

Creativity for a New Era

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Abstract

Increasingly, sustainability turns out to be a key factor for the success of our product culture. However, as a consequence of globally changing conditions - such as shortages of raw material resources and increasing consumption - the traditional concept of industrial design, as an essential element of that product culture, hardly seems to be viable in the long term.

The present study poses the questions that address which success factors mostly influence the sustainability of products and which changes in the field of product design are necessary in order to foster these success factors by design. The results of the study confirm that designers are usually not professionally trained, neither on the job nor at university-level, to undertake the areas encompassing the success factors, nor do they have a significant influence on them. The aim of this study is to provide indications for the readjustment of design education in both form and in the development of new didactical measures.

Keywords: Future of Design, Design Education, Sustainability

1 A new design awareness

The history of design is inextricably linked to the industrial production processes, entrepreneurship, and individual consumption. For decades, design has had a tremendous impact on modern lifestyles and economies. Despite the many positive aspects of this influence of design, phenomena such as climate change also indicate that our industrial product culture, with all its designed artifacts and rarely sustainable lifestyles, has very decidedly evolved into a massive global problem with far-reaching negative consequences for all of us.

Nearly 100 years after the establishment of the pioneering Bauhaus School, design sees itself confronted with fundamental changes related to production, consumption, and self-understanding: goods production, world population, and consumption levels are rapidly increasing globally. Climate change, raw-material shortages and energy bottlenecks are massive global problems. In this regard, design should have recognized long ago that the switch to a new industrial era must also be jointly shaped quite substantially by its own discipline - just as more than a century ago, when designers helped to decisively shape the change to industrial modernism. Or, as John Thackara puts it: "If we can design our way into difficulty, we can design our way out." [1] But, in which sense should the discipline of design strategically reorient itself? To find evidence for the further evolution of the discipline of

design, and accordingly for the evolution of design education, firstly a review of the situation is necessary.

The three dilemmas of design

In order to be able to help in shaping a more sustainable product culture, design obviously must find ways out of its *three dilemmas*. At the beginning of the 1970s Viktor Papanek's groundbreaking and partly polemic book, *Design for the Real World*, reviewed the ongoing waste of resources by – from his perspective - falsely designed products and non-holistic design practices [2]. In that sense, Papanek portrayed design as 'one of the most harmful professions'. Even nowadays, three fundamental dilemmas arise for designers when it comes to sustainability. The first one is an apparently unsolvable dilemma for designers: On the one hand, most Western economies have directly sought to drive ever-higher levels of consumption by creating more and more new products. On the other hand, most of the world – including most designers – now understand that this practice is not sustainable and that an environmentally and economically more sustainable product culture must be achieved. What contribution can design make in this respect? The second great dilemma of design consists in the fact, that design is fully integrated in and even dependent upon the complex structures of globalized production. However, due to its traditional role as an „estheticizing problem solver“ it has little, if any, influence on those rarely sustainable structures. Therefore, the question arises whether designers can expand their skills beyond design's traditional role within these structures, in order to convincingly act as agents of change. The third dilemma facing designers and the discipline of design today also poses a challenge to the world of business: Are designers to function as strategists, or opportunists? Managers and designers often still do not adequately seem to recognize the potential that a strong strategic alliance between them has for shaping a sustainable future. The question in this respect is whether designers should acquire much more skill in collaborating within economic, entrepreneurial relationships.

The *three dilemmas of design* already indicate that the design discipline probably must strategically reorient itself so that it can make a relevant contribution to a sustainable, postindustrial era and a culture of sustainability. Hence, a shift in focus might be necessary as early as in the education of designers.

Design as an integrating fundamental discipline

John Heskett noted that "..., design should be the crucial anvil on which the human environment, in all its detail, is shaped and constructed for the betterment and delight of all." [3]. Even if one does not potentially consider design to be such a holistic discipline, it is more than esthetics and customer awareness, just as sustainable innovation is something more than just "green products" that sell well. As can be seen in the innovation strategies of prosperous enterprises, such as Apple or BMW, the success of design can no longer be limited solely to the esthetic, semantic aspects of conventional product design, but must be seen as the optimized interaction of three levels of design along with the consciously designed user experience. These levels are: the level of the product itself, the level of the superordinate system, and the perception of the whole issue. Lucius Burckhardt once called this "a design of tomorrow that is able to consciously consider the invisible complete systems" [4]. In consideration of the fact that our current industrial product culture is rarely sustainable, a much more holistic understanding of innovation seems necessary to make sustainability as a concept actually come positively alive: An understanding of innovation that should not remain limited to the product level but that must logically act on the cultural level (since at the very least it concerns cultural transformation processes). This certainly means not just products and their design, but instead human needs,

satisfying them and if appropriate transforming them into artifacts. Thus, it involves societal system innovations, usage innovations, organizational innovations, etc. Even product innovations may – but not necessarily – represent the best solution; and this knowledge should be placed at the beginning of any design work. After all, this is the only realistic chance of smaller resource consumption by fewer products. Or as Dieter Rams said with reference to a sprawling and increasingly haphazard goods environment, "Less, but better!" [5].

Design „has come a long way from individualistic “artsy” creativity to a problem-solving discipline requiring conceptual vision and competent implementation.“ [6] Over the last decades, new dimensions were constantly added to the discipline of design by adapting or responding to economic and social changes. Accordingly, methods, processes, and activities that are characteristic to design (eg. co-creation, design thinking, and design management - just to name a few) were applied to other fields of expertise. Nowadays ‘rational’ managers and executives commonly experiment with design thinking as a process of inspiration. Just as it is no exception that designers are responsible for the management of innovation processes. Assuming that the switch to a sustainable product culture must be jointly shaped quite substantially also by the discipline of design, the question arises whether designers are qualified for that task.

2 The gap between requirements and abilities

When it comes to the development of new didactical measures, the fundamental question is whether the traditional education in design qualifies designers to make a relevant contribution to a more sustainable product culture. The hypothesis is that up to now we have neglected – and are continuing to neglect – to provide reasonable education for the massive global challenges that arise from a not sustainable product culture. It seems as if nowadays design education still does not impart the required knowledge and skills. In the following section the results of three primary surveys, which indicate the need for a reorientation of design education, are briefly described. The surveys focused on the qualifications that are necessary to envision and develop a sustainable product culture. The aim of the surveys was to find evidence for the further evolution of design education, by analyzing the status quo of nowadays competencies in design (which logically stem from traditional education models). The qualitative primary studies were conducted in the form of semi-structured (survey A and B) or structured (survey C) interviews with experts.

2.1 Survey A

It is obvious, that our current product culture is not sustainable. But, which factors within the life cycle of products have the greatest impact on sustainable development?

To answer this research question, in addition to a comprehensive literature research intended to narrow down the search field, an empirical primary study was conducted. The aim was to gain access to the mindsets and feelings of experts – and thereby provide indications of the most important parameters for sustainable product design. The qualitative and semi-structured approach selected allowed the experts to express ideas and experiences straightforwardly, thus delivering a deeper insight into what they really „feel and think“ that is important for establishing sustainable product design.

As part of survey A, 23 qualitative interviews with experts¹ were conducted. The expertise of the interviewees corresponded to consumer and investment goods (based on the MIGS classification of the European Union). To ensure that as many as possible potential parameters were considered, the expert’s knowledge referred to all phases of a product life cycle². In addition, experts in the fields of climate change, science, society and consumption were interviewed. In detail, the scopes of the experts were: consumer goods (n=7), investment

goods (n=7), climate change, science, society, and consumption (n=7), and product life cycles (n=2). The interviews, also of survey B and C, were conducted in the German-speaking part of Europe.

The interviews with the experts were designed as semi-structured interviews and were translated during the interview into an individual cognitive map – a visual representation of the cognitive structures of the respective expert. The experts were asked about which factors within the life cycle of products he/she thought would have the greatest impact on sustainable development. From the expert’s concepts (mental representations; mostly short phrases) as well as from their mental connections a cognitive map emerged in the course of each interview and was subsequently transmitted to the data analysis software Decision Explorer, with which a central analysis³ was carried out to identify the success factors and their importance. An exemplary cognitive map can be seen in figure 2. The top-ten-concepts (n=220) and the core-concepts (n=22) of each individual map were detected in this manner. Both categories of mental concepts were used to initially create relevant categories (the expert’s „mental world“) using cluster analysis. The categories can be seen in figure 1 in condensed form.

By mapping the 22 core-concepts to the categories, the influence of the respective categories on the target concept (sustainable development) was detected (for example six core concepts originated from the category „Definition“ and its sub-categories, which makes it the most influential one in the eyes of the interviewed experts.) The influence of the respective categories on sustainable development in descending order: Definition (27,3%), Strategy, Production, Consumption, Stance, Product (9,1%). The allocation of the core-concepts can be seen in figure 3.



Figure 1: The categories created by clustering the top-ten-concepts

2.1.1 Findings

The qualitative analysis of the expert’s interviews highlights the influence of particular parameters on sustainable development. From the expert’s point of view, the most influential ones are:

- The „Definition“ of a product (from the stimuli for innovation to the decision for production)
- The creative „Strategy“ in primary efficiency and also consistency
- „Production Planning and Logistics“ (selection, production and transport of materials and intermediate goods for the production – these are substantially the phases at the beginning of a traditional supply chain)

The findings illustrate that the whole defining creative process of products (traditionally the core competence of designers) is of vital importance to evolve a non-sustainable product culture into a more sustainable one. Beyond that, the findings show the particular importance of strategic approaches and the high impact of sustainable supply chains for achieving sustainable development.

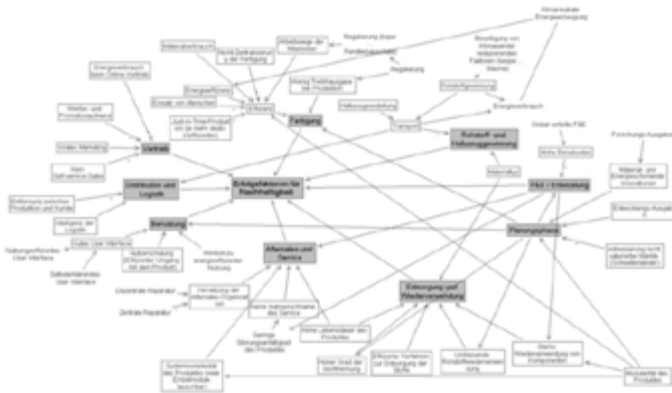


Figure 2: An exemplary cognitive map

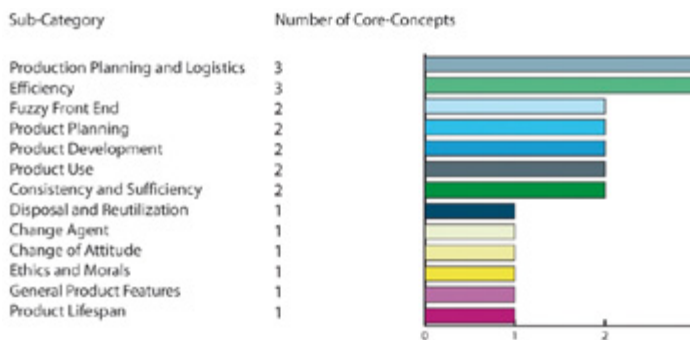


Figure 3 : The allocation of the core-concepts

2.2 Survey B

Design has given the Industrial Age a permanent face. Are designers also qualified to make a relevant contribution to a sustainable, postindustrial era and a culture of sustainability?

Eight (product) design experts were interviewed to find out whether designers are usually qualified for the tasks that lie ahead. Semi-structured interviews and an additional online survey were made. The interviews focused on tangible ideas of design-experts for sustainable product lifecycles, whereas the online survey focused on the current real influence of design on these lifecycles. From the interviews with the design-experts a total of 125 briefly recorded mental concepts, mostly short phrases, emerged. The concepts were mapped to the respective categories and sub-categories from the interviews of survey A. In total 196 direct correlations were found. The more mental concepts referred to a certain (sub-) category of survey A, the more associations the design-experts had with what is essentially necessary within that (sub-) category to achieve sustainable product lifecycles (see figure 4).

As part of the online questionnaire the design-experts were also asked to estimate the current real influence of product design regarding the sub-categories found in survey A: "How high do you think the current influence of product design is regarding the following problem

areas?" (with values from 1/no influence to 10/very high influence). The results can be seen in Figure 5.

2.2.1 Findings

The guiding values of companies (and consumers) are parameters, in which the design-experts see the most potential (see figure 4): The category „Stance“ is the most important category by far as determined by the values of its respective sub-categories for the interviewed design-experts. This category is strongly affected by ethics and moral commitment. Moreover, two of the three most influential sub-categories for the interviewed design-experts are also part of the category “Stance“ (see figure 4):

- „Change Agent“ (changing the guiding values of companies and strengthening their Corporate Social Responsibility)
- „Change of Attitude“ (changing the guiding values of consumers)

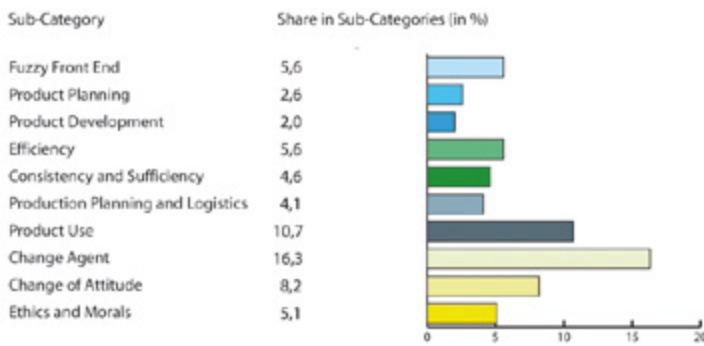


Figure 4: Share of mental concepts in the ten most important sub-categories of survey A

With the design-experts’ emphasis on the guiding values of companies and consumers (category „Stance“) in mind, it is obvious that the interviewees do not see the most potential in parameters such as „Efficiency“ and „Production Planning and Logistics“, which are the most influential ones for the experts. This is not surprising, if one considers that designers usually lack a profound educational background in these areas of expertise. The data for the current real influence of product design regarding the sub-categories found in survey A indicates that designers see their influence mostly in the (early) stages of innovation processes, and in the impact on usage patterns.

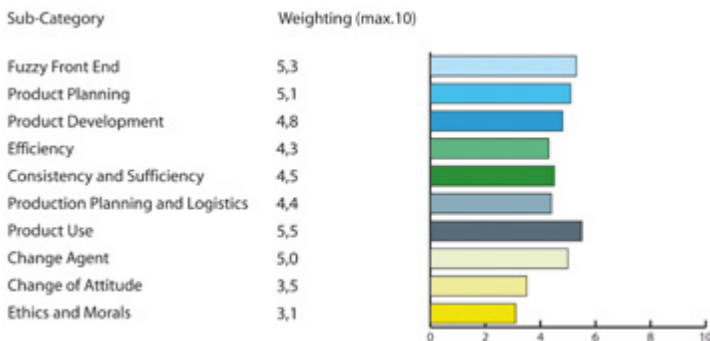


Figure 5: The current influence of design on sustainable development

2.3 Survey C

Collaboration between companies and designers (as well as between other stakeholders and designers) is a key factor when it comes to develop sustainable innovation: Are designers ready to collaborate accordingly?

To answer this question, structured interviews with R&D experts of six companies and experts of six cooperating design agencies have been conducted (n=12). The number of employees ranged from 250 to 3300 (companies), respectively from 3 to 80 (design agencies). The questionnaire contained both general questions about cooperation, that were put to the company experts and the design service providers alike, as well as specific questions for both stakeholder groups. For the participating companies the following requirements were defined:

- successful collaborations with design service providers in the past
- development of technology-intensive products⁴

For further evaluation the interviews were recorded and transliterated. Care was taken to ensure the readability and further interpretability of the data. The transcriptions were analyzed and coded with regard to the research question, and the coding of the interviews was carried out according to a defined evaluation scheme: All aspects treated within the interviews were first summarized and listed. Hence, an overview of the relevant statements was realized and a relevant set of factors was generated. Subsequently, every statement was assigned to a specific coded factor. A weighting of the factors and thus a priority and clustering was achieved in that manner. The relevant categories, that were detected using cluster analysis, are: The management level, the social level, and expertise. In the course of the analysis, it was found that the experiences in terms of the success factors of cooperation are very consistent within the two stakeholder groups.

As a result of survey C, a set of factors that mostly influence the success of collaboration in the long term has been identified (see figure 6). A successful cooperation is to be understood as a process between the two business partners and not as the market success of a product, which might have emerged from the collaboration.

From a business perspective, the major factors of success are (in descending order):

1. Relationship between the persons involved
2. Management (strategy and project)
3. Intensive face-to-face contact at the beginning of a project

From the perspective of the design agencies the success factors are (in descending order):

1. Appreciation for design within the company
2. Relationship between the persons involved
3. Intensive face-to-face contact at the beginning of a project

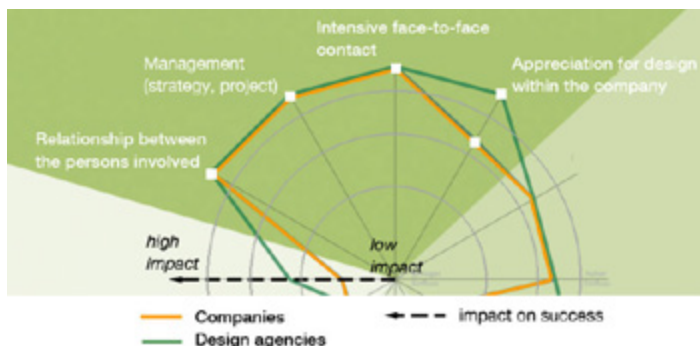


Figure 6: Comparison of the success factors from the perspective of both groups

2.3.1 Findings

One main finding is that social factors have a major influence on cooperation. According to the interviewed experts, the long-term success of collaboration between companies and designers is not primarily a question of expertise, but mainly a question of social skills. They obviously play a greater role than is often assumed [7]. Furthermore, none of the key success factors can be clearly assigned to the professional expertise of designers.

2.4 Conclusion and impact

The results of the surveys indicate a gap between the (future) requirements on designers and their abilities. Survey A provides an indication that, in the eyes of the experts, sustainable development is essentially a matter of efficiency and planning. The whole defining creative process of products, strategic approaches on innovation and efficient supply networks are of vital importance to them. The design-expert's point of view, however, is strongly affected by ethics, moral responsibility and the focus on user needs – and therefore based on a different mental concept on how to achieve sustainable development and sustainable product lifecycles. It is obvious that the interviewed designers tend to raise an ethical claim - but it seems design as a discipline has by far not enough influence and competence to meet that claim. That becomes obvious by the lack of mental concepts that lie outside of the „ethics-cluster“ of survey B. So it comes as no surprise that parameters such as „Efficiency“ and „Production Planning and Logistics“ are neither the center of their mental world, nor the focus of traditional education models in design.

However, survey A points to key success factors for the sustainability of products - such as highly sustainable supply networks, strategic approaches on innovation, and the guiding values of companies and consumers - that are often neglected in innovation processes, but are already important success factors for companies [8]. It becomes apparent that designers are usually neither educated or professionally trained within these areas, nor do they have a high influence on them (survey B). But, if they would be professionally trained, either on the job or at university-level, designers could assume more responsibility for the following important success factors for sustainability.

- Designing the „hidden history“ of products

The creation of really sustainable supply networks and that of the entire "hidden history" of products - as influenced by design: It seems reasonable to assume that there is too little understanding of these mainly technical and economic issues in the field of design. Moreover, „Production Planning and Logistics“ and „Efficiency“ are objective and not very emotional issues that do not originate in the basically human-centered approach that is deeply rooted in design-history. A new educational approach should therefore also focus on designing the entire supply networks that products originate from.

- Acting as change agents for sustainable development

The designers' moral claim should be used for acting as change agents for sustainable development. The designers seem to be aware of their responsibility for the product culture and the importance of a clear ethical position to foster sustainable development. Nevertheless, they are not able to use this moral claim and act as change agents for sustainable development. This is especially true for the very highly rated need for action with respect to the guiding values of companies. A new educational approach should therefore also focus on raising and enforcing an ethical claim.

- Designing the cultural relevance of products

„Product Definition“ and customer awareness are core-competences of designers. The studies A and B show the importance of the entire definition phase of products as a major factor of success for sustainable development. The results show the high influence of design-decisions on the definition of a product and on the use of products. The entire category "Definition" is the one that design currently has the highest impact on. As for the category "Product Use", both influence and need for action are rated comparatively high by the interviewed design-experts. Despite always focusing on customer awareness, the designers seem to be obviously aware of need for action in this category if sustainable development is the goal. A new educational approach should therefore, once again, focus on the „Definition“ of products and on the needs of people.

- Strengthen social skills so that design can become a catalyst force

Social factors have a major influence on cooperation. Beyond that, global problems can be tackled only by creativity and cooperation. Therefore, a new educational approach in design should also focus on the acquisition of social skills and the boosting of community spirit. In principle there is no reason not to grant these skills at least as much status as the acquisition of technical and scientific knowledge. In any case, creativity, cooperation, and networking represent the best preparation for typical working methods of the creative industries, which on the one hand tend to be more sustainable than traditional industries and on the other hand are becoming an increasingly more important economic factor [9].

3 Prospects for a re-focused design education

The surveys, as well as the long-term scouting of the discipline of design, highlight important factors of success for sustainable innovation and thus provide clues to the future of design and a re-focused design education. With the results of the surveys in mind, it is evident that the professional skills of designers have to be adapted to the challenges that emerge from a non-sustainable product culture: Today's design, with its basically still esthetic, artisan nature, is increasingly helpless and without influence in the face of the complex global problems, since designers, owing to their education, are usually only inadequately qualified and frequently may even be only slightly motivated to foster sustainable development (the surveys showed that as well). On the other hand, owing to their predisposition and education, designers (maybe better named creative talents) are professionals who usually have the cultural-creative potential for developing holistic solutions, which go far beyond esthetic, artistic questions. They are also usually better qualified than most other professionals to solve complex problems [10] and deliver creative approaches „off the cuff“. These skills of creative talents, applied to envision and develop a more sustainable (product) culture, procure high added value for society and companies in the long range, open up future prospects for design itself and permit the motivation for sustainable solutions by design.

If the discipline of design once again aims to be a culture-changing force - just as in its infancy, when it helped decisively to shape the change to industrial modernism - it must help to shape or even initiate our culture's vision of the future. The discipline of design should therefore react extensively and rapidly to both content and concept. Its decades-long history with the culture of mass production, however, complicates design's ability to assume this role. Furthermore, essential skills, that are necessary to successfully design a sustainable product culture, are apparently not conveyed to the next designer generation. It seems that, almost eighty years after the closure of the Bauhaus School, we have not progressed decisively further in the area of education of designers.

If the discipline of design aims to change culture towards more sustainability we need designers who possess imaginative powers and are sufficiently creative to design products,

processes, business models and complete systems according to the guiding principle of sustainability. This next designer generation will be of essential importance economically, ecologically and socially for all of our future. We should not leave their education to bad chance in even one single case! After all, Otl Aicher - co-founder of the legendary design school Hochschule für Gestaltung in Ulm (HfG)- summed it up: "the world in which we live is the world made by us." [11]

¹ According to Meuser and Nagel [12] an expert is somebody who is in some way responsible for the design, development, implementation and/or control of a problem-solving; and therefore, has privileged access to information about groups of people, social situations, decision-making processes, policies and so on.

² The product life cycle concept was therefore defined as the sequence of all phases in the course of a product's life - from the initial idea for a new product to its disposal (referring to the integrated product and technology life cycle concept of Pfeiffer and Bischof [13].

³ A central analysis in Decision Explorer looks beyond the direct links of a concept and examines the complexity of links at a number of levels away from the center. So the central or core concepts that are most influential can be detected.

⁴ Classification according to Eurostat 2005 - Sectors with medium-technology or higher

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