
Integrative Design



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Integrative Design

Essays and Projects on Design Research

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PREFACE

Ralf Michel

Integrative Design: The Outlines of a Concept

Almost half a century ago, the Club of Rome published its first report on ‘The Limits to Growth’ (Meadows et al. 1972). Since then, world population has more than doubled, from 3.5 billion to more than 7.5 billion. Late in 2018, the German astronaut Alexander Gerst returned to Earth after more than six months on the International Space Station. Shortly before his return flight, he sent a video message to his yet unborn grandchildren¹ apologising for his generation: ‘At the moment, it looks like we, my generation, are not going to be leaving the planet in the best condition’. Humanity is disrupting the climate, clearing forests, polluting the oceans, and we are consuming limited resources far too quickly. The Earth is a ‘fragile spaceship’, and he hopes that ‘we can still get our act together’. On his return, he said that as a child, he dreamed of flying into space, believing it to be the most extraordinary place. After more than six months in space, however, he realised that Earth itself was the most extraordinary place in the universe – and moreover a very delicate one. Of course, Richard Buckminster Fuller and others recognised this long before Alexander Gerst. But almost no one has expressed the vulnerability of our planet so clearly, understandably, and emotionally to the general public, and at the same time placed our own responsibility at the centre.

But what does all of this have to do with design? The challenges Alexander Gerst saw so strikingly from outer space call for action on everyone’s part. Not some day, not tomorrow, but today. Designers need to be aware of the implications of their actions, and must ask how their proposals lead to decisions or improve situations. According to Jörg Petruschat,² design generates power, and power has to do with the possibilities designers offer others through their designs.

Design reflects society and its developments in relation to issues that are addressed by the protagonists and thought leaders of the design disciplines, especially design researchers. In the future, a key term for the positioning of designers, the editor believes, may well be integrative design. This refers to the potential of an approach to design that is rooted in criticism, is intrinsically linked to political and economic positions, and that involves itself in sovereign ways in transforming the world based on a radically sustainable attitude. Or, as Tomás Maldonado proclaimed in 2009: ‘The path we have to pursue is an open, critical and attentive rationality, especially against the grave problems of our time’. A world in which the challenges are not only complex, but in which the very complexity of the problems is complicated, and in which, from the outset, solutions are under increasing pressure to really make the world a better place.

The common theme of this book is the idea that designers, as the protagonists of a discrete and often misunderstood discipline, need to redefine their role in collaboration with technicians, economists, and politicians, but mainly in their relationship with the key stakeholders: those who attach importance to their artefacts.³ From time to time, the paradigmatic conditions under which these roles are granted to them undergo change. Penetrated by the rationality of modernity, design has gone beyond the turmoil of postmodernism and moved towards blurred and not very productive concepts of the creative. Always bearing in mind the misunderstanding that creative action is somehow inexplicable, individual and, at best, ingenious. From recognition as an elusive economic factor to pride in authorship, designers pass through the shoals of superficial styling, which trap us with a consumerist level of consciousness. Today, so-called 'design thinking' is practised at management seminars. Creative design is misconstrued as an empirical method of variant formation. Design becomes recipe. Now, it resembles cooking: through experience, good chefs have internalised a sense of materiality and a taste for ingredients and types of preparation. They combine, vary, and create new connections based on this inherent knowledge. New roles in design are not created by simplification, and all attempts to generate recipes fail, because they suggest shortcuts.

This book attempts to describe the role of design in the culture of its integrative possibilities. It is not about a new design method, but instead about becoming conscious and about communicating. The point is to acknowledge, as a designer, and in all seriousness, that many people are part of the realisation of new possibilities and solutions, and that the role of the designer is to develop and visualise these possibilities and solutions in a sensual, meaningful, physical, and tangible way. The book *Integrative Design* brings together fundamental essays on aspects of integrative design; the associated website⁴ documents recently completed research projects that address these aspects.

Jörg Petruschat (p. 11) explores the essence of design and calls for the independence/autonomy of design – and thereby moves into a controversial dimension that marks the limits of intercultural understanding between English and German-speaking audiences, which is why original language concepts are used at times in the translation. The term design, for instance, is followed by (*gestalten/entwerfen*). Arguing historically, Petruschat's contribution goes in search of the autonomy of design and reflects on processes of consciousness raising and the heightening of awareness. Finally, his argumentation leads towards the self-image and, yes, the attitude of the designer. The discipline consists in showing possibilities to those for whom they design. And so, in his 'personal etymology', he connects doing (*machen*) with liking (*mögen*): the designer as humanist.

Cameron Tonkinwise (p. 44) reflects on the future of design and design research in a dawning era of design after ownership. As Petruschat demands, he outlines the role of designers as thought leaders for an era in which not property but communally used artefacts are at the centre of the designer's interest. The post-

industrialist design researcher must now focus on social practices and the ways in which new kinds of sociality are afforded by them. And Tonkinwise ends by stating that designers must become more politicised.

Tony Fry (p. 32) elaborates an unprecedentedly political agenda for design. He demands that designers reorient their positions to become truly future-oriented and political, '[...] which implies design becoming more dynamic, more powerful and more able to communicate the significance of designers to society in general. This means that the way designers think the culture they create and the practice they establish have to break radically with existing and dominant patterns.'⁵

The remaining five essays focus more specifically on the new artefacts with which designers and design researchers empower themselves through their competencies. Inclusion, social innovation, the role of direct creative action in the innovation process, and radical design in the context of participation and sustainability are such fields of action.

The role of design in the face of the challenge of inclusion was addressed by Tom Bieling (p. 97) in his dissertation, and now in condensed form as an essay in this book. The contributions of Sandra Groll (p. 113), who illuminates design as an interface with society, and Helge Oder (p. 128), who discovers future potential in the integration of design and technology, also draw upon dissertations. Ecological and social innovations as trendsetting basic positions in design, finally, are developed by Anna Meroni (p. 76) and Ursula Tischner (p. 57).

Without exception, all of these topics correspond to the UN's sustainability goals. However we may have heard or read about them, they mark the need for collective action on the part of our generation. They mark those fields of activity in which designers must take unambiguous positions. Political in the best sense, humanist in the best sense. Willing to compromise when it comes to solution strategies; uncompromising on core values. As a guiding concept, integrative design outlines a perspective for design that is genuinely involved. In addition to courage, its basis is practical reason, the ability to criticise and, of course, passion.

I thank the editor Nora Kempkens for her patience as we worked together to develop this book, Ian Pepper for his translations, and Sven Schrape for the graphic realisation. Thanks to Nicolas Ebner for his cooperation, and for his constant support, which accompanied the project right to the end.

And of course, I thank the authors for contributing to this initial approach to conceptualising integrative design; I hope we will be engaging in an ongoing discussion to sharpen our ideas. Specifically, we are building an internet platform where research projects that address the issues of integrative design can be published. Located at the following link will be an extension of this book in the form of concrete design research projects: <https://www.masterstudiodesign.ch/publications/integrative-design>.

Featured projects:

Eine Gretchenfrage an die Designtheorie

Oliver Baron

2012–13

Cape Peninsula University of Technology

Health Hardware Design

Christian Tietz

2012

Human Rights Award 2012

University of Technology Sydney

Lorm Hand – Communication Devices for deaf-blind People

Tom Bieling, Tiago Martins, Ulrike Gollner, Gesche Joost

2017–ongoing

Design Research Lab / Berlin University of the Arts

Hydrofix

Helge Oder

2015–17

HTW Dresden/ITU Dresden

Design for One World

Manuel Wüst, Patrick Müller, Ralf Michel

2017–ongoing

www.designforone.world / Institute Integrative Design – Masterstudio

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- 1 Message to my future grandchildren, from Alexander Gerst, Commander ISS, 19 December 2018, ESA European Space Association, <https://www.youtube.com/watch?v=4UfpkRFPIJk>.
 - 2 “‘Wicked Problems’: A Few Remarks on Design as Research’ in this publication.
 - 3 This position refers to the semantic turn, a theory of design that demands a paradigmatic change of perspective on the part of designers. The design of artefacts should primarily address their potential relevance to stakeholders rather than their sales-promoting rhetoric (Krippendorff 2005).
 - 4 <https://www.masterstudiodesign.ch/publications/integrative-design>.
 - 5 See ‘An Unfolding Political Agenda’ in this publication.

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- Meadows, D. L., Meadows, D. H., Randers, J., Behrens III, William W. (1972). *The Limits to Growth*. New York: Universe Books.

‘WICKED PROBLEMS’: A FEW REMARKS ON DESIGN AS RESEARCH

Jörg Petruschat

At first glance, it's about money. In this society, it's always about money. Whoever poses the question of whether design can be regarded *as* research has an interest in seeing *that* design is regarded as research. Whoever asks this poses a question about legitimacy. The legitimization of design as research vies for recognition in two domains: in economics and in academia.

In the domain of economics, it is difficult for designers to label the peculiarity and irreplaceability of their activities. The space of explanation is already occupied: product development – and this is not only true in Germany – is regarded as the business of implementing concepts within material processes. And then, from time immemorial, there have been engineers, managers, and marketing specialists, and standing above these actors, powerful decision-makers. They arrive at decisions according to corporate interests – as everyone knows, it is not a question of chairs or blenders, but instead of money. When in doubt, therefore, the decision-makers orient themselves through the Excel spreadsheet of the controllers. They want to know the figures for sales volumes, revenues, and earnings. Because valorisation is a function of the velocity of circulation, the controllers, the decision-makers, but above all the others, those who pay for product development or are paid for it, want to know the value of their activity per unit of time.

What do designers do with their time? They design. But what is that? Generally speaking, to design something means to toss out ideas – is a relationship that is palpable in German linguistically, where to design is to *entwerfen*, where a throw is a *Wurf*, and to toss something out is *hinauswerfen*. Designers toss out their ideas in a very special way. They incorporate them in drawings, into virtual and physical models. That is their performance. Afterwards, the engineers arrive and turn this theatre into something that is usable for business. They too engage in design activity. They too toss out ideas. But they do so, obviously, in a different way. Thanks to the designers, they already have a concept in front of them. The engineers, as they are fond of saying, change existing situations into preferred ones. And because standing at the end of their efforts are well-dimensioned plans or formulae across which the eye can rove gladly, engineers too are the creators of what is referred to throughout the English-speaking world as ‘design’.

Conditions for engineers are far tougher than those for designers. But precisely this physical, chemical, biological, and physiological toughness when it comes to the conditions of design faced by engineers actually makes design work

far easier for them. They simply do what these conditions permit. Their ideas do not go beyond these constraints, but instead into them.

The design activity of engineers is subordinated to the task of adapting to the acknowledged rules of technical reality and of technology. This is required by the market, and of assurances provided to customers. Here, there are standards and agreed-upon procedures. Engineers must be familiar with these routines. And they are. It is what they were taught. A proficiency with these routines is their knowledge. The engineer is – as a product of education – a conservative and cunning creature. As soon as engineers depart from agreed-upon procedures, depart from routines, their work becomes risky too. They are held liable for calamities. When they venture to engage in work beyond agreed-upon procedures and routines, they call it research. It requires some leeway, and some space. They call these spaces laboratories so that everyone will understand that the research taking place in them is also a form of work. In short, engineers legitimise their researches not through that which they have to do anyway, but because the old routines for the implementation of ideas and material processes have become inadequate. Designers, meanwhile, are remote from such agreed-upon procedures.

The second domain within which designers strive after money, but also legitimisation, is the academic enterprise.

Here, research is a constant. It is based on the developmental logic of the respective discipline. Recognised as research is that which follows the acknowledged rules of the academic enterprise, and which perpetuates a discipline's existence. To this extent, academic research too contains conservative elements. Within the academic enterprise, therefore, research that strives to establish new objects and methods also requires free space. The free spaces are situated between the disciplines, and are referred to as interdisciplinary or transdisciplinary research enterprises, and if laboratories also exist for this purpose, it is possible too to work on these free spaces themselves, so that new fields emerge in the realms between the disciplines.

In this context, designers have barely gained a foothold. Although they have attempted for decades to ennoble design via the supplement 'scientific', they are at best tolerated within the scientific fields. When it comes to sponsored research in Germany, design simply does not appear; here, as in general in the EU documents pertaining to budgetary decisions, their activities are consistently regarded as service provision. Here, the designers themselves are not entirely free of guilt. For decades, hoping to become economic players, they shouted the slogan: 'We are service providers!' at anyone who would listen. For ten years or so, the wording has been different. Now, designers are creative producers. They create ideas. Once again, they are playing the old cards of provocation and intervention, the card of art. Once again, they are original. That way, financing seems more assured. You pay artists, without asking too many questions, since, after all, they make art. These budgets too may be less generous in the future, but the status of art – with

regard to the academic training of artists as well – remains undisputed. An academy of art and design has already renamed itself an art academy, striking the word ‘design’ from its letterhead. This may be due to the fact that ever fewer students want to study design.

In the context of the art academy, design can only legitimate itself as applied art, as art that makes itself useful. Here too, it is true for design: please stand at the end of the queue, we’ll see what’s left over for you from art, or: why don’t you show us your usefulness as artists? Why, I am asking, did designers unequivocally want to exit this nexus sixty years ago?

In these preliminary remarks, I want to call attention again to a third attempt to legitimate design as research within the academic enterprise. This attempt consists in the subtle detection of the way the activity of designers has been a component of scientific activity for a long time anyway. Zealously, all of the sensuously graspable material that scientists have promoted in research processes – every notation, every sketch, every diagram, every model, everything that goes beyond alphanumeric formulations – is now recorded, discussed, referenced, and furnished with the label design. For many scholars in the humanities and social sciences, a lot of theories and discourses seem less metaphysical, less idealistic, less abstract in conjunction with these graspable, palpable objects, and hence more valid, richer, and a bit more ‘objective’ than all of the chatter about objects and methods could ever hope to have been.

But presumably, even this excursion into the cultures of experimentation will not grant design a ticket of admission to the concert of the academic disciplines. Not even when, after a ‘linguistic turn’ and an ‘iconic turn’, a ‘design turn’ is now proclaimed. For what is meant here with this recent turn is not design as an independent epistemic practice, but instead the availability of scientific knowledge (Schäffner 2010).¹ To the assertion that design is an applied art, the idea of a ‘design turn’ responds with the argument that design is applied science. But for this purpose, for the application of science, we already have engineers. A vicious cycle ensues. Suspended between art and science, design runs back and forth in search of a legitimation for its cognitive work, while resounding from the saturated disciplines are the words: We already have them.

In my words, the alternatives are: pander to or break away? Designers and their theoreticians have pandered since the 1950s. Not to the arts, from which they derive their origins and from which they have attempted, with good reason, to free themselves, but instead to the scientific and engineering disciplines.

I therefore want to develop a number of arguments that would make a break possible.²

All research endeavours about, through, as, or towards design (and no matter how this set of references is prolonged or differentiated), all of these efforts find their ideal point of reference in the notion that design is concerned with solving problems. Design counts as a problem-solving discipline. We find, however, that the consensus concerning this definition is stronger than our understanding of what is meant by the term 'problem-solving'. In the very recent past, for example, Nigel Cross regarded design as being comparable to chess, and believed one could best investigate how design functions as praxis by watching the great masters over their shoulders.³ Is this a pragmatic attempt to learn by imitation? Or does he still stand in the tradition of that rationalist school which believes that design can be fully demystified through the representation of methods? I have no wish to dispute this intention. But when a theory, with all of its epistemic equipment, can only demonstrate that designers solve their problems in the same manner as engineers or scientists, it remains incapable of highlighting the specificity of their occupation. It is hardly sufficient to postulate 'designerly ways of knowing, thinking, and acting' – they must be demonstrated with reference to the real activity of the designer. The criteria of specificity for 'designerly ways' cited by Cross are true for all creative work, and have not gone very far beyond the formulation of Herbert A. Simon, according to which 'engineers are not the only professional designers' (Simon 1996, 111).⁴ The customary equation in English-language and thought between the terms *Entwurf* and 'design' gets in the way of a more precise definition of design as professional praxis. In the German word 'Entwurf', activities are addressed in very general terms through which intuitions or 'ideas' are 'thrown out' into realities, lead out into reality. What I mean here is that without a reasonably well-articulated theory of the particularity of sensuously founded epistemological models, without a reasonably framed hypothesis concerning the nature of the formation of a gestalt/design (*Gestaltwerdungen*), and of the way in which it is related to specific human capacities, explanatory models on design draw – often counter to their intentions – upon a romantic conception of genius that is ill-suited to the collaborative character of contemporary design processes and the status of the designer within them.

This begins already with the implicit acceptance of an idea from Herbert A. Simon, according to which designers conceive preferred states, which are then transformed into existing ones. But is this the case? Does the motivation for change emerge from a nebulous future? In my view, a problem emerges when routines malfunction. Here, I follow Karl Popper, who perceives things in a similar way.⁵

Problems arise when the routines in which all living beings reproduce their existence lead to threats to that existence, or even remain unsuccessful. Then, alternatives must be found. This however involves no special performance on the part of designers. Any crow can do that. Creativity, the efforts of the living creature to

discover behavioural models that secure its existence, arises from the game of coping with disappointments and frustrations.⁶ I will be returning to this topic soon.

One strategy for arguing for the singularity of design is offered by Richard Buchanan.

Somewhat laboriously, he disentangles himself from the epistemological model proposed by Simon and Newell (1972) in *Human Problem Solving*⁷ and takes up a debate which arose in 1974 at the Design Theory Congress (Spillers 1974):⁸ the debate about the viability of Horst Rittel's idea of 'wicked problems' (Buchanan 1992).⁹

The mathematician Horst Rittel, who developed a logically grounded theory of design (*Entwurfstheorie*) during the 1950s and 1960s, and who taught at the Hochschule für Gestaltung in Ulm, encountered a category of problems in the context of his work in the area of urban sociology and planning which defied the linear programming of planning processes (Rittel and Webber 1973).¹⁰ It was a question of problems whose factors were in some sense messy, or in any event lacking in clarity, and hence not amenable to being transformed into manageable, logically structured tasks in the way familiar to engineers, the kind of problems that can be worked through ingeniously according to the formula of tables of calculations. Those involved in urban planning cannot simply project typologies of traffic flows and the resources for delivering supplies and for waste disposal according to engineering principles, but must also cope with a network of social factors, each of which displays an incalculable dynamism and complexity. The interaction of logically calculable and logically unpredictable factors and their ambiguous interrelationships makes the work perplexing.¹¹ A number of people who heard Rittel's lecture in New York came upon the idea of reclaiming the perplexing, vague qualities encountered in the initial conditions of problem solving as the specific challenge for design.

In the present context, it is important to recognise to begin with that responsible for the 'wickedness' identified by Horst Rittel with regard to complex problem areas are the limitations of a systematic planning theory. The term 'wicked problems' refers to the limits of what can be mastered by processes that are ramified in a linear way.¹² The model of linear operations, which allows computers to hum so promisingly, is no match for the complexity of everyday design praxis.

Although Richard Buchanan thematised certain issues with regard to the so-called 'wicked problems', the results of his efforts with regard to what actually designers do are disillusioning. In a typically Anglo-Saxon manner, Buchanan does not differentiate between the terms 'Entwurf' (i.e. a general sense of mental models that are thrown out into reality and thus bound back to reality) and 'design', making it difficult for me to discern what he regards as specific to professional design work. Finally, he perceives the perplexing quality of design problems in the fact that they are indeterminate (in contrast to being undeterminate/under-determinate). According to Buchanan, the special trait of designers is that they begin work with an explanation and specification of the object.¹³ Finally, he argues, they work on something that does not yet exist. This, he says, differentiates them from scientists, who know

from the beginning what they are doing because from the start, they act within regulated systems and in a sense only enhance their definiteness.¹⁴ This proposal for difference goes one step further – it shows that design is obviously something other than science, and that this something other has something to do with processes of clarification that function differently from scientific methods.

Nevertheless I find Buchanan's proposal ill-suited to enhancing the reputation of the designer in concert with research, since it amounts to saying that: Here are people who, at the start, never know exactly where they are going with the things they are doing. I do not deny that such uncertainty surfaces repeatedly, but it can hardly be declared to be the core of professional competence. Isn't it a question of instead demonstrating how designers succeed in overcoming general uncertainties? Isn't it necessary to show in detail how designers succeed in taming wickedness, which is to say proliferating complexity?

In opposition to Buchanan, I do not perceive the specificity of design problems in there being too little information on the table. Design does not begin in vagueness, like a spirit that hovers above the waters. The design conception always begins with a reality – that is the case. The primary art of design however consists in calling this reality into question, in dissolving the pre-existing forms and their order, which has up to now appeared to be compulsory.¹⁵ The vague and indefinite aspect of the design problematic is a self-created drama, not a special fate that clings to it.¹⁶

Design begins with the recognition that the factors on the table are no longer compatible with one another. More precisely: design begins with a recognition that the arbitrariness that has succeeded up to now in bringing the effective factors formally into a whole is no longer acceptable.¹⁷

Design begins with a critique and a disorganisation of reality, with the liberation and redemption of forms and functional models from their previous dispositions and contexts of application, with the destruction of a reality that is imagined as an integrated and functioning whole in the object.¹⁸ Designers dissolve – initially for themselves – the hitherto familiar performance of use and enjoyment. At least initially, then, this work on the dissolution of an existing order produces that vagueness which Buchanan identifies, not without justice, as a particular feature of design processes.¹⁹

It therefore falls short to see the special nature of design work solely in a trajectory from the vague to the formally determinate. As a praxis of professionals, design to begin with ascertains what is confounded in this world. Who, if not designers, are going to expose the beautiful appearance of the regulated world as deception and experience it as repellent?

They begin, then, by transforming the existing, the fixed, into something vague and virtual. *That is the problem.* They are competent, first and foremost, to destroy the surfaces and arrangements through which things and experiences have hitherto cohered. They achieve this, however, only by demolishing the aura of success,