

Aarhus School of Architecture // Design School Kolding // Royal Danish Academy

FORM ARTICULATED

Hove, Helle

Publication date:
2010

Document Version:
Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for pulished version (APA):
Hove, H. (2010). *FORM ARTICULATED: Communicating form experiences in design*. The Danish Design School Press. Copenhagen working papers on design Vol. 2010 No. 4

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

The background of the cover features a large, light gray triangle pointing towards the bottom right. Within this triangle and the surrounding white space are various white line-art illustrations: a chair-like form at the top left, a cluster of circles on the left, a spiral-like shape in the center, another chair-like form on the right, and a cluster of circles at the bottom. The title text is centered within the gray triangle.

FORM ARTICULATED

Communicating form experiences in design

Helle Hove

Photo montage on the cover shows:

Chair: NAP, Republic of Fritz Hansen, design: Kasper Salto, 2010

Ceramic object, Turi Heisselberg Pedersen, 2009

Textile pattern, Marimekko, design: Maija Isola, 1956

Blue fluted cup, Royal Copenhagen

Cup, IKEA 365+, design: Susan Pryke

Circle pattern constructed by the author

Translated from 'FORMSPROG: Formidling af designerens formgivningserfaringer'

English edition 2021

Translation Dorte Herholdt Silver

The Danish Design School Press // Strandboulevarden 47 // DK-2100 Copenhagen Ø // Denmark

Copenhagen Working Papers on Design is published at varying intervals by The Danish Design School. As a member of The Danish Centre for Design Research in Copenhagen, one aim of The Danish Design School is to stimulate and contribute to design research and create a public awareness of its results. For this purpose, Copenhagen Working Papers on Design serves as a channel of quick and informal dissemination of results from design research related to The Danish Design School; in particular early work and work in progress. (For a complete record of research under the auspices of The Danish Centre for Design Research, please consult the READ database: <http://www.re-ad.dk/front.do>.) Furthermore, Copenhagen Working Papers on Design occasionally features high-quality non-research papers that aim at informing future design research, or making work undertaken at The Danish Design School accessible to a wider audience.

General editors //

Nina Lynge // research coordinator // The Danish Design School
Per Galle // associate professor // The Danish Design School

Printing & binding //

The Danish Design School // Printing Centre

Back issues //

Issues from 2006 // no. 1 and on are available online as PDF-files, at
http://www.dkds.dk/Forskning/Publikationer/Copenhagen_workingpapers_on_design.

2010 // no. 3 // Kirsti Andersen, Nina Lynge, Thomas Schødt Rasmussen & Troels Degn Johansson
// Artistic practice and modern design education.

2010 // no. 2 // Per Galle (Ed.) // CEPHAD 2010. The borderland between philosophy and design research. Plenary sessions & supplementary items of the CEPHAD 2010 Conference, Copenhagen, 26–29 January 2010.

2010 // no. 1 // Helle Hove & Per Galle (Eds.) // CEPHAD 2010. The borderland between philosophy and design research. Regular table sessions and master class sessions of the CEPHAD 2010 Conference, Copenhagen, 26–29 January, 2010.

2009 // no. 1 // Martin Bodilsen Kaldahl // The digital clay: Research and development work at the Danish Design School, 2005–08.

2008 // no. 3 // Kitt Boding-Jensen & Thomas Schødt Rasmussen // Byggeriets Tekstiler: En hvidbog om tekstile løsninger i byggeriet (Construction Textiles: A Whitepaper on Textile Solutions in Construction).

2008 // no. 2 // Kirsikka Vaajakallio // Design dialogues: Studying co-design activities in an artificial environment.

2008 // no. 1 // Niels Hvass // Niels Hvass: Kunstnerisk virksomhed 2004–2007 (Niels Hvass: Artistic practice 2004–2007).

2007 // no. 4 // Karen Lisa Goldschmidt Salamon // Kulturel oprustning? Om den kulturalistiske drejning i dannelse og politik (Cultural reinforcement? About the culturalist turn in *bildung* and politics).

2007 // no. 3 // Denis Virlogeux // Design mellem kunst og forskning (Design between art and research).

- 2007 // no. 2 // Erik Krogh // Stolen i rummet – rummet i stolen (The chair in the room – the room in the chair).
- 2007 // no. 1 // Henrik Lund-Larsen // Designartikler til folket (Design articles for the people).
- 2006 // no. 7 // Per Galle // Hvad skal vi med designforskning? Bidrag til en målsætning (What do we need design research for? Contributions to a goal).
- 2006 // no. 6 // Akademisk metode 2 (Academic method 2).
- 2006 // no. 5 // Akademisk metode 1 (Academic method 1).
- 2006 // no. 4 // Kirsten Hastrup // Designforskning: Mellem materialitet og socialitet (Design research: Between materiality and sociality).
- 2006 // no. 3 // Karen Lisa Goldschmidt Salamon // Two papers on governance and self-management.
- 2006 // no. 2 // Marie Riegels Melchior // Modens fascination og logik: To artikler om mode (Fashion fascination and logic: Two articles about fashion).
- 2006 // no. 1 // Nikolina Olsen-Rule & Maria Mackinney-Valentin // Two papers on fashion theory.
- 2004 // no. 4 // Ken Friedman // Of course design pays. But who says so, and how?
- 2004 // no. 3 // Louise Mazanti // Four papers on contemporary craft.
- 2004 // no. 2 // Anne-Louise Sommer // Two papers on modern metropolitan cemeteries.
- 2004 // no. 1 // Snorre Stephensen & Peter Mackeprang // Keramiske Klimaskærme, 1. etape (Ceramic climate screens, stage 1).
- 2003 // no. 2 // Thomas Schødt Rasmussen // Research and artistic practice at Danmarks Designskole.
- 2003 // no. 1 // Thomas Schødt Rasmussen // Danmarks Designskoles plan for forskning og kunstnerisk virksomhed (The Danish Design School's plan for research and artistic practice).

ISBN // 978-87-7830-848-1

Table of Contents

Table of Contents	5
Summary	7
1.0 // Introduction	7
1.1 // Learning by doing	8
1.2 // Defining the topic	8
1.3 // Problem statement	9
1.4 // Purpose	9
1.5 // Basic assumptions	10
1.6 // Editorial overview	10
2.0 // Basic conditions for working with aesthetic issues	11
2.1 // Innovation	11
2.2 // Complexity	12
2.3 // Tacit knowledge	13
2.4 // Practice epistemology	14
3.0 // Communicating design experiences	15
3.1 // Focusing on possibilities	15
3.1.1 // Eye, take and appreciation	15
3.1.2 // Rules of thumb	17
3.1.3 // Alexander patterns viewed as a 'take'	18
3.1.4 // Communicating experience by explaining a 'take'	19
3.1.5 // Partial conclusion: focusing on possibilities	21
3.2 // Using cases	22
3.2.1 // Partial conclusion: using cases	23
3.3 // Communicating tacit knowledge: comparing examples	24
3.3.1 // Examples as a clarification of a statement	24
3.3.2 // Illuminating comparisons: similarities	24
3.3.3 // Illuminating comparisons: differences	26
3.3.4 // Illuminating comparisons: triads	28
3.3.5 // Helping students render tacit knowledge explicit	29
3.3.6 // Alternatives to verbal communication	30
3.3.7 // Partial conclusion: communicating tacit knowledge – comparing examples	30
4.0 // Assessments	31
4.1 // Assessments are an integrated aspect of the description of form experiences	31
4.2 // Assessment and judgement as a necessary skill	32
4.3 // Judgements as tacit 'knowledge'	33
4.4 // Judgements of taste in education	35
4.5 // Partial conclusion: assessments	37
5.0 // Conclusion	38
Acknowledgements	39
About the author	39
References	40

Summary

This report discusses methods for examining and communicating experiences and knowledge about the means designers can use in order to achieve a form expression that speaks to an immediate sensuous experience, with a particular view to courses, practice-based research and artistic development in design education. The discussion builds on Donald Schön's (1983/2016) theories of the reflective practitioner and underscores the following conditions for the designer's approach to aesthetic issues: complex wholes, the inadequacies of language and the call for innovation. In this light, the text proposes methods based on the use of cases and illuminating comparisons of examples as a way to identify design phenomena and qualities. The concepts of 'eye' (to have an eye for an issue or a topic), 'take' (a way of doing things) and 'appreciation' (the attitude that motivates a choice) are used to describe types of experience that can meaningfully be communicated. It is pointed out that an adequate description is not possible without including a certain value charge and that expressed attitudes and assessments are crucial for the design student to develop the aesthetic judgement that is a necessary aspect of the design process.

1.0 // Introduction

Design education programmes in Denmark are under transformation and are becoming increasingly academic. Students at The Danish Design School are faced with a growing demand to present arguments in their project presentations. They are asked to motivate their choices and 'I think it looks nice' is not considered an acceptable motivation. This trend may cause considerations of form to slip into the background in favour of more conceptual or 'contrived' approaches to product design – simply because the latter are easier to argue.

However, form and aesthetics are key components in most products that are designed, whether as eye-catching device or as an integral part of the product's function and message. The competent handling of form and aesthetic expression is a core design skill and one that students need to hone on par with their grasp of innovation, concept, materials, user involvement and so forth¹.

But how can this skill be developed and honed? What is the knowledge the designer builds on in making aesthetic choices? How can experiences of form be communicated, and how might we facilitate a nuanced and precise dialogue about this topic? Is it possible to enhance the educational practice in this field?

¹ Jørgen Rosted, head of development at FORA, the research unit under Erhvervs- og Byggestyrelsen (Danish Business and Construction Authority), mentions aesthetics and form as one of the two major challenges that a Danish design policy needs to address, in part by raising the entrance requirements for design education programmes in that regard. (The other main challenge, according to Rosted, is design thinking as a strategic tool). (Interview in Danish Designers' membership journal, *Inform*, January 2010, pp. 29–31).

1.1 // Learning by doing

When design students learn to work with aesthetic effects such as form and colour, they usually do so through project assignments in the workshop or at the drawing table in an iterative process of trial and error. 'What happens if I make this line thicker, the form sharper, the colour more saturated?' Through continuous experimentation and in a dialogue with the teachers about the specific case, the students develop a grasp of basic design tools, which is partially in the form of know-how or tacit knowledge.

That is how I was taught at The Danish Design School and at Design School Kolding during the 1990s, and this type of project approach continues to play a major role in Danish design education².

In his book *The Reflective Practitioner* (1983/2016), Donald Schön points out the many good reasons for this educational method and examines the studio or sketchpad approach, where the student works on a project, emulating (aspects of) the professional designer's working process. While Schön used his – fairly uncritical – observations of an education situation in a school of architecture to lay out a basic 'practice epistemology' and propose a 'practicum' in professional education, I am going to use his analyses to see if we might finetune and ground design education with a more nuanced and explicit articulation of knowledge as a way to follow Schön's call to practitioners to find suitable ways to convey their experience (Schön, 1983/2016, pp. 230 ff).

In the following, I focus on the parallels between Schön's school of architecture example and Danish design education. Several of the other texts I refer to in my discussion of design process and education also come from architecture research. Although several voices in the current Danish debate are pointing to the differences between architecture and design³ I feel that the selected texts are relevant because architecture and design have many common conditions in relation to the issues of form that I have chosen to focus my discussion on.

1.2 // Defining the topic

Design offers practitioners a number of effects, and one of the key tasks for design students is to familiarize themselves with these effects. Sometimes, teachers complain that the students cannot *see*. They lack awareness of form. To be able to *distinguish nuances*, to register differences and to *grasp the effects at one's disposal* are key skills for designers and may be seen as a condition for or parallel issues with conceptualization, second order understanding⁴, user dialogue, trends, personal style and taste. The topic of this discussion is not, essentially, how to find the right choice but *how to develop a confident understanding*

² The teaching practice itself could be made the topic of a separate study.

³ There was heated debate in the Danish press in spring 2010 in connection with the plans for a merger of The Danish School and the Royal Danish Academy of Fine Arts – School of Architecture.

⁴ Klaus Krippendorf (2006) uses this term to refer to the designer's understanding of how others will perceive a product.

of the options.⁵ How to develop a grasp of the 'register' of aesthetic effects available⁶ in designing.

In this context, I will focus on the aspect of designing that speaks to what Donald Norman (2004) calls 'the visceral level' in his book *Emotional Design*. Norman lists three categories of perceptual or emotional responses to design: visceral, behavioural and reflective. 'Behavioural' responses relate to the product's function, 'reflective' reactions to cultural and social meanings and product reflections. 'Visceral' has to do with our intuitive 'gut' feeling; in evolutionary terms, according to Norman, it is the most primitive level and shared by people all over the world. It refers to the immediate appeal of certain forms and colours that we cannot necessarily explain. I do not share Norman's view of the primitive character of these qualities⁷ but use the triad to specify how I define my topic of interest in this context. Thus, when I use the term 'aesthetic' in the following, I refer to the *immediate, sensory perception of, for example, form*. For simplicity's sake, I use the term 'form' as a general term about anything that a designer can shape or form, including colour, texture, spatial qualities and so forth.

1.3 // Problem statement

The questions I will be examining here are the following:

How can we, in the context of a design education programme, establish a dialogue and communicate experiences and knowledge of issues of form that belong to Norman's 'visceral' category of immediately sensuous reactions? What is a good and effective way to try to express aspects of designers' tacit knowledge about this? What types of experience is it relevant to include in a course?

1.4 // Purpose

In 1995, I wrote the opinion piece *Giv Os et Sprog* (Give Us a Language) in the journal *Dansk Kunsthåndværk* (Danish Craft and Design). It called for a richer, more nuanced language of form in design education and a reaction to the current trend among both designers and laypeople to move very quickly from the internal, inarticulate perception

⁵ Even if assessments and attitudes, on closer inspection, prove inevitably to become part of such a description.

⁶ Steen Eiler Rasmussen uses this term in his book *Experiencing Architecture* (Rasmussen 1957/1959).

⁷ Norman's thesis is that reactions at the 'visceral level' are universally human and biologically based, and he mentions a selection of universally appealing effects (for example, a rhythmic heart beat, symmetry and the properties of sweet, colourful fruit). In my opinion, the range of effects is much broader and more diverse. We not only react spontaneously to soft and sweet but also to salty and fierce. We have an entire nonverbal 'language' at our disposal, which can be very sophisticated. Indeed, despite this list, Norman quickly acknowledges that there are no hard-and-fast rules for how designers can employ the effects that relate to the 'visceral level'.

of the form expression of a product to an assessment: good or bad, interesting or boring. In the following, I will look at the significance of assessments and aesthetic attitudes in designing but I will also discuss how we can better search for and express nuances in reflections on form and designing – how we can balance for longer in the explorative field that lies in between the wordless experience and the subsequent assessment. The general purpose is to improve education, both in order to create a more nuanced basis for argumentation in project presentation and, above all, in order to identify relevant methods for enhancing the student's or the practitioner's awareness and understanding of the effects that designers have at their disposal.

1.5 // Basic assumptions

I base the article on the following assumptions:

- It is helpful for designers to be able to distinguish nuances and to be aware of the effects at their disposal.
- At an aesthetic level, designing is about telling different stories⁸ – for example, one desk may have a light and dynamic expression, while another has a weighty, stable expression. Although it is possible to rate quality on various parameters and argue for a given choice, there simply is no one objectively correct solution.

These assumptions could be debated at a different time, but they are basic premises of the following discussion.

1.6 // Editorial overview

After the introductory Chapter 1, Chapter 2 describes the conditions for the designing. In Chapter 3 I discuss how reflections on and experiences with the use of aesthetic effects can be communicated in design education in a way that takes these conditions into account. Chapter 4 discusses aesthetic judgement and the role of normative theories in education. In accordance with my own proposal of using cases in education, I will use illustrative examples throughout the report, which is rounded off with a conclusion.

⁸ Cf. the view in *The Architecture of Happiness* (de Botton, 2006) and *Experiencing Architecture* (Rasmussen, 1957).

2.0 // Basic conditions for working with aesthetic issues

Working with form in design is characterized by certain key conditions that need to be taken into account in considering what type of knowledge design students should acquire:

- *Innovation*: Design is a forward-looking and often innovative activity. Thus, the designer's task often involves thinking across boundaries and established categories. This means that knowledge of existing phenomena is of particular interest due to the opportunities for innovation that it may point to.
- *Complexity*: Second, expressions of form are experienced as whole entities in a complex interaction of the individual components, resulting in combined effects that are difficult to anticipate.
- *Tacit knowledge*: Third, much of our experience with designing (giving form to something) is established as so-called tacit knowledge. Language is not always adequate, which presents a challenge in communicating about this topic.

An additional condition that I will discuss in the following is:

- *Assessments*: Continuous assessments play a crucial role in the design process, which makes judgement an important skill for students to develop. Furthermore, it is difficult to communicate aesthetic experiences in a satisfactory manner without also conveying an opinion.

2.1 // Innovation

The work of designers and architects is inherently forward-looking and often innovative. The designer's task is not to describe what exists but to imagine what is coming (cf., e.g., Galle, 1999 and 2008).⁹ In the creative process, categories, definitions and distinctions are not necessarily static entities but rather aspects of dynamic processes. Designers can operate with fluid boundaries and new combinations across traditional 'boxes'¹⁰. In this context, classic ways of examining design in terms of historical styles and categorizations is more relevant to designers when they can serve as a basis for innovation by pointing to alternatives than if they are perceived as templates or 'boxes' that the innovation has to fit into.

⁹ Among others, Nigel Cross has described the particular kind of knowledge that is required of a designer. A type of knowledge that, according to Cross and the sources he quotes, stands out as a third knowledge culture in addition to the natural sciences and the humanities (Cross, 2006, p. 2).

¹⁰ Richard Buchanan has pointed this out and proposed the term 'placements' to describe how designers, in contrast to the scientific use of precisely defined categories, operate with open concepts in order to explore options (Buchanan, 1992). In a lecture in 2009 (the research seminar held by the Danish Centre for Design Research at Hotel Nyborg Strand) Buchanan used the term 'topics' to refer to a more fluid or dynamic way of defining or inquiring about a topic.

Example 1 // Mathematical categorization of ornaments

As a designer, my interest in the mathematician Slavik Jablan's effort to categorize ornaments based on their mathematic and geometric structure (Jablan, 1995) is not just motivated by a desire to be able to place my own patterns neatly into specific categories. I am also interested because it opens my eye to possibilities that I was not previously aware of. I may realize that all the patterns I have designed so far are based on a particular symmetry and that other symmetries are possible that will produce new effects. The categories thus give me a new awareness of possibilities and are valuable to me, as a designer, regardless whether Jablan covered all the possible symmetries or whether other mathematicians might identify flaws in his system.

Bryan Lawson has pointed out that designers often benefit more from awareness of phenomena and the issues they relate to than from accurate calculations and fixed norms for the outcome, because new factors often come into the picture that the original descriptions do not account for (Lawson, 2006, pp. 70 ff). In design, the communication of experience might thus benefit from focusing more on clearly demonstrating challenges and issues than on proposing solutions and answers.

2.2 // Complexity

The particular complexity of design issues was pointed out, among others, by the architecture researcher Sven Hesselgren, who studied the perception of architectural elements. In his book *On architecture: An architectural theory based on psychological research* (Hesselgren, 1987), he explains that we cannot base studies of the perception of form on technical measurements of the forms themselves; instead, we must direct our attention at the human perception of the phenomena we wish to study. Based on examples of optical phenomena, he demonstrates the difference between measurable, physical realities and the psychological perception of the same phenomena. For example, he shows how two fields of colour with the same objective properties shown side by side can appear as two different shades due to the influence of surrounding colours and shapes.

In his 1987 treatise, Hesselgren describes his own research as 'phenomenological analysis' to indicate that his topic is the *perception* of phenomena, not their objective properties. One of the key points in his research is the *impact of the greater whole and the context* on human perception of a phenomenon. Thus, studies seeking to identify universal properties of individual elements will have very limited validity.

For example, Hesselgren mentions a survey, in which the respondents were asked to pick the most beautiful colour on a colour scale. Blue had the highest score, by a significant margin, while yellow was the least favoured. 'People prefer blue, and designers should therefore favour blue whenever possible and avoid yellow' might be the conclusion to this scientifically conducted test. However, as Hesselgren points out, there are far more yellow houses than blue ones in the Swedish landscape. Naturally, this is because colours are seen in context – for example against the green landscape and the blue sky.

The survey respondents probably favoured blue over yellow due to the white background used in the test material.

Thus, it is not easy to make general statements about an isolated feature, as context is crucial for how it is perceived.

The concept of complexity is also well-known outside the context of psychology, for example in the chemical composition of ceramic glazes, where two components that both have a very high melting point may melt at a much lower temperature when they are combined. Certain ingredients need to be mixed in a certain combination to achieve certain colours or effects, and the impact of a component does not always follow a linear regularity, in the sense that adding a small amount of a substance will necessarily produce a similar increase in effect. Just as many scientific researchers have to rely on empirical methods, designers too have to test the composition of their elements. The 'butterfly effect' described in chaos theory – the notion that a butterfly flapping its wings can change the weather on the other side of the planet – also applies to issues of form: a tiny detail may change the end result in a way that is rarely predictable without the use of a sketch or a model.

Aesthetic issues are thus often too complex to conform to universal rules or descriptions of the effects of increasing or decreasing individual factors, even if we disregard the possibility that survey respondents might change their preferences or have different cultural backgrounds and instead rely solely at our own perception of form expressions. It is possible to zoom in and try to study the individual factors on their own to develop a *sense* of their impact and potential, but we should not expect to come away with firm knowledge that will enable us to make predictions.¹¹

2.3 // Tacit knowledge

Among designers, aesthetic reflections are often communicated in a few words or merely through gestures and often remain an unarticulated undercurrent, also in education and practice-based research projects. That is not without reason. Several researchers have pointed out the distinction between sensory experiences and language and the difficulty of articulating the know-how and sensibilities one's work and aesthetic judgements are based on (Alexander, 1968, quoted in Schön, 1987, p. 23; Daley, 1982; Whitfield 2005).

Michael Polanyi (1966) introduced the notion that researchers – and people in general – possess knowledge that goes beyond what can be expressed verbally, and that this 'tacit knowledge' is a personal and embodied condition for explicit knowledge. Tacit knowledge is acquired through experience, imitation, practice and storage of lived examples¹². Tacit knowledge may be completely obvious to the individual but can be difficult to put into words¹³ – Polanyi uses the recognition of faces as an example of knowledge we use on a daily basis but would have difficulty articulating verbally.

¹¹ By contrast, it is possible to falsify ordinary assumptions using questionnaire surveys. Hesselgren refers to a study where people were asked to choose among differently proportioned rectangles. The one that most closely approximated the golden section was not favoured by the respondents.

¹² A point that is reflected in The Danish Design School's research plan (Danmarks Designskole, 2008, p. 6) as it underscores that theory should be taught by practising researchers to ensure that it is not just textbook examples but the actual research *approach* that is conveyed. This may also justify why the school's subject teachers are required to be (or have been) practitioners of the subject they teach.

¹³ If anything, *language* rests on tacit knowledge. Try to explain the meaning of *before* and *after* to a child who does not grasp the concept of time.

on a daily basis but would have difficulty articulating verbally. A key concern in design is to give products a 'face' and an expression, and the difficulty of expressing one's knowledge in this regard can be compared to the difficulty of describing what it is we recognize in a face, even though we have no problem making the distinction and may even be able to reproduce it visually.

2.4 // Practice epistemology

Donald Schön was building on Polanyi's ideas when he introduced his concept of 'practice epistemology' in *The Reflective Practitioner* (Schön, 1983/2016), which challenges the technical-rational 'scientizing' of practical disciplines. Schön demonstrates how the practitioner's knowledge is acquired through a reflective and dynamic process, rather than through static, written theories.

With his concept of 'practice epistemology' Donald Schön sought to account for exactly the kinds of conditions I mentioned in relation to design work. He describes how practitioners deal with situations that are vague, ambiguous and uncertain. Schön points out that due to the complexity of such a practice situation and the many different elements and layers, all of them mutually interacting, it is impossible to predict all the consequences of a given move, let alone which move is preferable. The practitioner has to initiate a 'conversation with the situation' – testing a move and seeing what happens, listening to the situation's response. The knowledge that the practitioner relies on in these complex situations does not come from textbooks but has emerged as experience through multiple layers of specific examples – so-called repertoire building, meaning that the practitioner relies on a repertoire of previous situations as a precedent for unfamiliar, unique situations that are both similar to and different from the previous examples (Schön, 1983/2016, pp. 138 ff).

Schön's perhaps best-known example of a conversation with the situation comes from a school of architecture, where a student, Petra, is working on the design of an elementary school (Schön, 1983/2016, pp. 75 ff., 1987, pp. 44 ff.; Schön & Wiggins, 1992). He demonstrates how Petra and her teacher, Quist, during the sketching phase jump between different layers or domains, for example from thoughts on the design of the layout to the consequences of a given change in design of anything from learning situations to access conditions and how the sun falls, as they test new moves, sketching the layout of the school. It is only by testing these moves that they can get a sense of their consequences and of the overall nature of the task. Quist does not have a preconceived answer as to what would be the best layout, but his experience lets him quickly spot promising possibilities and develop an idea of the sorts of moves that might prove useful.

This example illustrates how architects continually jump between many different points of view and need to consider multiple aspects of an issue simultaneously. The same applies when we focus on the aspect of the design process that is about giving form to things: material, proportions, texture, curvature – a change in a single parameter results in altered conditions for the other parameters, and the designer has to continually jump between points of view in order to sense the impact of a given choice. It makes a difference whether you choose tubular steel or wood for a furniture design – the coolness of the metal and bendability of steel tubes affect all the other design choices, and all the parameters mutually influence each other.

Schön sees the traditional sketchpad education in schools of architecture (and design) as suited for developing precisely that ability to deal with uncertain and complex situations and to acquire the skills the future practitioner will need (e.g., Schön, 1987, pp. 36 ff). In extension of this point, he advocates the use of cases in education rather than universal guidelines. He also points out that Quist, in the example he quotes, is not very explicit in the way he shares his knowledge – the student is expected to acquire the approach in a sort of apprenticeship process, as she observes how he deals with a given task and subsequently tries to emulate his approach (ibid., p. 96). Might we supplement this way of conveying experiences with more explicit communication? Might we develop a more precise and nuanced dialogue?

3.0 // Communicating design experiences

In the following three sections I will propose ways of approaching dialogue and communication about issues of design and form in education, based on the conditions I have discussed so far: *Focusing on possibilities* proposes an approach that offers a good basis for innovation, *Using cases* proposes ways of accounting for the complexity of aesthetic issues, and *Communicating tacit knowledge – comparing examples* proposes ways of expressing design considerations that may be difficult to put into words.

3.1 // Focusing on possibilities

I propose that the exchange of experience in design should focus less on ‘what we know for certain’ and more on elucidating an issue by demonstrating ways of understanding issues and providing a clear awareness of the designer’s palette and toolbox in order to point to new possibilities.

3.1.1 // Eye, take and appreciation

In the following, I will use the terms ‘eye’, ‘take’ and ‘appreciation’ as fruitful approaches to communicating issues of form. They are not related to factual, verifiable knowledge but describe ways of addressing and understanding the topic.

By ‘eye’ I refer to discovering *new ways of perceiving form*. For example, as I did in my youth when I learned about the phenomena of figure/ground and ‘negative form’, that is, the gaps that emerge as background for the figure. I could see that some figures had greater quality than others but did not know what this might be attributed to. Now I realized that the design of negative space played a significant role. I had developed an eye for a new aspect of form that I would be able to use in my future work.

During their first years at The Danish Design School, the students learn particular ways of seeing objects, for example as consisting of primary forms, such as spheres or cubes, and translating this view into a drawing. This leads to the development of a certain ‘eye’ – a way of seeing and grasping form. This ‘eye’ is rarely attained in a single leap, simply because it has been demonstrated once, but is acquired through iterative drawing exercises. (See fig. 1).

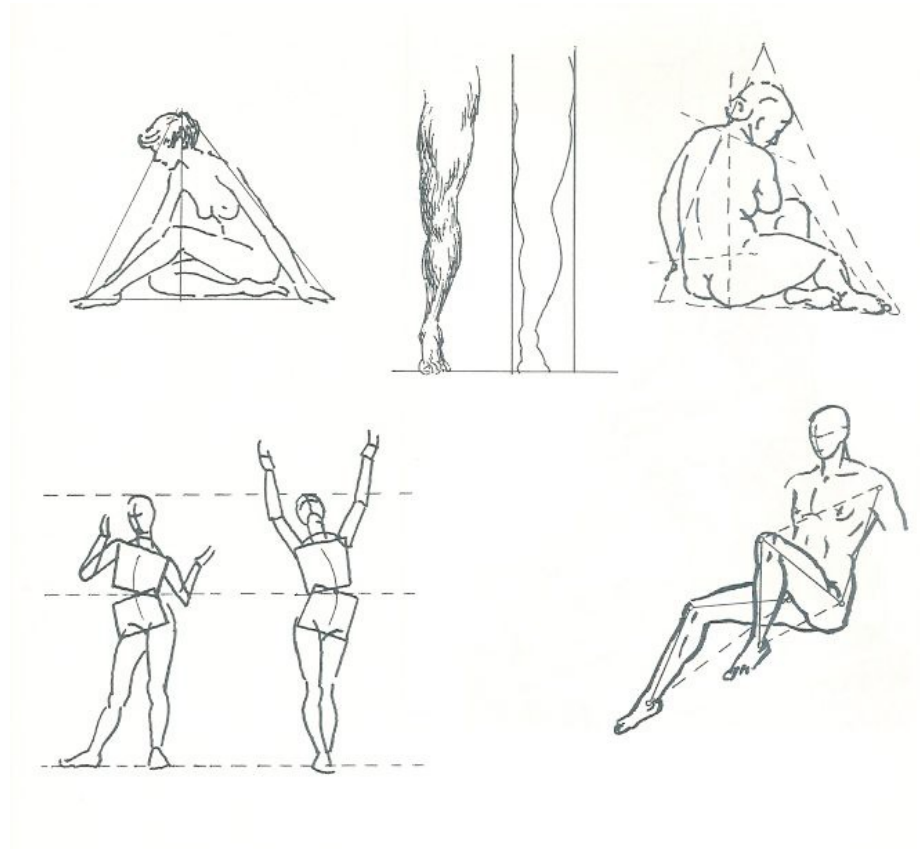


Fig. 1 // From Hauchkrog (1984). Drawings by Eskil Hauchkrog.

Awareness and ‘eye’ for such aspects and issues are taught in a number of fields, including perceptual psychology and art and design history, but designers also work with issues which are so specialized that many of them have yet to be described as a certain ‘eye’ and exist only in the individual designer’s experience.

‘Takes’ are ways of doing things. For example, Arne Jacobsen’s use of right angles and arcs (along with the parabolic curve of the grip) in his Cylinda-line series. (See fig. 2).

Finally, there is ‘*appreciation*’, which plays a key role in design. I will argue that assessments, attitudes and values can be regarded as part of a designer’s register – or tone, perhaps, as another musical analogy. Hence, attitudes and values are also an important aspect to address in order to understand possible form choices and their underlying motivation.



Fig. 2 // Stelton, Cylinda-line Design: Arne Jacobsen, 1967.

Bringing the concepts of 'eye', 'take' and 'appreciation' to bear in the analysis of specific examples of and statements about design applies a perspective that invites innovation. Thus, what is being presented is not 'answers' but perspectives and angles that highlight possibilities rather than aiming for comprehensiveness, clear-cut definitions and delimitations.

3.1.2 // Rules of thumb

Rules of thumb are a particular form of explicit communication of experiences with aesthetic issues, which come up both in education and at the drawing table in the studio. Some reject rules of thumb as untenable assertions that are easily disproven, while others follow them too unquestioningly. If we instead choose to regard rules of thumb as a way of communicating the concepts of eye, take and appreciation, they may contribute to a fruitful understanding of the issue they pertain to.

Example 2 // Rule of thumb: 'A bouquet should have an odd number of flowers'

Many florists are familiar with the rule of thumb that says a bouquet should have an odd number of flowers. The rule probably stems from an observation of the perceptual phenomenon that odd groups tend to 'come together', while even groups 'fall apart'. The same is true of windows in a facade. When there is an even number, one of the gaps will be in the middle, while a row with an odd number will always have a window in the central axis; hence the rule of thumb calling for an odd number of windows.

odd groups come together



even groups fall apart



However, in many cases, the rule of thumb does not apply. If we alter a single factor

such as size



or spacing



the rule of 'even groups fall apart' no longer applies. (Thus, if you have a very big flower, you can combine it with three, rather than four smaller flowers in order to follow the spirit of the rule of thumb, rather than its letter. If your flowers are similarly sized, you can rely on the rule of thumb and use five).

Rules of thumb point to challenges and potential solutions. It is problematic if they are perceived as universal principles, since any rule of thumb will fall short in many real-life situations. As Hesselgren points out, we always need to consider the totality of the given situation. If we, instead, look at the basis for the rules, we may enhance our understanding of form. If we see them as representing a certain 'eye' for a challenge (in the example above: 'Some groupings will come together visually, while others tend to fall apart'), an expression of an aesthetic attitude or 'appreciation' ('It is desirable to have groupings come together') and a proposal of a 'take' that might solve the problem ('Use odd numbers'), rules of thumb may serve as small, helpful warning lights that draw our attention to issues that designers then need to engage with first-hand. As such, they are valuable, and it would be relevant to collect and analyse the rules of thumb that are in use in various design areas.

3.1.3 // *Alexander patterns viewed as a 'take'*

One theorist who sought to articulate experiences in a way that is related to rules of thumb is Christopher Alexander, whose 'pattern language' proposes techniques that can be used in certain contexts (Alexander, 1977). Alexander's 'patterns' are a way to express experiences with connections between physical design and human perception and behaviour. They stand out by being at once holistic and highly specific in their recommendations and thus address precisely the 'missing link' between general aesthetic values and concrete physical form that is the topic of design education.

According to Alexander, the patterns are based on empirical, verifiable findings (Alexander, 1979, pp. 269–270), but many architects find them provoking due to their generalized statements, which are seen as opinionated and reflecting a certain aesthetic attitude¹⁴. Rather than devoting one's energy to challenging the universal applicability of the patterns, however, one might instead choose to appreciate them as clear and helpful descriptions of *takes* that may serve as *eye-openers* by anyone who shares their *underlying values*. Thus, a different attitude towards the concept of knowledge leads to a different view of the relevance of these theories.

3.1.4 // *Communicating experience by explaining a 'take'*

I will offer an example of how it is possible to convey a design experience by describing a 'take' I have used in my own work. I was not initially aware of the common feature in many of my landscape projects – it was only after applying this 'take' in a wide range of contexts that I became consciously aware of it and the qualities it afforded. My description includes observations of perception and aesthetic expressions but also of functions and economic factors. Since weighing incongruent aspects against each other in choosing a solution is a typical aspect of design work I consider them relevant to include in the description of an aesthetic 'take'.

Example 3 // Explaining a 'take': (Drawing lines made up of points)



Fig. 3 // Helle Hove and Iben Brøndum, *The Serpent's Trail*, 2008, Roskilde. Photo: Iben Brøndum

In various landscape projects I have used the method of using points to draw lines.

¹⁴ See, e.g., Dovey (1990).

When points are lined up, we perceive them as a line, and if they are properly placed, the eye, so to speak, finishes the job and connects the dots into a perceived line.

When you work with this effect, spacing becomes crucial – both the gaps in between the points of the line you wish to draw and the distance between lines. If there are multiple lines, the points that make up the individual lines have to be more closely spaced to clearly define where they belong. Otherwise, it may not be clear which line a point belongs to, and the points are then no longer perceived as lines but as a swarm. If this approach is used in a landscape, it is also necessary to consider the foreshortening perspective. Distances that seem big and distinct seen from an aerial perspective (or on a plan drawing) may appear so small seen from the ground that the design becomes muddled and vague.



Fig. 4 // Helle Hove and Iben Brøndum, The Burning Lake, 2007, Roskilde. Photo: Iben Brøndum

One of the qualities of the dotted line is that its appearance varies with the viewing angle: seen from the side, the gaps between the points become visible, but in a lengthwise view, the line almost looks solid. Thus, the viewer's movement changes the appearance of the line in a way that would not be the case with a solid line.

In design, transitions and closures are typically the most likely to cause problems. Perceptual research provides numerous examples that the brain is particularly sensitive to visual shifts. Thus, the closure of a line in the landscape risks looking very abrupt. Using points, it is possible to design a closure that blends into the landscape by gradually increasing the spacing towards the end of the line.



Fig. 5 // Helle Hove and Iben Brøndum: *Crocus Swirl*, Byparken, Roskilde. Photo: Iben Brøndum.

A line made up of points has a light feel and blends into its surroundings in a way a solid line does not. The perforations also allow for unhindered travel, both in practical terms (you can push a pram through the line without bumping into anything) and perceptually. Although we can step over a solid line, for example a line of crocuses, it does not feel as if we are 'supposed to'. A perforated line, however, allows people to slip through while also inviting them to follow the line or take in the spatial experiences it gives rise to.

There are also practical advantages and economic savings in using a dotted line and leaving it up to the viewer's perception to connect the dots. Material consumption is considerably reduced, and as a practical advantage, it is easier to establish and adjust curves based on dotted lines than trimming a solid line.

This review describes my considerations in using the 'take' and mentions certain advantages that it holds. It should not be misconstrued as an attempt to prove that it is objectively superior to any other takes. Instead, it communicates a certain 'take' – a way of doing things – along with an 'appreciation' of its implications. I offer some arguments in favour of the technique that might be relevant in other contexts, but there are obviously many other options.

3.1.5 // *Partial conclusion: focusing on possibilities*

As a way to account for the forward-looking and creative character of design work, I have proposed the use of the concepts of 'eye', 'take' and 'appreciation', more in an attempt to highlight ways of focusing on and elucidating form issues than to provide finite answers. With this, I aim to expand the understanding of a field and to help bring out relevant experiential material, for example rules of thumb, normative theories and categorizations.

3.2 // Using cases

Rules of thumb and similar attempts at universal statements may thus be helpful in a general examination of problem areas, after which the specific case has to be addressed in a first-hand engagement. In contrast to universal dogmas, Donald Schön underscores the use of 'cases' as a means to develop understanding of a practice field. In a sense, cases offer a way to obtain insights second-hand. Engaging with a concrete case, with all the peculiarities and exceptions it holds, conveys specific reflections, free from generalizations, but the case is also added to the list of examples that the practitioner bases his or her experience on (cf. 'repertoire building' (Schön, 1983/2001, p. 138)).

Hence, I advocate for extensive use of cases and a method that involves comparing specific examples with the purpose of achieving familiarity with design effects and their potentials. By 'cases' I mean examples whose role is not, primarily, to serve as 'typical' incarnations of an abstract concept (as is sometimes the case with illustrations accompanying a text) but instead to *stand out with clarity in their particular character* and thus to illustrate multiple aspects at once.

Thus, the point of using cases is that aesthetic issues are best understood from a holistic point of view and that multiple examples of holistic concepts combine to shed light on a problem complex. Paradoxically, it seems that *the best path to general knowledge about aesthetic issues goes through individual cases*.

Example 4 // A 'case' as a source of expanded understanding (blue fluted porcelain)

When I was a design student, I had a teacher who drew my attention to design issues through the examination of specific examples. Once he asked me whether I could tell what (in his opinion) was unique about blue fluted porcelain from Royal Copenhagen.

'It's not the vines in themselves,' he said, 'but the fact that they are painted on a fluted surface.' The textured background adds small variations in colour and thickness to the line that give it a lively feel it would not otherwise have.

I was not particularly interested in tableware, but his explanation was an eye-opener. With this concrete example he expanded my way of *seeing*: I developed an 'eye' for something I had not previously noticed: first of all, of course, that this is how blue fluted porcelain *actually looks* – even though I liked the way it looked, I had not considered why that was – but also that it makes a difference whether a line is even and uniform or whether it pulsates in colour and thickness. I came straight from upper secondary school, where I had learned to abstract and to distinguish between significant and insignificant, and above all, I saw blue fluted porcelain as a conservative symbol of a particular culture (corresponding to Norman's 'reflective level' (Norman, 2004). By attributing significance to a seemingly minor detail, my teacher opened my eyes to the dizzying array of effects designers have at their disposal.



Fig. 6 // Blue fluted cup, Royal Copenhagen.

The experience also drew my attention to an *expressive possibility* – a ‘take’ I could use myself: the bouncy line on a slight relief and the semi-transparent blue that settles a little more thickly in the hollows and thus changes colour. This is an approach that can be used across a wide range of contexts, besides tableware. I also learned from his assessment that the blue line is dull on a smooth surface but interesting on a fluted one – that was a *different parameter of appreciation* than the parameter of simplicity I had embraced earlier. It was easy to take for granted the notion that painting on a fluted background would be a problem – that the texture would add ‘noise’ and blur the clarity of the expression. Now I was introduced to a different opinion, which I could reflect on and transfer to many other situations, where I could compare variation and minor irregularities to precision and uniformity.

Thus, a concrete example can become a source of greater general understanding – probably in many more regards than the ones I have outlined here. The concrete example opens a multitude of dimensions and makes it possible to suggest some general conclusions (the lively line, the eye for detail) without making them too rigid or firm, as isolated dogmas and rules of thumb will often be. Rather, the example is subsequently used as a sort of metaphor and is related to different aspects, depending on the current situation it is applied to.

3.2.1 // Partial conclusion: using cases

In order to accommodate the complexity of design issues and the many different and incongruent aspects designers need to address in any given project, I propose the use of cases to facilitate the discussion and communication of design experience.

3.3 // Communicating tacit knowledge: comparing examples

Cases are also helpful for addressing design issues that are difficult to put into words. Using examples and juxtaposing examples can add new information that is not always captured by our verbal language.

3.3.1 // Examples as a clarification of a statement

One obvious reason to use examples is the desire to clarify meaning and points.

Words alone do not suffice in examining or discussing form expressions. In *The Sense of Order*, the art historian E. H. Gombrich (1984) includes this example from a book on interior design, whose authors write:

‘Among all the forms of a chair there are some which are dictated by the shape of our body, the needs of our convenience ... what is there that Art could add? It should purify the forms dictated by convenience and combine them with the simplest of outlines, giving rise from these natural conditions to ornamental motifs which would be adapted to the essential form without ever disguising its nature.’

C. Percier & P. F. L. Fontaine (1812). *Recueil de decoration intérieures* (Quoted from Gombrich (1984), p. 31)

Gombrich notes how astonished the modern reader must feel when she compares the authors’ text to the related examples (illustration from the book):

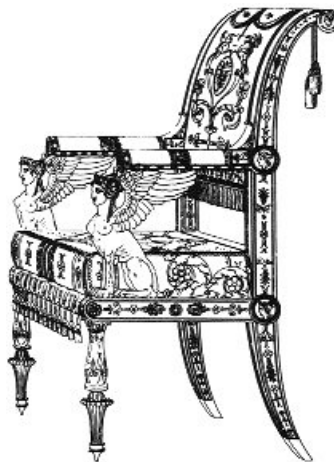


Fig. 7 // From Gombrich (1984). Chair designed by C. Percier and P. F. L. Fontaine. Paris, 1812.

The picture of the chair makes us smile, because, to our modern sensibilities, there is a stark clash between the almost functionalist credo and the abundance of sphinxes and volutes in the example. However, the point is that if we want to understand the authors’ ideas of form, we need to study their examples – the text may be helpful, but it cannot stand alone.

3.3.2 // Illuminating comparisons: similarities

Thus, concrete examples appear to be a necessary element in communicating aesthetic issues and design effects. However, there is considerable variation in how an example is perceived – what is noticed and what is overlooked. An accompanying text may point to perceptions, eye, take

and appreciation, but the *comparison of* examples with common features may also help to convey aesthetic considerations that are otherwise difficult to communicate with the same degree of nuance as that afforded by the purely sensory perception.



Fig. 8 // From the exhibition *TimeOut*, Designmuseum Danmark, 2009. Ceramic objects and selection of additional objects: Turi Heisselberg Pedersen. Stool: Kay Fisker, 1925. Samovar: Danish, 18th century. Photo: Anders Sune Berg.

Example 5 // Comparison of examples with common features (Heisselberg Pedersen)

The photo from the *TimeOut* exhibition (see above) illustrates how the ceramic artist Turi Heisselberg Pedersen has selected objects from the collection of Designmuseum Danmark and reflected on them by creating new ceramic forms. To a professional – that is, to another ceramic artist, who also works with form – this clearly communicates the appreciation of form and shadow effects. We notice the profiles of the forms, all appearing as solids of revolution. The horizontal profiles in the milled legs of the stool are echoed by the dark figure, whose sharper profile shifts take on a dynamic or floating character in space, while the samovar and the big light-coloured figure next to it share a weightier, softer, curvy expression. This juxtaposition shows an ‘eye’, a ‘take’ and ‘appreciation’ by pointing to the qualities Heisselberg Petersen focused in the selected objects.

The understanding we can gain by comparing examples is immediate in its embodied/sensory nature – in a sense, we skip a link in a translation procedure by communicating exclusively by visual means. However, these comparisons are also an excellent basis for verbal reflections on the given form effects, as they allow us to become aware of qualities and dwell longer on them by talking about them, regardless how difficult it might be to put the wordless experience into words and how clumsy and awkward the articulation might appear.

Heisselberg Petersen’s exhibition was surely not created with a pedagogical purpose in mind but rather as a question: ‘What might it be that fascinates me about these particular objects from the museum collection? And how do I create forms capable of engaging them in “conversation”?’

An artistic exploration of form. However, the juxtaposition functions both as investigation and as communication.

3.3.3 // Illuminating comparisons: differences

The investigation or communication of an aesthetic expression may also be approached by comparing examples to show *differences among closely related designs*, as I will illustrate with the following example:

Example 6 // Marimekko design

This textile designed by Maija Isola for Marimekko in 1956 (fig. 9) possesses certain qualities that I would like to examine. (The occasion might be that I aim for a similar quality in my own design or that I want to elucidate it in an educational course). My overall impression of the design in fig. 9 could be stated as a combination of dynamic and frank simplicity. But what is the specific source of this expression? If I were to create a new design with some of the same qualities, what would I aim for?

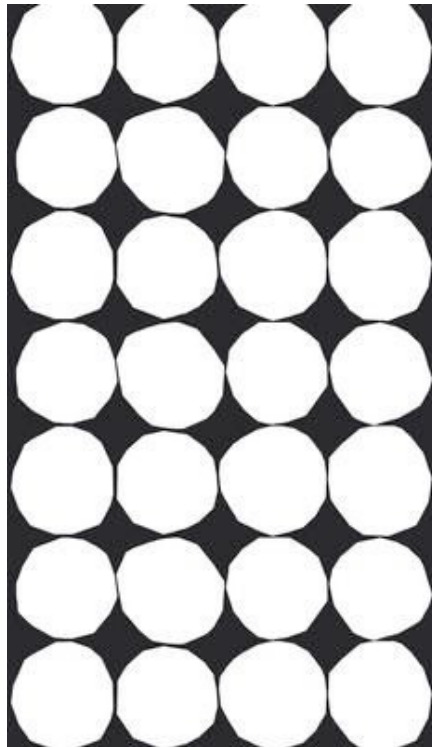


Fig. 9 // Marimekko, original design by Maija Isola, 1956.

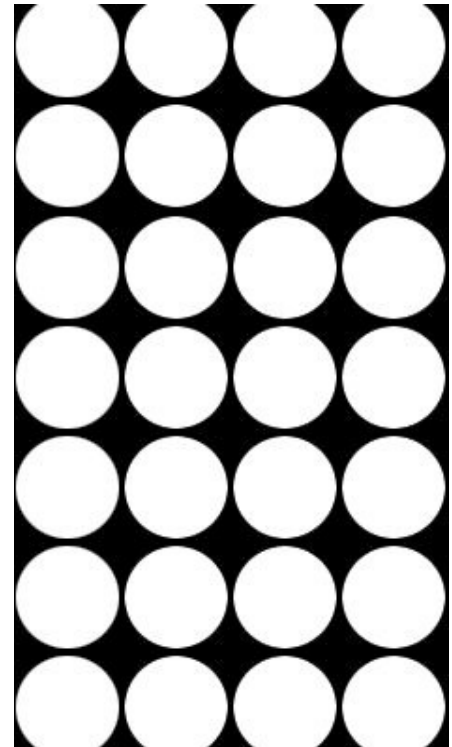
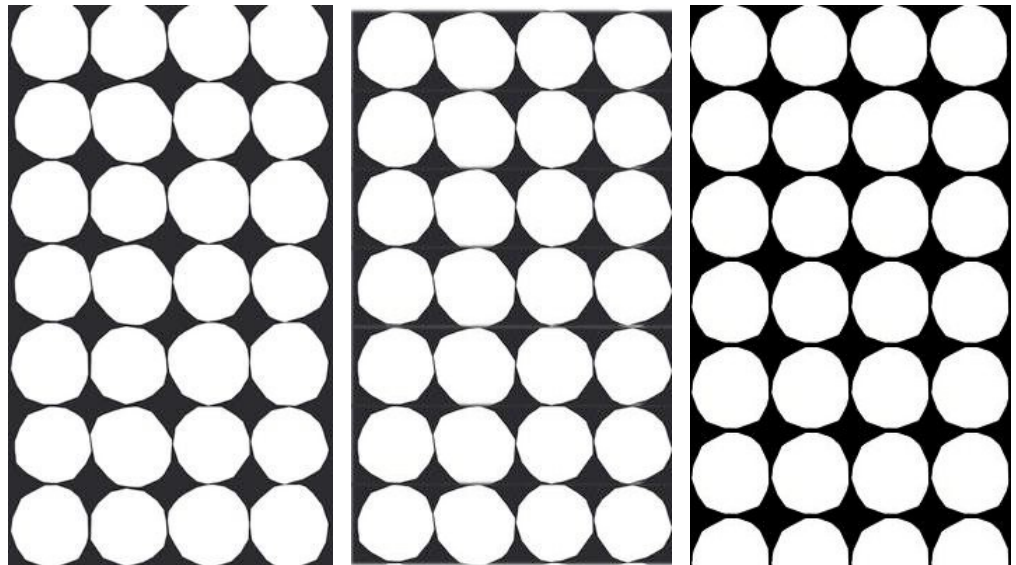


Fig. 10 // Circles (my design).

Comparing Isola's design for Marimekko (fig. 9) with a design that is, in principle, closely related – white circles on a black base, same number, same structure, same size (fig. 10) – highlights the 'hand-cut' contours of the round shapes. It brings out the difference it makes, for example, for the black spaces in between (the so-called negative space), which are dynamically different and asymmetrical in the first example compared to the identical, smooth spaces in the other. There is a frank, plucky feel to Isola's angular 'near circles' as well as a boulder-like weight. The circle pattern in fig. 10 has a high degree of graphic simplicity but no associations to either boulders or pluck.

I could continue by comparing the original to an example where another parameter had been modified, for example the number of round shapes, the colour or the texture (to the extent the latter could be reproduced in print) in order to develop a first-hand sense of the effects that are at play in the design and how I might use them in new designs.

In this context, I will take a closer look at the report (the repetition of the pattern). Isola's design has a report of two rows of rounds, all slightly different. A precise repetition occurs with every two rows. To examine this approach I might compare it to an example with a report of just one row and one where the same shape is used throughout.



*Fig. 11 // The original.
(Maija Isola, 1956, Marimekko).*

*Fig.12 // Single-row report (own
design based on the original).*

*Fig.13 // Single-round report
(own design, based on the
original).*

As I examine the three examples, I can try to articulate what I see: that fig. 12, where a single horizontal row is repeated, brings an emphasis to the vertical rows that is not present in the original (fig. 11). The vertical repetition of form stands out, and the design oddly appears more mechanical than fig. 13, where the same shape is repeated throughout. This latter version has both horizontal and vertical emphasis but lacks the dynamic expression of the original.

These juxtapositions of related examples with minor variations resembles the way a designer typically uses sketching to explore form expressions and choose the preferred one. While the designer's sketching is directly guided by the goal of reaching a satisfactory design of a given product, a more systematic juxtaposition of examples might be a way to achieve a broader understanding and examination of an effect in an educational context or in practice-based research.

To me, it is fruitful to try to verbalize one's observations, and it can help oneself and others to spot aspects they would otherwise have missed, but again: think twice before you conclude that you have deduced a general dogma for future use. More likely, you will have acquired a fairly clearly articulated experience and an eye for certain phenomena.

The richest source of information lies in the examples themselves, and examining them closely is likely to afford a deeper understanding, which can be very cumbersome to express in words.

3.3.4 // *Illuminating comparisons: triads*

I have demonstrated how it is possible to highlight specific qualities by comparing objects with certain commonalities (as in Heisselberg Petersen's exhibition) or closely related examples in order to examine or communicate their differences (as in the Marimekko example).

In a research project titled *Emotionelle Værdier i Tekstil* (Emotional Values in Textile), PhD scholar Anne Louise Bang, Design School Kolding examined a method for inquiring about users' experiences of emotional (which I will, in the present context, read as 'aesthetic') qualities of upholstery fabrics that combines the examination of similarities and differences. The motivation for using so-called triads in connection with, for example, 'probes', design dialogues and design games is that language can be quite imprecise and that a collection of examples can help participants specify their communication about perceived qualities. The method, which is derived from the field of psychology (Kelly (1955), quoted in Bang (2009)), involves presenting three examples (in this case fabric samples) and asking the person to name a quality that two of them have in common and which is absent in the third; a combination of the two methods I outlined above.

Anne Louise Bang shows that this is a way to clarify terms and concepts (for example, soft versus rough or soft versus hard) and to elicit more detailed user responses (Bang 2009). The method has also been used in an attempt to generate a dedicated language of textiles (Homlong, 2006). However, Anne Louise Bang points out that the examples are crucial for the communication of qualities, which in my opinion is an important point: language can point to qualities but does so in an interaction with the visual (tactile, spatial and so forth) examples, resulting in a mutual exchange between verbal reflection and examples. Essential information would be lost if we detached the verbal response from the examples that it was elicited by.

According to Anne Louise Bang (personal communication, July 2009), the use of triads has also worked well in connection with courses for design students, for example to help clarify concepts at the outset of a group assignment by facilitating a common understanding of the words that are used in discussions and in the articulation of goals and objectives.

I have used triads in my own teaching in order to train the students' awareness of form. One exercise involved using closely related examples, for example three cups of varying designs, and discussing what the two have in common in contrast to the third. All combinations are tested. This enhances the awareness of qualities the students might have missed initially but which influence the overall impression.



Fig. 14 // What do the two have in common in contrast to the third?
 Left: Cup, Arzberg. Centre: Cup, IKEA 365+, design: Susan Pryke. Right: Cup, Helle Hove, 1996.

3.3.5 // Helping students render tacit knowledge explicit

Teachers that I have spoken with call for students to be able to explain in words what they see and what they are aiming for in terms of form. There is no doubt that the ability to express reflections on form shows an understanding of the topic, but it is important to note that it is an acquired skill. Thus, in extension of Schön's theories on learning, I propose that teachers not only question the students but also devote some time to demonstrating how considerations on form can be put into words. Not in general terms and not as an authority figure but in a dialogue and based on specific demonstrations. For example, the teacher can describe what he sees when he looks at an exemplary piece or the student's own product and thus demonstrate ways of speaking about form. (Which is not at all easy, as I have pointed out).

In my description of the triad method, I mentioned some exercises that, in addition to contributing to a greater awareness of form, can help students find a language for qualities of form. I can add another, tried and tested exercise: 'word life drawing', where, instead of drawing from life, the students are asked to spend five minutes, for example, to describe an object as aptly and as precisely as possible. Reading the results out loud is an important part of the learning process, as this lets the students expand their own vocabulary by borrowing each other's terms and phrases. Again, closely related examples lead to more precise descriptions.

I am not sure it is a good idea to ask students to examine an extensive series of compared examples (as the one I suggested in my look at the Marimekko pattern) as part of their project assignments. That might take away some of the drive and direction that are so important for design work. Students should probably be allowed – like heat-seeking missiles – to go for *the solution* in order to develop know-how and tacit knowledge by carrying out their projects as a realistic design process.

On the other hand, teachers and researchers could undertake a more thorough and systematic attempt at examining and elucidating issue of form through commented cases and illuminating comparisons.

3.3.6 // *Alternatives to verbal communication*

Based on the notion of the use of examples as an important way to communicate experiences, exhibitions or images of objects are an obvious way to communicate about form and aesthetics. They may be seen as 'statements' from one designer or maker to another that is predominantly visually articulated rather than verbal.¹⁵ I am not going to engage in a discussion about whether objects in themselves can be considered research – above, I have argued the value of being able, also, to articulate one's reflections and experiences more explicitly, but I do see certain avenues for the visual communication of experiences that I would like to point to.

In this context, museum collections of objects constitute a treasure trove of concrete examples of the use of aesthetic effects. At Norman's 'visceral' level, which is about the spontaneous reaction to form, it is possible to find expressions of form that were created a thousand years ago and which still speak to us. This communication across millennia is possible precisely via form, because we have preserved examples from the past. (Something chefs and dancers have to do without). Form lets us study whole solutions created by historical masters and thus familiarize ourselves with the effects they employed. Through that lens, the collections have a value that goes beyond the historical perspective: as a collective bank of experience that provides the basis for creating new designs.

To organize such an experience material about design and aesthetic issues in a way that matches the designer's working methods, I propose focusing on visual characteristics. A designer who is interested in the aesthetic qualities of grid structures should be able to find lace, wrought-iron gates and the Bird's Nest Olympic Stadium in the same search. That is not possible in a traditional literature search. However there are visually oriented online search engines that could be used in a design school study library.¹⁶ One might imagine a search for related forms or a search a la 'others who looked at this image also looked at ...' and thus create an organic, rhizomatic system structured on visual qualities. One might also have images accompanied by an analysis and – a la Wikipedia – allow the selection to grow and expand based on contributions from online users suggesting possibilities for future approaches to form.

A visual search engine would be a relevant supplement to more traditional search methods when looking for knowledge and inspiration in connection with design issues.

3.3.7 // *Partial conclusion: communicating tacit knowledge – comparing examples*

Understanding of form is present, to a high degree, as tacit knowledge, which makes it relevant to use examples and comparisons of related examples in order to convey qualities that are difficult to put into words. In addition, these methods may facilitate a verbal articulation of design experiences. This descriptive capacity for articulation does not come naturally to the students but has to be trained, and the teacher can lead the way by demonstrating nuanced ways of speaking about reflections on form and effects. Furthermore, the possibility of developing visual search engines might open new perspectives for exchanging experience related to form that focuses more on visual qualities than on language categories.

¹⁵ Nigel Cross has described the particular 'designerly way of knowing' that is embodied and evident in both products and processes of designing (Cross, 2006, p. 9)

¹⁶ For example <http://fffffound.com/>

4.0 // Assessments

So far, I have included the concept of 'appreciation' in my analyses without discussing the basis for incorporating this perspective. You might ask, why not simply present the effects neutrally and leave it up to the individual designer to use them as desired?

I see two main reasons to include assessments and value-based statements in the treatment of aesthetic issues in education: first of all, it is difficult to describe a form effect neutrally without leaving out important qualities of the experience being described. Second, assessments and judgement are an important skill for designers to possess in order to practice their profession, and thus it is a skill the students need to acquire.

4.1 // Assessments are an integrated aspect of the description of form experiences

The first part of my review has addressed the question of how to elucidate the effects that designers have at their disposal. Doing this on a neutral basis is Steen Eiler Rasmussen's ambition in *Om at Opleve Arkitektur* (Experiencing Architecture) from 1957 (American edition 1959). He writes in a postscript to the original Danish edition that while Odd Brochmann (1954) aims to teach people to distinguish between beautiful and ugly it is his own intent to '*avoid passing aesthetic judgments that I do not believe could possess any objective value*' (Rasmussen, 1957, p. 240) However, it is difficult to offer a neutral description of an experience without losing sight of important qualities, as Rasmussen acknowledges in his preface:

'My object is in all modesty to endeavor to explain the instrument the architect plays on, to show what a great range it has and thereby awaken the sense to its music. But even though I do not propose to pass aesthetic judgments, it is very difficult to hide one's likes and dislikes. If one wants to demonstrate the instrument of an art it is not enough to explain its mechanics as a physicist would. One must, as it were, play a tune on it so that the hearer gets an idea of what it can do – and in such case is it possible to avoid putting emphasis and feeling into the performance?' (Rasmussen, 1957/1959, p. 6)

I believe this is an essential insight: when we deal with effects that are intended to influence our perception of form, the *experience* is central. As aesthetic experiences are subjective and value-based, they are more adequately described in charged terms. The words we have at our disposal and which most aptly describe a given experience of a form effect will typically carry either a positive or a negative charge. What we can strive for is nuance and clarity – neutrality, however, would drain the experience of colour, quality and resonance.

Assessments are so deeply integrated in the designer's 'eye' for form effects and the 'takes' he chooses to use that 'eye' and 'take' cannot be conveyed without at least some degree of value charge. The same will be reflected in education, where it will be virtually impossible for the teacher to discuss a form expression without expressing an opinion.

Even if the teacher chooses only to inquire about the student's own thoughts without engaging personally in the discussion, the choice of questions will reflect a basic attitude.

4.2 // Assessment and judgement as a necessary skill

Aesthetic attitudes and values can also in themselves be considered part of the designer's register, as possible guidelines informing the other choices. Taste, attitudes and values can thus be regarded as skills that students need to acquire along with their knowledge of the effects.

Schön and Wiggins describe assessments and value judgements as a core part of the design process. In the article 'Kinds of Seeing and Their Functions in Designing', Schön & Wiggins (1992) describe the core substance of the design process as 'seeing-moving-seeing': making a sketch, reviewing and assessing it, changing it and assessing it in a new review. The authors use the example of the architecture student, Petra, who first draws a plan for some classrooms as six rectangles in a staggered layout, then decides that the classroom units are 'too small to do much with' and instead tries to link them into three L-shapes, which she thinks have more character and also afford certain advantages in other regards than form. The authors demonstrate how the design process is permeated by assessments. With each small step, each line she draws, the designer has to determine whether she is getting closer to a desirable outcome or moving away from it.

'Petra's designing depends on her ability to make just such normative judgments of quality, to see what's bad and needs fixing, or what's good and needs to be preserved or developed. In the absence of such qualitative judgments, her designing can have no thrust or direction; it would be entirely unmotivated. She would neither be able to set problems nor to tell when she has solved them.' (Schön & Wiggins, 1992, p. 137)

In order to design at all, the designer relies on her ability to make judgements, continually assessing her sketching throughout the process.

Schön and Wiggins acknowledge that Petra's judgements are subjective – other designers might have a different assessment of the rectangles and the L-shapes (although her assessment might well be aligned with common notions of good design) – but they also point out that as long as her judgments are internally consistent, her sketching can be considered an experiment that follows an objective process – an internal logic – where she might discover 'flaws' or find 'solutions'. This ability to make subjective value judgements is precisely what enables this internal logic (ibid., p. 138).

Schön and Wiggins thus point out an aspect of design that might be called '*the normative paradox*': on the one hand, decisions about form expressions rest on a subjective and variable basis – tastes and fashion vary, and there does not seem to be a rational or scientific basis for certain ways of designing. On the other hand, it seems crucial for the individual designer or architect to possess a reliable sense of what is the 'right' aesthetic choice in the given situation in order to be able to practice as a designer at all.

4.3 // Judgements as tacit 'knowledge'

Should it not rather be the users' or the clients' taste and attitudes that are reflected in the design? Should it really be the designer's subjective judgement that governs the logic in a design process?

Even when the designer has a stated ambition of designing in a way that matches the receiver's taste, she depends on her own knowledge of effects and her own judgement. There are so many individual choices to be made in a design process that one could not possibly ask the users to consider every single issue, and it can be difficult to transfer a response to individual situations to the next situation in line without applying a more intuitive assessment. Again, complexity and the shortcomings of language are conditions the designer needs to contend with.

Donald Schön quotes G. Vickers' concept of '*appreciative systems*', which describes the sense of the norms and values of a field that professionals base their assessments on (Schön & Wiggins, 1992, p. 138). It acts as a sort of inner compass in uncertain situations with many potential solutions and is developed, in part, through education and experience.

Schön points out that even if a designer bases her judgement on her 'appreciative system' she will not necessarily be able to describe the criteria of her judgement. It is perceived, rather, as an *intuitive or embodied sense of the 'right' choice* or for elements that 'don't fit'. I sometimes refer to this sense as 'your inner divining rod', which indicates when you approach the 'right' solution (referring to the belief that some persons are able to locate water underground using a forked rod). This sense is crucial for setting one's design process on the right path and determining where to start 'drilling'.

Timothy Jacob Jensen of Jacob Jensen Design explains how his decisions about form are based on a nonverbal sensation. Thus, he attributes far greater weight to his first-hand impression of new sketches, in the morning, than on verbal arguments (lecture, 1996, confirmed in a personal email, 2009). This approach to decision-making appears to be common among designers and seems to be a mechanism that acts as a form of 'tacit knowledge'. To me, the sense of quality or approaching the right choice is perceivable as a feeling in my hands. Flaws or things that miss the mark trigger a sensation in my throat, while a colleague of mine senses a particular flavour on her tongue when she is on to something. Because design issues are so tremendously complex it seems necessary to rely on this sensation, which I call *the designer's aesthetic judgement*. This sensation can give the individual designer's work a personal expression, but it can also be a sense of what a particular group of users or clients are going to appreciate.

I will illustrate this sense of judgement in practice with the following example:

Example 7 // The stove in the corner:

Some of our friends have invested in an oval Bekkasin wood-fired stove, whose placement in a particular corner of the living room has led to heated discussions. What is the 'correct' placement of the stove in relation to the corner walls? Our friends think it should be placed parallel with one of the walls and thus at 90 degrees to the other wall. My husband and I feel with great certainty that it should be placed diagonally. Like ourselves, our friends are trained designers, they make carefully considered and deliberate choices, and I generally have great respect for their judgement. Still, I remain deeply convinced that the stove would 'look better' if it were placed on the diagonal.

Who cares? Does it really matter? Maybe it does not – there is no functional difference, it heats the room equally well and takes up about the same amount of room. It is a strictly aesthetic issue. A question of our experience of the placement of the stove in the room.

In principle, countless placements are possible: the stove could be placed like this or like that, at any conceivable angle to the wall, and it would not make any functional difference. In this case, we all agree that there are no other acceptable possibilities than either the diagonal or the 90-degree angle. For example, we do not imagine a 30-degree angle, even though it might make room in the corner for the log basket.

This degree of consensus probably springs from conventions and general arguments about simplicity and harmony. But even though we agree on the goal – harmony and simplicity – that can be used as an argument in favour of either solution: placed at a 90-degree angle the stove follows the directions of the walls; placed on the diagonal, its oval shape fits symmetrically into the corner.

From an intellectual-verbal perspective, both choices can be considered equally valid. But they feel different! – At least to a designer.

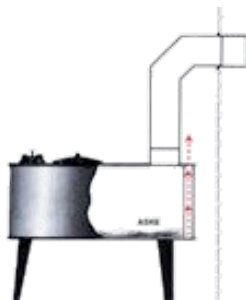


Fig. 15 //
The Bekkasin stove.

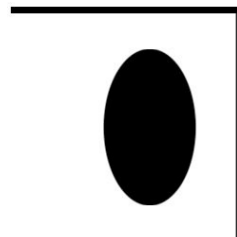


Fig. 16 //
90-degree angle in the corner

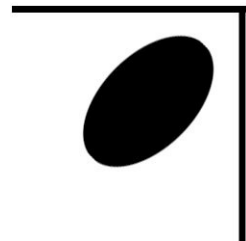


Fig. 17 //
Diagonal placement in the corner.

This mundane example demonstrates that many of the choices that need to be made during the design process have no logically determined right answer but also that most people with an interest in form will have an opinion about them anyway. (Maybe the reader has an opinion about the best placement of the stove?)

A designer would be completely paralysed or lost without some sort of compass – inner or outer – guiding his choices. (An issue that is sometimes evident in design students' independent projects). For example, it is not viable simply to draw lots (unless that was an important part of the concept) – for even though many issues of form cannot be said to have a final, correct answer, aesthetic quality is commonly associated with a certain consistence and degree of coherence in choices of form and expression, which results in the closest I can get to a universal aesthetic quality: to be convincing.¹⁷

Some might consider aesthetic judgement to be part of an innate artistic talent, a special 'flair' that some people have and others do not. However, it is worth considering whether there might be educational approaches that enhance and hone this 'flair' and to search for ways of communicating the experiences and considerations a designer with 'flair' relies on. In relation to the latter questions, the concepts of 'eye', 'take' and 'appreciation' may be relevant.

4.4 // Judgements of taste in education

If we assume that designers base their assessments on an 'appreciative system' – a sense that rests on an inner value base – it becomes important to consider how education can promote the development of a strong – or a flexible – value base. We might consider such a value base as a set of guiding principles that can help designers develop the inner design consistency or 'logic' that Schön and Wiggins speak of. As a foundation of the judgement that any designer must possess and of the designer's chosen way to activate her register of effects.

Design students need to develop their own judgement, but it seems to me that they also benefit from knowing ('developing an eye for') the respective value bases that guide other designers' work or the aesthetic qualities that a particular target group appreciates.

In this perspective, the discussion about personal taste or style may be considered a relevant aspect of design education, just as the teacher's personal assessments and attitudes may serve as a value base that students can relate to. A teacher with clear attitudes can offer the student an inner voice to be in a dialogue with (as in 'what would NN say about this?'). Not with a view to following that voice but in order to enhance her own argumentation or awareness. Some might object to the notion of including the teacher's personal taste in the education, but since it is inherently difficult to speak of form expressions without a value charge, the education will probably be more beneficial if teachers and students articulate their attitudes and tastes explicitly, instead of having them as a tacit undercurrent behind a studied neutrality.

Immanuel Kant (1790/2009) wrote that taste is subjective. It is not possible to 'prove' or objectively argue that something is more beautiful than anything else, but we all make judgements of taste and often defend them by referring to universal arguments as *if* they applied universally. The same can be said to characterize many of the architectural theories that have been proposed over the years, only to be subsequently criticized as simply polemic statements of opinion without any scientific validity.¹⁸

¹⁷ Thus there appear to be parallels between rhetoric and design.

¹⁸ Jon Lang, quoted in Groat & Way (2002), p. 78.

However, in his article 'Arkitekturteorien: Mellem Manifester og Videnskab' (Architectural Theory: Between Manifestos and Science), Erik Nygaard argues that although manifestos and poetics are not theories in the scientific sense of the word, the architectural profession needs the forward-looking discourse that the normative architectural theories afford (Nygaard, 2002). They do not represent objective knowledge, but they offer a possible guiding principle that architects or designers may choose to adopt. A value system that they may subscribe to and within which it actually *is* possible – and helpful – to talk about right and wrong aesthetic choices and thus also, possibly, dissolving the normative paradox.

In his book *Den Æstetiske Relation* (The Aesthetic Relation) the philosopher Morten Kyndrup (2008) wrote about judgements of taste (aesthetic assessments) that there are no right or wrong judgements of taste – there is no objective truth about ugly and beautiful. However, it is possible to speak of poor (inarticulate) and good (substantiated, well-described) judgements of taste. Kyndrup does not think that judgements of taste should have any place in research in the humanities (Kyndrup, 2009), but it is worth considering if design education should not embrace the philosophical concept of 'good' judgements of taste. With this, I am not referring to the notion of 'good taste' but to offering nuanced descriptions and explanations for why one appreciates one thing over another.

Example 8 // A good judgement of taste – Kasper Salto, directionless furniture

In an interview in Politiken (Hedebo Olsen, 2010) designer Kasper Salto advocates furniture that is 'directionless', in organic forms. Salto points out how some furniture has very clear directionality and straight lines relating to spaces and environments, for example Poul Kjærholm's rectangular easy chair PK22. According to Salto, this type of furniture easily comes to look messy if the pieces are not perfectly aligned with the other lines in the room, such as tables and walls. By contrast, more organic, directionless furniture without too many straight lines slips easily into the context in most positions.



Fig. 18 // PK22, Republic of Fritz Hansen. Design: Poul Kjærholm, 1956.



Fig. 19 // NAP. Republic of Fritz Hansen. Design: Kasper Salto, 2010.

Salto's reflection opens our eyes to an issue that has to do with how furniture relates to a space, depending on whether it has a clear directionality built into its form. He gives us an 'eye' for a phenomenon that most people recognize and uses that as an argument for using directionless furniture in interiors. However, this eye can also be used to argue the opposite point – advocating for furniture with a clear directionality. It depends on the expression one is aiming for and one's understanding of the purpose of the interior. Some might prefer to know exactly how the furniture should be positioned. Furniture with a clear directionality makes it easy to find the right position in relation to the table or wall, and it provides a taut, precise expression that some people appreciate. However, in his appreciation of furniture capable of handling a slightly 'messy' and random placement, Salto represents a different attitude and a different idea about the sort of the life that should play out around the furniture.

As this illustrates, the same eye for a basic phenomenon can support widely differing solutions, depending on the intended context of the product and what qualities one appreciates. In many issues of form, the arguments driving a choice will ultimately come down to taste, artistic attitude and world view. What can be demanded of a student's argumentation in that regard is thus not objective argumentation for why a given aesthetic choice is right but instead 'a good judgement of taste' in the form of a nuanced description of considerations and impressions and an account – in the form of a model, images or words – of the inherent logic that guided the choice.

I will argue that there could be a place for 'good judgements of taste', both in connection with project presentations, in design discussions and in the teacher's discussion of form examples with the purpose of making the students more clearly aware of their respective value bases. Again, I propose the use of 'cases' and specific examples as the most relevant way to communicate 'appreciation' and thus the underlying value base.

4.5 // Partial conclusion: assessments

In this section I have described how assessments and the development of judgement and a value base or 'appreciative system' are part of the designer's skill set. To a high degree, this value base serves as tacit knowledge or a sense, but texts in the form of manifestos and poetics may be seen as attempts to express a value base that are suited to serve as guidelines for designers, architects and artists. An explicit statement of 'appreciation', attitudes and 'judgements of taste' are thus a relevant part of the education and of the discussion of design issues. Attitudes are always open to debate, but it could be said that this is precisely why it is important to debate them, at a qualified level, and thus also to give students a language for engaging in this discussion.

5.0 // Conclusion

This report has debated how it is possible to examine and communicate considerations about issues of form (in this case restricted to designs that speak to an immediate sensuous experience) with the purpose of enhancing design students' skills in this area.

Since designing is a forward-looking and creative activity, I propose an emphasis on a clear and nuanced investigation of *issues* rather than a presentation of 'answers'. The goal is to enhance the students' own basis for designing new products, each of which will constitute their own 'answer'. The concepts of 'eye', 'take' and 'appreciation' are proposed for use in education in the exploration of issues of aesthetics and form. These concepts can point to issues and draw out relevant knowledge and possible approaches, including, for example rules of thumb as well as the analysis of specific examples.

Examples and cases are highlighted as well-suited for conveying experiences with form and designing, because they address and allow for complexity and the many different aspects of aesthetic issues in a way that general dogmas cannot. Paradoxically, the best way for a designer to acquire a general understanding of aesthetic issues seems to go through specific examples and individual cases.

Since experiences with form and designing are often represented by 'tacit knowledge' a method is proposed for communicating reflections on form that are difficult to put into words; a method that revolves around focusing on differences and similarities in comparisons of specific examples. These methods can also help facilitate a verbal articulation of experiences with form and designing which the teacher can support by offering additional examples of how it is possible to speak about reflections on form and effects with nuance and detail and in a way where words and examples shed light on each other. It is also possible that visual search engines will open new perspectives for communication about form that is based more on visual qualities than on verbal categories.

Developing judgement and a set of values, an 'appreciative system', is an important part of becoming a designer. This represents an additional paradox in design education: on the one hand, design is about creating something new and treating every possibility as open – when it comes to decisions about form, there are few objectively correct choices. On the other hand, designers need strong and reliable judgement in order to maintain a sense of direction and consistency in their choices. Students need to find their own voice to engage in a dialogue with materials, context, users and so forth, and to do that, they need support and feedback as they develop their value base. That is why I propose the involvement of assessments, attitudes and judgements of taste in education – not with the goal of arriving at firm answers or consensus but in order to ensure a lively and nuanced discussion that enhance the individual designer's work with form. Precisely because the design profession is not about describing the present but about proposing the future, it needs a forward-looking discourse that relates to goals and quality – also in regard to issues of form.

Acknowledgements

I thank the Danish Centre for Design Research for funding this project and The Danish Design School for hosting it. A special thanks to Associate Professor Per Galle for competent and knowledgeable supervision and to the research group and subject teachers at The Danish Design School for engaging in inspiring discussions.

About the author

Since graduating from Design School Kolding in 1996, Helle Hove has worked with site-specific events, commissions for public space and participatory projects. She is also active as a public speaker, a writer for craft and design magazines in Denmark and abroad and as a guest teacher at The Danish Design School, among other institutions. See www.hellehove.dk for additional information.

References

- Alexander, C. (1979). *The timeless way of building*. Oxford University Press.
- Alexander, C. et al. (1977). *A pattern language*. Oxford University Press.
- Bang, A. (2009). Triads as a means for dialogue about emotional values in textile design. In *Proceedings of 8th European Academy of Design Conference: Design Connexity*. Aberdeen, 1 to 3 April 2009.
- Brochmann, O. (1954). *Om grimt og smukt* (About ugly and beautiful). Gyldendal.
- Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues* 8(2), 5–21.
- Cross, N. (2006). *Designerly Ways of Knowing* Springer-Verlag London Limited
- Daley, J. (1982). Design creativity and the understanding of objects. *Design Studies*, 3(3), 133–137.
- Danmarks Designskole (2008). *Forskningsstrategi og –plan 2008-2010* (Research strategy and plan 2008–2010).
http://www.dkds.dk/media/forskning/forskningsplan/DKDS_ForskningsstrategiPlan08.pdf
- de Botton, A. (2006). *The architecture of happiness*. Pantheon.
- Dovey, K. (1990). The pattern language and its enemies. *Design Studies*, 11(1), 3–9.
- Galle, P. (1999). Design as intentional action: A conceptual analysis. *Design Studies*, 20(1), 57–81.
- Galle, P. (2008). Candidate worldviews for design theory. *Design Studies*, 29(3), 267–303.
- Gombrich, E. H. (1984). *The sense of order: A study in the psychology of decorative art*. Phaidon.
- Groat, L. & Way, D. (2002). *Architectural research methods*. John Wiley & Sons.
- Hauchkrog, E. (1984). *Grundskolens tegnekursus* (Primary school drawing course). Danmarks Designskole.
- Hedebo Olsen, L. (2010, 16 May). Kasper Salto: Min stol holder lidt på dig (Kasper Salto: My chair holds you slightly). *Politiken*. <http://politiken.dk/kultur/kunst/article972556.ece>
- Hesselgren, S. (1977). *Vad vacker är* (What is beautiful). Byggeforskningsrådet.
- Hesselgren, S. (1987). *On architecture: An architectural theory based on psychological research*. Studentlitteratur.
- Homlong, S. (2006). *The language of textiles: Description and judgement on textile pattern composition*. (PhD dissertation). Acta Universitatis Upsaliensis.
- Hove, H. (1995). Giv os et sprog (Give us a language). *Dansk Kunsthåndværk*, 2. Can be accessed at www.hellehove.dk
- Jablan, S. (1995). *Theory of symmetry and ornament*. Mathematical Institute, Belgrade.
- Kant, I. (2009). *Critique of judgement*. Oxford University Press. (Original work published 1790).
- Krippendorff, K. (2006). *The semantic turn: A new foundation for design*. Taylor & Francis.
- Kyndrup, M. (2008). *Den æstetiske relation: Sanseoplevelsen mellem kunst, videnskab og filosofi* (The aesthetic relation: The sensory experience between art, science and philosophy). Gyldendal.
- Kyndrup, M. (2009). Den nødvendige smagsdom 2.0 (The necessary judgement of taste). *Standart*, 23(2), 43–45.
- Lawson, B. (2006). *How designers think: The design process demystified* (4th edition). Architectural Press.
- Norman, D. A. (2004) *Emotional design: Why we love (or hate) everyday things*. Basic Books.

- Nygaard, E. (2002). Arkitekturteorien: Mellem manifeste og videnskab (Architectural theory: Between manifestos and science). *Nordisk Arkitekturforskning*, (3), 47.
- Polanyi, M. (1966). *The tacit dimension*. Doubleday & Company
- Rasmussen, S. E. (1959). *Experiencing architecture*. MIT Press. (Original work published 1957).
- Rasmussen, S. E. (1957). *Om at opleve arkitektur* G:E:C: Gads Forlag.
- Rittel, H. (1972). On the planning crisis: Systems analysis of the first and second generations. *Bedriftøkonomen*, (8), 390–396.
- Schön, D. A. (2016). *The reflective practitioner*. Taylor and Francis. (Original work published 1983).
- Schön, D. A. (1987) *Educating the reflective practitioner*. Jossey-Bass.
- Schön, D. & Wiggins, G. (1992). Kinds of seeing and their functions in designing. *Design Studies*, 13(2), 135–156.
- Thyssen, O. (Ed.) (2005). *Æstetisk erfaring: Tradition, teori, aktualitet* (Aesthetic experience: Tradition, theory, currency). Forlaget Samfundslitteratur.
- Wang, D. & Groat, L. (2002). *Architectural research methods*. John Wiley & Sons.
- Whitfield, T. W. A. (2005). Aesthetics as pre-linguistic knowledge: A psychological perspective. *Design Issues*, 21(1), 3–17.

