Published in ICERI2017 Proceedings, ICERI2017, Sevilla, Spain.

CAN YOU PICTURE THIS? INSTRUCTIONS FOR USING SKETCHNOTES TO HELP NOVICES IMPROVE THEIR DESIGN SKETCHING SKILLS

Mie Nørgaard

MIE NØRGAARD – Learning by Sketching (DENMARK)

Abstract

In design related activities, sketching is a thinking tool next to writing, and sketches are often referred to as the language of designers. The ability to sketch out ideas rapidly in various formats is a central skill for a designer, and should be fostered in many educational programs. Besides design schools and schools for architecture, sketching is – for example - also a central skill for students of interaction design and experience design at a computer science faculty.

For most of these students, however, sketching skills are far less developed than writing, and as a result, many students shy away from using sketching as the powerful tool it is for thinking, articulating and communicating ideas with their peers. This proves a great challenge for teachers at programs that rely on students being able to use the language of designers, but rarely provide them with any techniques to help them learn the trade.

This paper concerns the use of sketchnotes as a means to train basic visual communication and drawing skills for students with next to no experience with drawing. Based on a practical experiment with 55 students it presents insights as to which central basic drawing skills significantly improves the students' ability and motivation to use sketching as part of their design work.

The paper presents valuable instructions for teaching, exercising and critiquing sketchnotes in class in order to train students' sketching skills.

Keywords: Sketching, design sketching, visualization, sketchnoting, re-framing, memory, design teaching, thinking tool, dialogue tool.

1. INTRODUCTION

In the past 15 years, faculties around the world have seen research areas and courses like interaction design and shape changing interfaces expand the area of Human-Computer Interaction (HCI). Consequently, design plays a growing role in IT education. To many, it is a welcome opportunity to combine skills and interests in industrial design, interaction design, and technical and material construction. Unfortunately, students enrolled in a design course at a computer science faculty rarely get the same training in design tools as students in design schools. If any at all. In consequence, students either avoid hand drawn sketches all together, make a few poor quality sketches with whatever drawing tool is around, or create work-arounds, for example organising pre-made clip art in a text editing program (for example, see figure 1). Unfortunately, none of these techniques support thinking and exploration to the same degree as producing fast handmade drawings of a concept or a form. As a result, students miss the opportunity to develop the visual language that they↓if they are to practice design professionally↓need as a tool for reflection and dialogue.

During my own teaching in fields related to interaction design, I have experienced how students lack the courage to present information visually and are unfamiliar with common attributes such as line quality, shading or annotation. These are used to convey valuable information in a drawing of physical objects, but are also useful when you sketch out for example user journeys, use scenarios or process overviews. Seeing how my own courses relied on students being able to sketch both processes, abstract concepts and physical artefacts but held no room for teaching any sketching techniques, I started to look at sketchnotes as a frame for training hand drawing in class. I hypothesized that sketchnotes could be used as a valuable note-taking and analysis tool for students, and a presentation tool for me, while at the same time providing a setting for teaching and training techniques used in sketching.

Figure 1: The examples above demonstrate attempts from two students with no prior sketching training. The examples demonstrate many potential areas for improving skills, including using, materials, drawing technique, annotation technique, composition and contrast to convey information.

The revised instructions presented in this paper stem from the work described in a previous publication on the use of sketchnotes in class (Nørgaard, 2016).

Next, I will briefly present the concept of sketching as it is understood within interaction design, and argue why the practice holds such a central role in courses related to experience and interaction design. Following this, I will present my revised instructions for using sketchnotes in class in order to help novices improve their sketching skills.

2. THE THINKING TOOL OF DESIGN

In the design community, sketching is often understood as the production of paper sketches of the type described by (Goldsmidt, 1991; Goldsmidt, 2003), but in fact, sketches can take many forms. Buxton (2007) uses the term sketch to describe any representation of an idea or concept that can be used to get new ideas, develop old ones, or think about well-known issues in a new fashion. Consequently, a sketch can be pen on paper, a design artefact or physical performance of, say, an intended interaction design. In the literal as well as in the metaphorical sense, designers sketch to help themselves and others see things in new ways, including physical forms which can be sketched using 3D modelling or experiments with materials, modes of interaction, and the potential use context of a design, which can be sketched using enactment techniques such as forum theatre, (Newell et al., 2006) or bodystorming, (Oulasvirta et al., 2003).

No matter the material properties of the sketch, the act of sketching is a tool for aiding idea generation and exploration of ideas in a design situation. Accordingly, the activity of sketching facilitates reflection in action (Schön, 1983) because of the on-going dialogue between the sketch and the sketcher. Further, the activity of creating sketches depends on a whole series of choices that spark the process of and attention to the framing and re-framing of a topic, as described by (Paton & Dorst, 2011).

Apart from helping new thinking in terms of reflection in action and the framing of concepts, sketching also serves to help designers talk and about and share an idea, as well as remember and store its key components (Ferguson, 1992; McGown & Green, 1998; Ullman, Wood, & Craig, 1990). This is why sketching is many designers' preferred technique to inspire thinking and help them communicate with others. And this is why sketching is such a crucial technique to any designer.

2.1. Using sketchnotes to inspire training

Sketchnotes is a genre of visualization. A sketchnote is a hand-drawn visualisation made on paper or tablet, created within a short time frame (for example see figure 1 of a sketchnote capturing the content of a workshop). The genre is broad and include - in one extreme - sketchnotes made entirely of words (drawn letters) that are organised spatially and - in the other extreme - sketchnotes with complex drawings that visualises one or more arguments in intricate models.

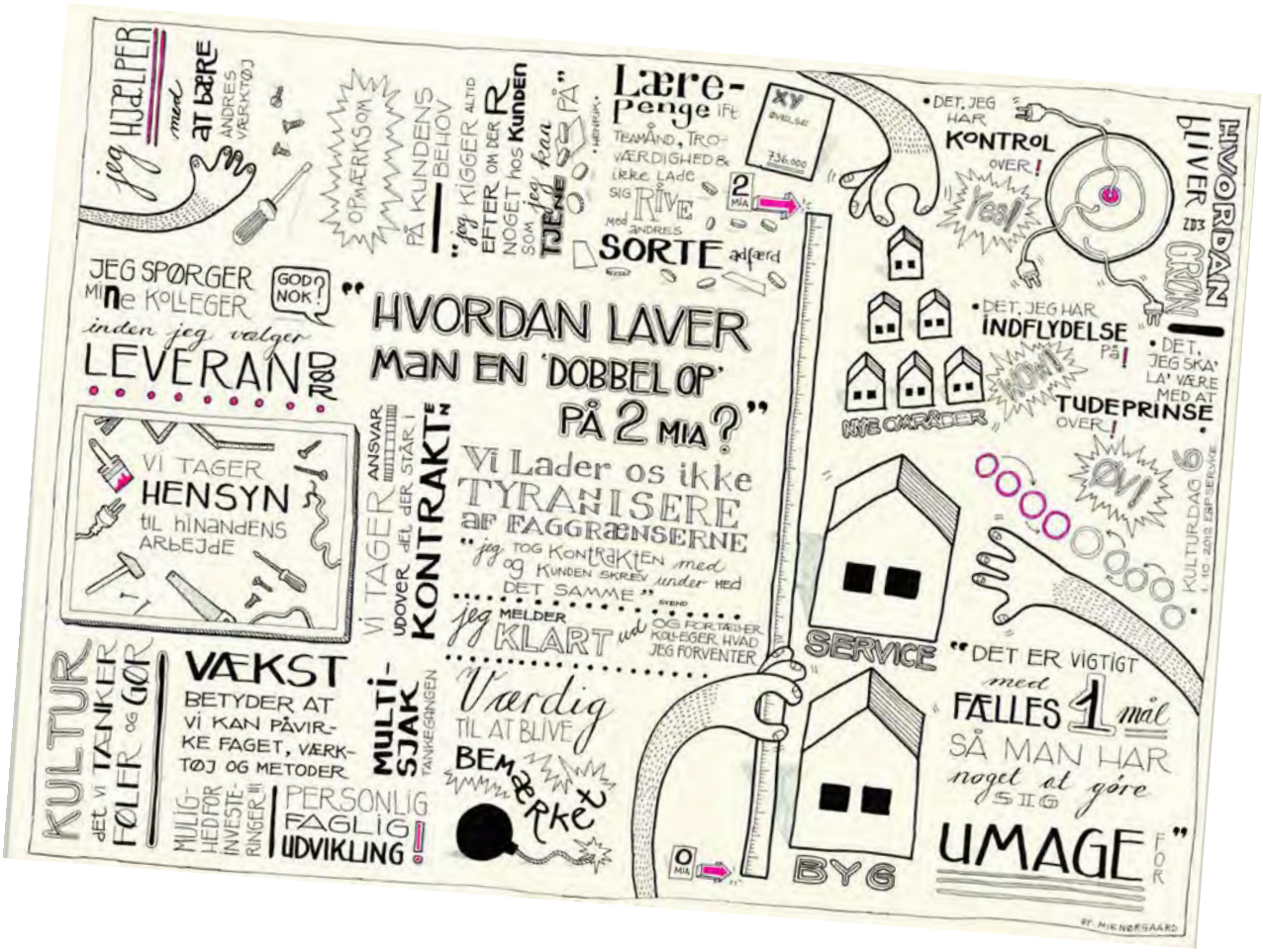

Figure 2: Sketchnotes most often combine text and drawing. They can use contrast in - for example - saturation, font, space and orientation to organize and relate information and use simple drawings to improve memory, tag themes and aid navigation of the eye. The example is provided by the author.

Sketchnotes is a genre defined and developed by the people producing sketchnotes, and a variety of examples can be seen on community websites such as www.sketchnotearmy.com or open/members-only sites for pracitioners on Facebook. The community of practitioners recently held it's first conference – 1st International Sketchnote Camp, in Hamburg (September 2017), which suggests a field in booming development.

Perhaps the special 'feel' of a sketchnote is what defines it best; it feels informal, like it has been produced quickly by a playful and light hand, and in this way it sums up someone else's arguments real time. This light and informal tone resonates well with the words used by Buxton to describe the quality of designers' sketches such as 'explorative', 'fast', and 'open for interpretation' (Buxton, 2007).

This shared quality makes sketchnotes particularly interesting as a means to train design sketching for novices. Particularly novices who not only are expected to sketch physical artefacts, but also to visualize abstract concepts such as services.

The free format makes sketchnotes suitable to help novices' practical experiments with fast visualization. If one is uncomfortable with drawing objects, one can start by creating interesting compositions with hand-drawn letters, if one cannot write or draw in straight lines, one can explore organic compositions, that make use of a variation in size and orientation of the drawn elements, and so forth.

In a previous paper, I introduced a series of sketchnote related activities deployed in a design course at a computer science faculty (Nørgaard, 2016). The activities aimed at boosting students' use of sketching in product development and the paper reported on insights gained through activities such as 'teaching basic drawing technique' and 'using peer review as a way to open students' eye to sketch

Figure 3: Sketchnotes used in class by the teacher as supplement to oral lectures.

qualities'. The paper also argued for the value of teachers using sketchnotes as a teaching tool in class, in order to provide inspiration and help assert that 'drawing' is a completely natural element in design teaching and in no means lesser valued than spoken or words. Examples of teacher sketchnotes from the experiment are shown in figure 3.

The paper concluded with very general guidelines and the identification of basic skills and techniques that proved immensely valuable to motivate students to use visual language.

Next, I present revised detailed instructions for how I used sketchnotes in the experiment to improve the novices' sketching techniques. The activities and exercises described below can easily be copied by teachers with basic sketching skills. Teachers of courses and programs that do not rely on students' ability to produce sketches as it is understood within the field of interaction design and described by for example Buxton (2007) may find the use of sketchnotes interesting as a means to simply share knowledge in class, and help capture key learning points in a way that has proved valuable in learning situations, see for example (Brown 2009, Kress 2000, and Mirzoeff, 2002) for arguments related to brain and memory and (Nørgaard, 2012., Paton & Dorst 2011, Hautopp & Nørgaard, 2017) for arguments related to engaging students in discussion and reflection.

3. TRAINING BASIC VISUALIZATION TECHNIQUES WITH SKETCHNOTES

In the following I will present key activities, exercises, critique assignments and learning goals for 7 sessions. Each session should be approximately a week apart in order to make room for students to practice. Courses that communicate knowledge via oral presentations/talks, articles/books or video can easily make use of these instructions since the topics of the sketchnotes could be anything from biochemistry to medieval politics. A visualizer is a type of hardware that can be found in some auditoriums and they are very helpful when the teacher needs to demonstrate material-specific points such as in session 1.

3.1. Session 1: Sketching tools and materials, and how to mix them.

3.1.1. Activities:

The teacher demonstrates materials and help students understand that pens and paper need to match. For example: Fine liners and Bristol paper work well together, as do pencils and paper with structure. Students are advised to examine which materials can be combined for a professional result.

The teacher demonstrates how to hold different types of pens and how to adjust pen and body to find the correct angle for use.

The teacher demonstrates pens with different types of tips. Chisel tips, bullet point and brushes all have different strengths and weaknesses. These are demonstrated.

The teacher demonstrates various types of paper, for example, manifold, Bristol and rough textured paper, so that students get an understanding for paper qualities.

The teacher demonstrates how to draw lines and circular shapes with big open movements using the lower arm and wrist rather than composing basic forms of a series of tiny movements made with the finger tips.

The teacher demonstrates how to use frames to organize the content.

3.1.2. Exercise:

Students create a reference sheet (A3) for all their pens. The sheet contains the following information in a horizontal line (written with the pen in question): The pen's name, the manufacturer and the size. Hereafter follows a series of lines (straight, zigzag, circular, etching) and dots to show various line qualities. Pens from the same manufacturer are grouped, starting with the smallest size.

Students create five sketchnotes each communicating and demonstrating the unique qualities of a combination of various pens and paper (for example, marker with brush tip on manifold, fine liner 0.05 on textured paper, chisel tip pen on Bristol paper, etc.).

3.1.3. Critique session:

All students put their original work on display in front of the class. After a 15 minutes silent gallery session, where the class look at the productions, students in groups of five critique what they consider the best examples of good/poor use of pens and paper. Further, they try to describe specific qualities of the sketchnote.

3.1.4. Learning goals:

Students start to notice how 'good visualization' is less about 'pretty' and more about how information is organized spatially, how line weight is used to convey specific meaning, how annotation is used in various ways and how a personal style of drawing attracts the eye better than simplistic icons.

3.2. Session 2: Annotation and simple techniques that add depth

3.2.1. Activities:

The teacher demonstrates the use of curvature lines, drop shadow and outline to add the perception of depth.

The teacher introduces annotation and demonstrates how to produce a hierarchy in text with simple changes in font.

The teacher demonstrates how to do lettering with chisel tip and bullet point, and advice drawing letters in capitals rather than using ordinary handwriting.

The teacher introduces the use of thin parallel horizontal lines to help control the direction of the annotation.

3.2.2. Exercise:

Students create a sketchnote (of a selected topic) using three different hand drawn fonts to organize content into title, headings and body text annotation. The sketchnote must also demonstrate use of drop shadows, curvature lines and outline, and include a meaningful use of frames and demonstrate proper combination/use of the materials used to create the sketch.

3.2.3. Critique session:

As session 1.

3.2.4. Learning goals:

Students learn different techniques to quickly achieve a sense of perspective rather than say, a more accurate 3-point perspective. They develop their understanding of which techniques help them create interesting dynamic visualizations. Students learn how to draw letters and create legible annotations.

3.3. Session 3: Contrast in spatial distribution (solid/void) and saturation (light/dark)

3.3.1. Activities:

The teacher demonstrates how to use contrast in the spatial distribution of visual elements in order to create a dynamic visualization (contrast between solid/void areas).

The teacher demonstrates how to use contrast in saturation in order to create an interesting visualization and supports sense of depth (contrast between light/dark areas).

3.3.2. Exercise:

Students create a sketchnote (of a selected topic) that demonstrates how to use contrasts in spatial distribution and saturation in order to create an interesting composition.

3.3.3. Critique session:

As session 1. After the gallery session, students mark their favourite submission and the teacher facilitates a discussion that helps students use the newly learned concepts to describe qualities in the sketchnotes in front of them.

3.3.4. Learning goals:

Students learn techniques that are helpful for organizing content spatially and make more interesting visualizations by adding contrast in saturation.

Students practice using professional terms to describe qualities in a sketchnote. Being able to name specific techniques help students recognize these techniques in other visualizations and learn from those.

3.4. Session 4: Contrast in scale (small/large)

3.4.1. Activities:

The teacher demonstrates how to use contrast in scale – elements of varying rather than similar size - to show priority or simply add a dynamic feel to the visualization.

3.4.2. Exercise:

Students create one sketchnote (of a selected topic) that demonstrates the use of contrast in scale to create an engaging visualization.

Students create another sketchnote that uses all three types of contrast. They document this with a photo, before adding drop shadows, curvature lines, outline and frames.

3.4.3. Critique session:

Same as session 3. The students bring both original sketches and the ‘before’ photo for the critique in order to show the effect of combining techniques rather than using just one.

3.4.4. Learning goals:

Students can identify a number of techniques used in sketchnotes made by others, and they can use the techniques deliberately in their own work to – for example – create engaging compositions that show relations and priority between concepts.

3.5. Session 5: Visualizing abstract concepts – low and deep level of processing 1

3.5.1. Activities:

The teacher shows examples of visual work that combine drawing and a moderate amount of annotation to communicate information of high abstraction level. One group of examples aims at creating complex visualizations – overviews – by using for example, metaphors and re-framed examples. The other group uses simple drawings/icons to supplement specific words or arguments

but do not attempt to relate these or make interpretations. Where the latter in many ways resemble classical note-taking used by many in class, the former demands more work in terms of analysis and interpretation on behalf of the sketchnoter.

The teacher facilitates a discussion in class of a complex topic (say, a research article) in order to identify the overall argument and the claims that support it. The teacher probes for suggestions as to how to visually present this information in a way that – rather than listing the claims as augmented bullet points – provides an overview of their internal relations and tries to make the abstract concrete by using metaphors.

3.5.2. Exercise:

Students create a sketchnote on a topic with a high level of abstraction. Only moderate use of annotation is allowed. They use techniques from previous sessions to add levels of information – for example, use proportions to suggest importance, perspective to suggest chronology, spatial distribution to suggest relation in topic, colour to suggest relation between other elements etc.)

3.5.3. Critique session:

As session 1. After the gallery session the teacher facilitates a discussion of selected works in order to articulate specifically how they communicate abstract information.

3.5.4. Learning goals:

Students learn to use visual techniques to present an analysis or interpretation of abstract concepts rather than copy phrases and augment them with simple icons. This way they learn to differentiate between sketchnotes that demand low level and high level of processing, and get inspiration on how to achieve the latter themselves.

3.6. Session 6: Visualizing abstract concepts – low and deep level of processing 2

3.6.1. Activities:

Same as session 5 only with no use of annotation.

3.6.2. Exercise:

Same as session 5 only with no use of annotation.

3.6.3. Critique session:

Same as session 5 only with focus on topics and techniques trained in previous sessions.

3.6.4. Learning goals:

Students train how to use visual techniques to help them analyze and present an interpretation of abstract concepts.

3.7. Session 7: Information content 3

3.7.1. Activities:

Same as session 6.

3.7.2. Exercise:

Same as session 6

3.7.3. Critique session:

Same as session 6 only now students critique their work in smaller groups using the concepts taught in class.

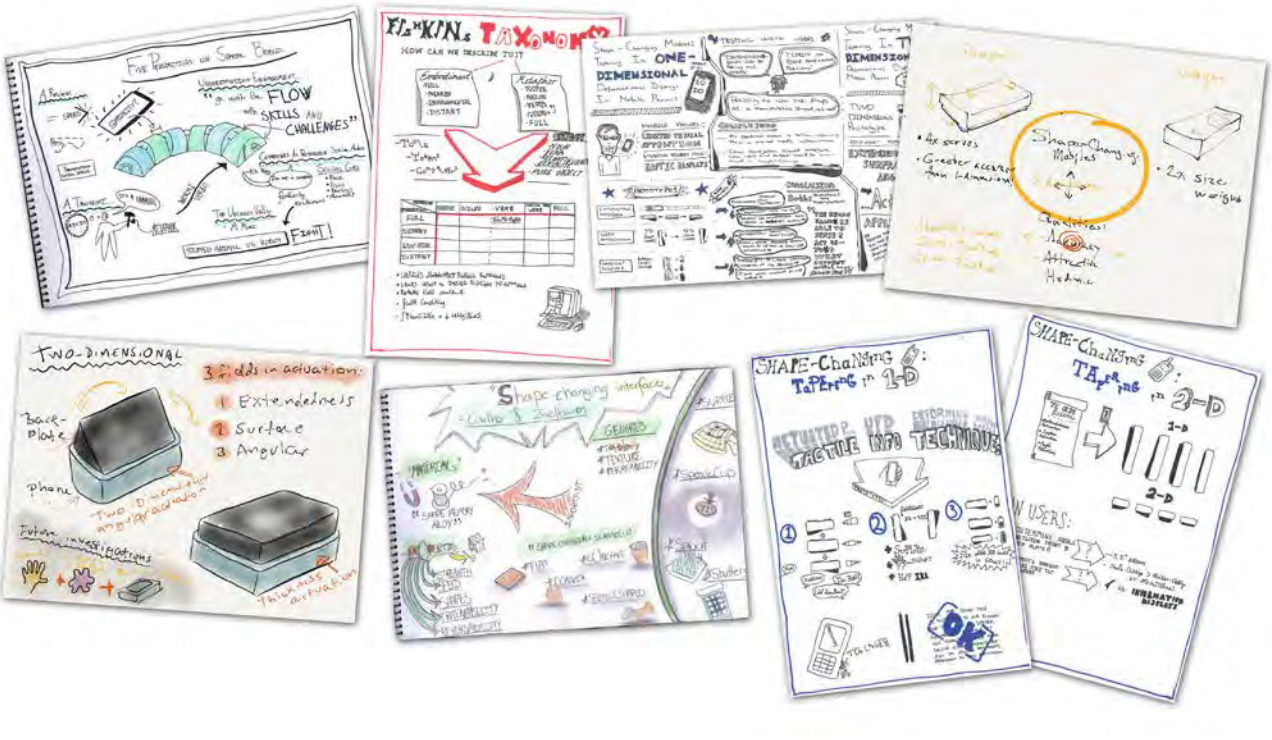

Figure 4: Examples of successful novice sketchnotes made during the design course. The examples show use of techniques related to form and information content, for example the use of contrast in scale/proportions to create a dynamic visualization, or the use of colour to group elements.

3.7.4. Learning goals:

Students learn to use a professional language to describe specific qualities and techniques of sketchnotes. They learn to spot which qualities add to the value of a sketchnote and get help identifying their own development areas. These qualities and techniques are highly relevant for their successful work with design sketching in the future.

4. CONCLUSIONS

This paper presents lessons learned from my practice using sketchnotes in class to help novice students improve their sketching skills. They comprise a series of focus areas and central techniques that seemed most valuable (and learnable) to the students in the course experiment described in (Nørgaard 2016).

Creating sketchnotes based on research papers is in many ways more similar to visualizing process models or cartoon scenarios than they are to industrial design-related visualization work such as described in (Henry 2012) and many other great books used in design schools. The themes that research papers concern are often abstract and hard to picture because they are ideas rather than objects. Accordingly, the techniques that proved most valuable for the students in my class turned out to be somewhat different from the content of standard books teaching industrial design type visualization. This is not to say that learning how to create a correct perspective or calculating a precise drop shadow is worthless for sketching. Learning how to do things 'the correct way' makes it far easier to 'wing it' when in a hurry later in life.

However, the experiment demonstrated the value of practicing very basic and fast techniques that provided students with the possibility to show certain types of information in a drawing. High precision shading is definitely not needed for a novice learning to sketch. But knowing a few simple techniques that help a visualization communicate: "look, there is a shadow right there, so this must be a three-dimensional object even though the perspective might be a bit off" is – for example - very valuable.

A final remark is due. Using sketchnotes as a note-taking tool in class, may help students practise key sketching techniques without any extra cost for the faculty. An exemple of how far we might move the novices is seen when comparing the 'before' examples in figure 1 with the 'after' examples in figure 4.

However, if they **are** key techniques, and we **do** agree that sketching is crucial to becoming a successful designer, and if we actually **mean** that the visualization of ideas is as valuable (though a different value) as words, then we should revise our curricula and examination formats to support these claims. This would motivate students like mine to practice more seriously and use visualisations as the efficient communication and thinking tools they can be.

5. REFERENCES

1. Brown, S. (2009). Play: How It Shapes the Brain, Opens the Imagination, and Invigorates the Soul. Penguin Group
2. Buxton, B. (2007). Sketching User Experiences - Getting the Design Right and the Right Design. San Fransisco, Morgan Kaufmann.
3. Ferguson, E. S. (1992). Engineering and the mind's eye. Cambridge, MA, MIT Press.
4. Goldsmidt, G. (2003). The Backtalk of Self-generated Sketches. Design Issues, 19 (1), 72-88.
5. Goldsmidt, G. (1991). The Dialectics of Sketching. Creativity Research Journal, 4 (2), 123-143.
6. Hautopp, H. and Nørgaard, M. (2017) Playful Participation: How pen, provocation & a personal touch boost user engagement in workshops. Paper accepted for publication in Conjunctions - Transdisciplinary Journal of Cultural Participation (in press)
7. Henry, K., (2012) Drawing for Product Designers, Lawrence King Publishing Ltd.
8. Kress, G. (2000). Multimodality: Challenges to Thinking about Language. Teachers of English to Speakers of Other Languages, Inc. (TESOL), 34, No. 2, pp. 337-340
9. McGown, A., & Green, G. (1998) Visible ideas, informational patterns of conceptual sketch activity. Design studies, 19, 431-453.
10. Mirzoeff, N. (2002). The Visual Culture Reader. Routledge (2nd ed.)
11. Newell, A. F. ; Morgan, M. E. ; Gregor, P. and Carmichael, A. (2006), Theatre as an intermediary between users and CHI designers, CHI 2006 Montreal, Quebec, Canada, 22-27 April, pp.111-117.
12. Nørgaard, M. (2012) Using extreme sketching in creative business modelling. Cumulus conference proceedings, Santiago Chile
13. Nørgaard, M. (2016) Using sketchnote technique in class to help novice designers improve sketching skills, Proc. of Advanced Visual Pedagogies Conference(AVPC2017), Aalborg, Denmark.
14. Oulasvirta, A.;Kurvinen, E.; Kankainen, T. (2003) Understanding context by being there, case studies in body storming, Personal Ubiquitous Computing, 7 (2), 125-134.
15. Paton, B. & Dorst, K. (2011), 'Briefing And Reframing: A Situated Practice', Design Studies, vol. 32, no. 6, pp. 573-587.
16. Schön, D.A. (1983) The reflective practitioner - how professionals think in action. Basic Books.
17. Ullman, D., Wood, S., & Craig, D. (1990). The Importance of Drawing in the Mechanical Design Process. Computers & Graphics, 2, 263-274.