation.

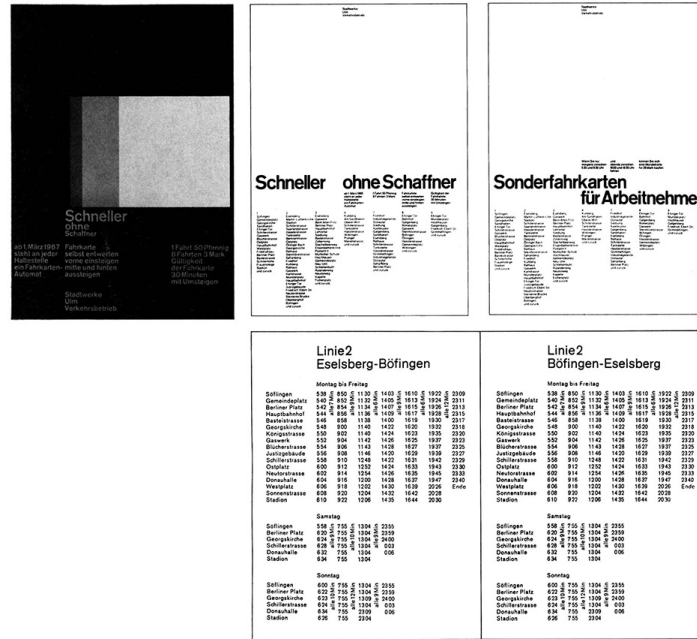


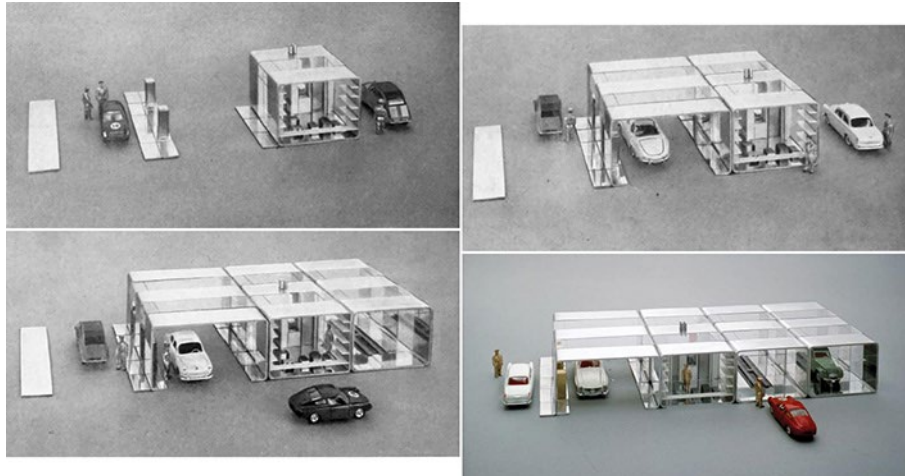
Figure 4 Advertisements and timetables for public transport, 1966/67. Visual communication department, 2nd year. Teacher: Herbert W. Kapitzki. Student: Karl Gröbli.

On the visual communication aspect, some new traffic signs were developed, working on the semantic aspect of them, together with road and transport safety campaigns (Figure 4). Those works focused on the transmission of information on printed material. The designers' research focused on optimising legibility through typography and layout. The local transport company finally implemented these projects as bus posters and timetables (Rinker, 2003a).

The system for petrol stations designed in 1963 by Herbert Ohl and Bernd Meurer (Figure 5) shows, as well, many characteristics of sustainability that can be noted for this analysis. The task consisted of creating a system of industrially manufactured standard units for petrol stations. It focused on the optimum use of grounds including access to roads, smooth running and staff organisation. It also considered the adaptability to various functions, combination and extendibility. The project included strategic, technical and physical analysis and planning, functionality and construction, cost, manufacture, assembly and manuals. Several sustainability concepts are observed in these petrol stations, such as spatial optimisation, accessibility, multifunctionality, or use of natural light. The stations can also be customised according to the size and terrain.

Following these examples, it can be asserted the Ulmer criteria followed scientific research of all factors involved in the design process, use of new materials, the formal and constructive development of the concepts, the rationalisation of resources, the social aspects, and a systemic approach.





*Figure 5 System for Petrol Stations. Design: Herbert Ohl, Bernd Meurer, 1963. Photo: ulm 8/9 & HfG-Archiv Ulm, Ulmer Museum.*

#### **4.2 D4S Bus shelter for London, a sustainable project by Benjamin & Stedman**

Benjamin and Stedman wanted to create and develop a product for public, everyday use (Benjamin, 2017). The goal seemed simple, but to explore sustainable solutions can be complex, as designers can find hidden challenges that will influence their decisions. The concept of “need” was the trigger for selecting what product to design.

Benjamin describes a 2008 competition from Transport for London to design a new city bus shelter provided a chance to give birth to a new product that could be compared to a successful existing one. The shelter is an essential item in a transport system that, with the possibility of moving a vast number of passengers per day, brings several advantages to human well-being and the reduction of carbon dioxide emissions. By enhancing the transport services, the city provides an cost efficient, safe and comfortable option to its citizens.

The shelter design proposals had to include technical specifications as well as indicative costs in order to be considered. Sustainable design was not part of the specifications, but Benjamin and Stedman were committed to present a sustainable shelter. They named it D4S Shelter (with D4S standing for ‘design for sustainability’). Their proposal was shortlisted for further development and received a high score for technical rigour. “We had assumed that a shelter made predominantly from wood was unlikely to progress in the competition due to technical concerns over the material; virtually all urban shelters are made of steel, aluminium or stainless steel. Furthermore, the supply chain for metal (ferrous and non-ferrous) is both sophisticated and mature. Therefore, the cost is reasonably predictable for the high-volume production of extruded and rolled components.” (Benjamin, 2017)

Through the use of Sima Pro, they carried out an LCA to compare the new shelter to the existing ones (Insignia), resulting in less than 10% of the environmental impact of the Insignia Shelter. The overall benefits were substantial, particularly the savings in CO<sub>2</sub>.

Both the overview of health, ecosystem and resources analysis and the impacts on human life scored high for the D4S shelter.

Benjamin concludes in a D4S shelter overview that not only was the product excellent, affordable and suitable for the purpose, but it also followed sustainable design approaches. It was suitable for London's streets and intended to last at least 30 years. The selection of materials encouraged people's affection by providing generous seating, lighting, information and security, as well as easy maintenance and good ageing. The modular system will have a good fit for any road's characteristics, allowing a customisable configuration according to the needs.

The principles of sustainable design that can be outlined from Benjamin and Stedman shelter are:

- **Renewable resources with socioeconomic advantages:** use of sweet chestnut wood from a sustainable source.
- **Reuse:** will fit the existing foundations, installation can be performed quicker than the existing one, will save energy and cut costs. Glass panels from older ones to be reused as well.
- **Renewable energy:** solar panels on the roof will generate back-to-grid electricity. Payback of these panels estimated in 10 years of energy savings.
- **Colocation:** information case and flagpole are integrated into a totem to reduce space and avoid the installation of flagpoles, which would include digging and concrete filling.
- **Future-proofing:** a multipurpose area that can be used as seating space, advertising and information touchscreens. Wooden panels allow easy modification and update to other uses.
- **Product longevity:** most components have an estimated service life of 30 years (solar panel, CCTV, infrared detectors and ICT totem and electrics might be shorter). The wooden structure fits in the landscape, as well as having the ability to be easy to repair by non-specialist local woodworkers.
- **Optimisation:** utilisation of all materials was optimised in order to minimise both the number of materials and installation time.

Although the shelter commission was cancelled in the end, the D4S shelter proved to be a sample of sustainable design that will serve its purpose well. The experience helped the designers in the following task, that provided the city of Cornwall with Sustainable Bus Shelters<sup>1</sup>.

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1 More details on this project on Benjamin & Stedman's website <http://www.naturalshelter.com/>



*Figure 6 Hans (Nick) Roericht. TC100 tableware. 1959 thesis project at the HfG Ulm. Photo: HfG-Archiv Ulm, Ulmer Museum.*

### *4.3 Use of systems*

The actual sustainability conversation urges to use an integral problem-solving approach as part of the design process. Shedroff emphasises the only alternative to efficient sustainability is a systems perspective, because many things are interconnected, and those connections must be addressed in a design task. This viewpoint involves financial, social and environmental implications. To understand a systems perspective, one must think of a system as a whole, considering all the factors which contribute to a particular activity (Shedroff & Lovins, 2009).

In Ulm, the design disciplines at the School were practised based on planning and systematisation. Marcela Quijano (2003) describes the concept of ‘design as a process’, radically opposed to the assumption that it could be a spontaneous achievement, a creative act, or even spurred on by a moment of inspiration in order to solve a given problem.

Some of the projects developed in Ulm showed systemic approaches, like those in areas such as tableware or food packaging. The projects granted the advantage of stackability, easy washing, modularity, standardisation and reusability.

Hans (Nick) Roericht’s 1959 thesis project (Figure 6) is one of the most well known HfG products, that even made it to the MOMA permanent collection. An industrial product that was transformed into an icon of German “Signature Design” – the antithesis of the HfG Ulm’s conception of design, as Gui Bonsiepe mentions in an interview with Groll (2015). It was licenced for Thomas/Rosenthal, who produced this tableware from 1962 until 2006. In 2010, HoGaKa started manufacturing and selling the set again, bringing the product out of the

museum stand and back to a regular public. It was conceived for gastronomic use in hotels, canteens, hospitals, and cruise ships. The TC100's compact conception covered several needs in a few systematised pieces, achieving rationalisation in production and use. Its concept changed the idea of crockery as pieces of personal artistic expression. It probably was the first set of tableware with the possibility of stacking every piece, even the sugar bowl, as the lids are flat and designed to be stacked on top of each other. The elements of the system belong to a few families of forms – in some pieces, the use of a double cylinder can be appreciated. The double cylinder design (a big one for the upper part and a smaller one for the lower part of the cups) allow a stackability of more than 8 cups, as they lock-in deep one on top of the other. The 120° angle between the base and the sides and the borders also facilitates the stacking.

Moreover, the same principle applies to other pieces. The ground-breaking feature of this set was not only the stackability but the fact that it was compact (in the name TC100, C stands for compact) and saved space when stored. This peculiarity was achieved by modularity, having all the elements following a grid system. For Ulrich Conrads, it was an example of compact-design. He notes that the project "...lies between the two extremes of functionalism (the slogan of which is: what functions well and fulfils the purpose is good and beautiful) and artistic expressionism. Compact-design demands experimental methods as well as the refinement of taste. Compact-design is creative design. Design with an idea" ('Notes on Ulm / Compact Style', 1962). Despite the simplicity of this design, there was probably no life cycle analysis, as would be appropriate today in sustainable design practice. However, instead, there was some thinking behind how to save an employee's time (cafeteria or bar), considering how it would be washed in an industrial dishwasher, dried and stored. Mäntele (2014) describes how, during the industrial production phase, there were *in situ* interventions to optimise the production of cups and other pieces. This dinnerware was produced for over 40 years so it can be considered a successful and sustainable product as well, even if the word wasn't used in the late 50s as it is used today, showing how *avant-garde* these designs were.

Apart from the use of systems, the TC100 set follows, additionally, sustainability principles such as re-utilisation and replacement of parts, against planned obsolescence. Planned obsolescence is criticised from the sustainability approach, both in theory and in practice. Material reduction, increase of product lifespan, part replacement and product repair as well as debating ownership and property are part of sustainable design debates on planned obsolescence (Cooper, 2017; Park, 2017; Tonkinwise, 2017). Hugh Dubberly (2008) draws on the idea of design in the age of biology and speaks about a shift from a Mechanical-Object Ethos – related to manufacturing – to an Organic-Systems Ethos – more connected to software and services. "The mechanical-object-organic-system dichotomy also appears vividly in discussions about ecology. Much of our economy still depends on 'consumers' buying products, which we eventually throw 'away.'" It proposes the idea of products-as-services.

Modules, series, and repetition were topics in the basic course. Starting with basic geometric

shapes, and moving gradually into forms, then 3D and complex structures. As explained by Bonsiepe (2012), the students entered the School with a previous background; they demanded a reason to understand why a design decision was better than another, an argument that is not easy to make. The systemic approach was combined with a structural point of view. The teaching of maths aspects related to groups and combinations was applied to the dimensional and modular coordination. Some examples of these approaches are architectural models showing modular structures whose aim was reducing the cost of housing, an essential goal at the department of architecture. Unfortunately, this hope was for naught because the low cost of construction was overridden by real state speculations on the land. Ultimately, the person in need of a home was not getting a low-cost benefit. This construction approach can be paired with some of the LEED norms such as indoor environmental quality, efficiency in the use of resources, use of innovative techniques and proper material selection.

The Students' housing using modular construction design by Herbert Ohl & Bernd Meurer in 1961 at the Institute for Industrialized Construction, is an excellent example to illustrate what was discussed in the previous paragraph. This HfG project carries several Sustainable Design concepts. For instance, the use of systems, modularity, simplicity, multifunctionality, low cost and ease of building. This idea of construction can be compared to modern green construction norms the purpose of which is to promote highly efficient and cost-saving green buildings. Schnaidt (1964) speaks about the "Prefabricated Hope", and he shows acknowledgement of the housing issues' political implications over technical aspects of building. The use of systems is, by far, not a guarantee of sustainability.

Nevertheless, the systemic vision in this modular housing project offers some advantages like an easy and simple replacement of parts that would age well, allowing a longer life for the buildings as a whole. This vision lowered the construction cost and the material optimisation as well. These are features portrayed in actual sustainable construction.

## **5. Conclusion**

The Ulm School of Design (HfG Ulm) through its discourse, the educational Ulm Model and the projects developed by students and Faculty showed an *avant la lettre* concern and awareness of sustainability. Not having used the term, sustainability was part of the design definition that the school proposed, with a programme that included social equity, resource optimisation and respect for the planet and the environment, which are now considered main pillars for sustainable design practices. The connection between sustainable design ideas and the Ulmer institution could offer a different approach to current design practices.

Transportation is one of the main concerns in sustainability issues, and solutions for commuting are critical for the environment. This topic was highly relevant and extensively discussed in Ulm. The motorisation wave between 1955-1970 caused an automobile growth from 1,693,000 to 13,941,000, transforming cities and demanding new ways of dealing with the transit (Hausmann, 2003). New and complex challenges opened to the design

realm, and echoes of it were heard at Ulm. At the Industrial Design department, they dealt with Signaling systems, utility and personal vehicles, railway wagons, and other supportive products ranging from petrol pumps to street lights. Traffic-related structures such as bridges and parking lots were typical assignments from the Building Department. At the Visual Communication department, assignments include new traffic signs and advertising campaigns related to urban transit.

“Whether they were student projects or commissions undertaken by the school’s commercial development groups these transportation designs serve to exemplify criteria specific to Ulm: the scientific analysis of all design-relevant factors; the use of new materials; the formal and constructive development of space and resource-saving concepts; and systematic thinking in two and three dimensions. Consistent disciplinary cooperation between all the departments of the school resulted in forward-looking developments in the field of transportation.”

(Rinker, 2003a)

Victor Papanek (1971), in the 70s, addressed how the automotive industry in Detroit was pushing for car renovation every three years. That frequency was a response to the factory’s manufacturing part lifespan. The industry kept functioning but created a disposable culture, which smoothly advanced onto categories like clothing, furniture, and electronics. Years later, we see how this disposable culture has taken a toll on the Earth’s health.

Much earlier, in the 60s, the Ulmer thinkers were raising the same issues. Ohl warned not to take the implementation of new materials as a fashion, or as design-oriented to obsolescence, as it was in the consumer goods industry. “Design is a coordinated procedure; design is an activity directed towards balancing all aspects of a problem to be solved.” (Ohl, 1965). Moles first mentioned the concept that actual sustainability targets, *planned obsolescence*, using the term *incorporated obsolescence*. He debated about the crisis of functionalism and the need to produce and sell relentlessly. A way out of this dilemma was “...the technique of *incorporated obsolescence*; artificial breakdowns of function are built into the product which after a certain period of use will collapse...” Moles questions whether functionalism is dead as a design philosophy, as there are severe contradictions with the affluent society, which “...on one side contributes in rationalising the mechanism of affluence, on the other side fights against waste.” (Moles, 1967) This concept is, as well, a principal contradiction in the actual Sustainable Design discourse, and a concern that this paper wants to address.

The use of systems was present in many of the Ulmer projects. System thinking and how to create complex structures using simple techniques were part of the exercises done by students. These ideas were translated into different product categories, as shown in previous sections (stackable crockery design by Nick Röricht, the student’s housing building, the petrol station systems, and other projects).

This brief recap from selected work by Ulmer students and teachers shows how objectively the concept of design contained a sprout of sustainability. Those projects did not bring out environmental concerns that were not present at that time. However austerity,

multifunctionality, use of systems, obsolescence awareness and research practices were considered.

The flexibility and diversity exposed in these examples are characteristics asked of sustainable products. Manzini points out the diversity and complexity of natural systems (often combinations of multiple independent systems) are the basis of their resilience, in other words, their ability to adapt to changes (Manzini, 2013).

However, one of the most exciting aspects of modern sustainability, that separates it from being just an instrument to lower energy consumption and material costs is the idea of a change in behaviour, and not just optimising production. Manzini is promoting a cultural and behavioural gate to sustainability through cultural changes and demeanour (Brooks, 2011). As he asks how a designer can help people change their conduct, he sees that these changes have already started (and there are positive improvements). Therefore, what comes next is how to guide these changes, enhancing this new way of doing and thinking about social innovation with knowledge and appropriate tools.

The promotion of a culture of sustainability (Wolf, 2013) is a crucial tool to encompass sustainability from diverse areas: technological, political-economic, and tradition-innovation. In articles from the *ulm* journal they were also discussing change through behaviour and culture, the acknowledgement of not only a “physical environment but also behavioural environment” (Maldonado, 1965) and a critique to the lack of commitment in the modern architectural practices (Schnaidt, 1967).

Presenting the comparison offered in this paper, we want to revisit some concepts of the past, creating a dialogue with contemporary discussions. Looking at the questions held decades ago, we understand that they are also relevant today. Finally, this conversation could lead to the creation of more desirable futures.

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## 6. References

- Benjamin, Y. (2017). A journey of Two Designers. In *Routledge handbook of sustainable product design* (pp. 173–191).
- Bhamra, T., Hernandez, R., & Mawle, R. (2013). Sustainability: Methods and Practices. In *The handbook of design for sustainability* (pp. 106–120). London ; New York.
- Bonsiepe, G. (1965). Visual/Verbal Rethoric. *Ulm 14/15/16*, (December 1965), 23–40.
- Bonsiepe, G. (2003). The Relevance of the Ulm School of Design Today. In G. Hochschule für Gestaltung (Ulm, U. Museum, & H.-A. Ulm (Eds.), *Ulmer Modelle, Modelle nach Ulm: Hochschule für Gestaltung Ulm 1953-1968 = Ulm School of design 1953-1968* (pp. 124–133). Ostfildern : New York, NY: Hatje Cantz ; Distribution in the US, D.A.P. Distributed Art Publishers.
- Bonsiepe, G. (2012). *DHUB Sessions: Disseny i crisi. Reflexions sobre l’HfG Ulm des del context actual*. Barcelona, España. Retrieved from <https://vimeo.com/36023897>
- Brooks, S. (2011). *Design for Social Innovation: An Interview With Ezio Manzini*. Retrieved from <http://www.shareable.net/blog/design-for-social-innovation-an-interview-with-ezio-manzini>

- Bürdek, B. E., Dale, M., Richter, S., & Hausmann, N. (2015). *Design: History, theory and practice of product design* (Second revised edition). Basel: Birkhäuser.
- Chapman, J. (Ed.). (2017). *Routledge handbook of sustainable product design*. London ; New York: Routledge, Taylor & Francis Group.
- Cooper, T. (2017). Which way to turn? Product longevity and business dilemmas in the circular economy. In *Routledge handbook of sustainable product design* (pp. 405–422).
- Dubberly, H. (2008). *Design in The Age of Biology: Shifting From a Mechanical-Object Ethos to an Organic-Systems Ethos*. Retrieved from <http://www.dubberly.com/articles/design-in-the-age-of-biology.html>
- Groll, S. (2015). Traces and Hopes of Design Research: An Interview with Gui Bonsiepe,\* Klaus Krippendorff, Siegfried Maser,\* and René Spitz\*. *Design Issues*, 31(1), 18–31. doi:10.1162/DESI\_a\_00305
- Hausmann, B. (2003). Experiment 53/68. In Hochschule für Gestaltung (Ulm, Germany), Ulmer Museum, & HfG-Archiv Ulm (Eds.), *Ulmer Modelle, Modelle nach Ulm: Hochschule für Gestaltung Ulm 1953-1968 = Ulm School of design 1953-1968* (pp. 16–33). Ostfildern : New York, NY: Hatje Cantz ; Distribution in the US, D.A.P. Distributed Art Publishers.
- Hochschule für Gestaltung (Ulm, Germany), Ulmer Museum, & HfG-Archiv Ulm (Eds.). (2003). *Ulmer Modelle, Modelle nach Ulm: Hochschule für Gestaltung Ulm 1953-1968 = Ulm School of design 1953-1968*. Ostfildern: Hatje Cantz.
- Jacob, H. (1988). HfG Ulm: A Personal View of an Experiment in Democracy and Design Education. *Journal of Design History*, 1(3/4), 221–234.
- Maldonado, T. (1964). Present-day problems of Industrial Design. *Ulm 10/11*, (May 1964), 74–76.
- Maldonado, T. (1965). Opinions ‘The Emergent World: A Challenge to Architectural and Industrial Design Training’’. *Ulm 12/13, March 1965*, 2–10.
- Manzini, E. (2013). *Small, local, open and connected. Resilient systems and sustainable qualities: Design Observer*. Retrieved from <http://designobserver.com/feature/small-local-open-and-connected-resilient-systems-and-sustainable-qualities/37670>
- Moles, A. A. (1967). Theory ‘Functionalism in crisis’. *Ulm 19/20*, (August 1967), 24–25.
- Notes on Ulm / Compact Style. (1962). *Ulm 6*, 36–37.
- Ohl, H. (1965). Industrialized Building with Steel. *Ulm 14/15/16*, (December 1965), 16–22.
- Papanek, V. J. (1971). *Design for the real world: Human ecology and social change* (1st American ed.). New York: Pantheon Books.
- Park, M. (2017). Print to repair: 3D printing and product repair. In *Routledge handbook of sustainable product design* (pp. 236–249).
- PODCAST: The ‘Ulm Model’ – floor talk with Dr. Martin Mäntele, director of the HfG-Archive. (2014, August 21). Retrieved 31 August 2019, from <https://rmitgallery.wordpress.com/2014/08/21/podcast-the-ulm-model-floor-talk-dr-martin-mantele-director-of-the-hfg-archive/>
- Quijano, M. (2003). Is the Means the End? In G. Hochschule für Gestaltung (Ulm, U. Museum, & H.-A. Ulm (Eds.), *Ulmer Modelle, Modelle nach Ulm: Hochschule für Gestaltung Ulm 1953-1968 = Ulm School of design 1953-1968* (pp. 56–71). Ostfildern : New York, NY: Hatje Cantz ; Distribution in the US, D.A.P. Distributed Art Publishers.
- Rinker, D. (2003a). Design on the theme of transportation. In Hochschule für Gestaltung (Ulm, Germany), Ulmer Museum, & HfG-Archiv Ulm (Eds.), *Ulmer Modelle, Modelle nach Ulm: Hochschule für Gestaltung Ulm 1953-1968 = Ulm School of design 1953-1968*. Ostfildern : New York, NY: Hatje Cantz ; Distribution in the US, D.A.P. Distributed Art Publishers.



- Rinker, D. (2003b). 'Industrial Design is not an art' – Tomás Maldonado's Contribution to the Creation of a New Professional Identity. In *Ulmer Modelle – Modelle Nach Ulm*. Ostfildern: Hatje Cantz.
- Schnaidt, C. (1964). Prefabricated Hope. *Ulm 10/11*, (May 1964), 2–9.
- Schnaidt, C. (1967). Theory 'Architecture and Political Commitment'. *Ulm 19/20*, (August 1967), 26–34.
- Shedroff, N., & Lovins, L. H. (2009). *Design is the problem the future of design must be sustainable*. Brooklyn, N.Y.: Rosenfeld Media.
- Simon, H. A. (1996). *The sciences of the artificial* (3rd ed). Cambridge, Mass: MIT Press.
- Thackara, J. (2005). *In the bubble: Designing in a complex world*. Cambridge, Mass: MIT Press.
- Tonkinwise, C. (2017). Transitions in sociotechnical conditions that afford usership: Sustainable who? In *Routledge handbook of sustainable product design* (pp. 349–358).
- White, P., St. Pierre, L., & Belletire, S. (2012). *Okala Practitioner. Integrating Ecological Design*.
- Wolf, B. (2013). *5th Sustainable Summer School. The Culture(s) of Sustainability*. Retrieved from <http://www.sustainable-summer-school.org>

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