USING SKETCHNOTE TECHNIQUE IN CLASS TO HELP NOVICE DESIGNERS IMPROVE SKETCHING SKILLS

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ABSTRACT

In design, 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 educational programmes. For most students, however, sketching skills seems far less developed than writing, and as a result, they often avoid communicating visually all together. This paper concerns the use of sketchnotes as a means to train basic visual communication and drawing skills. It presents a practical experiment with 55 students from IT product development at a computer science faculty who were involved in lectures, critique and open sketchnote assignments as part of their course in shape changing interfaces. The paper discusses insights related to how the different activities contributed to improving the students' skills in making knowledge visual and engaging others with their drawings. The paper discusses outcomes related to the visual qualities such as the use of various types of contrasts and to the informational quality such as the level of abstraction in the drawings comprising a sketchnote. Finally, the paper relates these outcomes to the students' journey towards becoming more confident sketchers.

KEYWORDS: Design sketching, design teaching, sketchnoting, thinking tool, dialogue tool

INTRODUCTION

Computer science is not what it used to be. 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).

Figure 1: Examples of student productions prior to training.

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. In consequence, I have –in my role as university lecturer- observed the following practices over the years: 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 organizing pre-made clip art in a text editing program (for examples, 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 courses 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, that are used to

convey information in a drawing. Seeing that our curriculum held no room for training sketching techniques as one would expect in, say, industrial design, I started to look at sketchnotes as a frame for training hand drawing in class.

In this paper, I describe the activities carried out in class in order to inspire students to take up the practice, and I will discuss how each activity has contributed to improving students sketching skills.

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.

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 (like, say, a conference talk). Examples include sketchnotes made entirely of words that are organised spatially and sketchnotes with complex drawings that visualises one or more arguments.

Sketchnotes is a genre defined and developed by the people producing sketchnotes, and a variety of examples can be seen at the web page www.sketchnotearmy.com. 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 it is persistent in the way it captures your eye and forces you to look, read and think about what it might want to communicate. 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 interesting as a means to train design sketching.

SKETCHNOTES IN ACTION

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.

While the main goal for having students do sketchnotes was to make the production of visualizations on paper an automatic activity next to writing, the activity had other goals too. These are describes below.

Goals related to visual quality
Introducing students to sketchnoting, I wanted them to improve their drawing technique (the way the hand holds and moves a pen). Further, students should learn the potential and constraints of different drawing tools and materials such as pencil, pen, iPad, and various types of paper. Lastly, students should improve how they com-

posed a hand-drawn presentation, being able to use dynamic lines, the physical space, and various types of contrast to create and interesting visualisation.

Goals related to informational quality
I aimed at moving participating students from being able to illustrate a text with simple icons (low complexity and level of abstraction, so-called 'bullet point sketchnotes') to being able to create a complex drawing that deploys specific visual qualities to organise and present valuable (layers of) information (high complexity and level of abstraction). This is in fact one of the core reasons for using sketching as a design technique. A good sketch does not necessarily equal a 'pretty' sketch. One does, after all, not sketch for the purpose of produce a 'well-balanced composition'. But one might, however, avoid sketching all together if one has no idea about why or how to produce a visualization that can inspire thinking.

USING SKETCHNOTES IN CLASS
In the following, I will describe the sketchnoting activities carried out as integral part of a 7 ects shape changing interfaces curriculum. These comprise a 'learning the basics' sketchnote workshop, using sketchnotes in lectures, having students do weekly sketchnote assignments, and critiquing each others work.

'Learning the basics' workshop
The voluntary 3-hour workshop on sketchnotes was conducted at Aarhus University, early 2012. The local student organization invited the author to throw a workshop based on more than 10 years of experience with visual facilitation and rapid sketching in various business contexts. Of the 55 students involved in the activities reported in this paper, 12 participated in this workshop, and of these, only a few had tried sketchnoting or done much drawing at all since primary school.
During the workshop, students trained basic techniques to improve the quality related to the visual quality of the sketchnotes. These included tips about using frames to define and arrange the space on the paper, using variation in proportions, spatial density (balancing solid/void) and contrast to create a dynamic image, and the use of colour to provide additional information. The workshop also trained the use of handwritten fonts and annotation. Students learned about tools and materials and about how to use line thickness to convey information. To demonstrate techniques the teacher used a LDC video projector to share her sketchbook drawings live with the participants in the auditorium. After each training session an example from a participant was shared with the auditorium and critiqued by the teacher.

Sketchnotes in lectures
To motivate students, I strived to use sketchnotes myself as the basis for the lectures each week. While my goal was primarily to show how interesting visual presentations do not have to be very complex or time consuming to make, I also wanted to display a range of styles for inspiration and motivation for the students. Further, I wanted it to be a natural thing in my classes to produce, experiment with and share hand-drawn sketches.

Critique of weekly assignments
Each week, students faced a mandatory assignment that involved sketchnoting. Often the assignment was to interpret one or more research papers from the design curriculum into an A4 sketchnote. Other times students were asked to present what they thought was the five key takeaways from, say, a field trip. The assignments were 'open' meaning that students were free to produce any style of sketchnote they thought would fit into the genre as presented by the examples displayed at the gallery site sketchnotearmy. com.
A critical part of the experiments, was trying out different ways to provide feedback on students' sketchnotes. For some critiques the teacher brought copies of all submitted work into class, and would - after 15 minutes of students quietly browsing each others' work in a gallery session - pick and discuss good examples of a technique or composition in front of the class. At other times, students were - after a silent gallery session - asked to put a mark on a sketchnote that they enjoyed or would like to learn from. The various qualities of the top 5 sketchnotes were then discussed in plenum. Finally, some experiments with providing written or annotated feedback on individual sketches in the online submission system were carried out.

RESULTS
The workshop
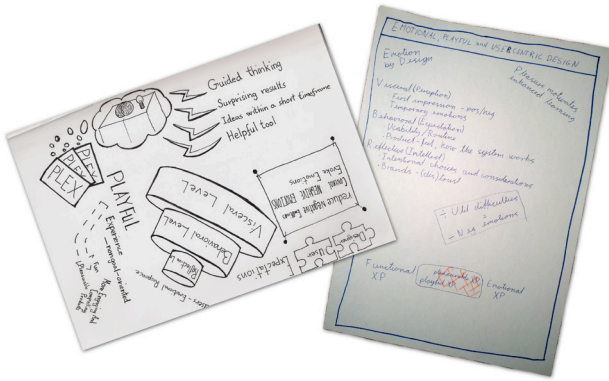The 'learning the basics' workshop proved useful

Figure 2: Examples of two novice sketchnotes made very early in the experiment. The sketcher to the left, had participated in the workshop, and is training the use of line thickness, spatial distribution and contrast in scale and saturation. The sketcher on the right had not participated in the workshop.

in that it taught the students a few tricks that immediately improved the visual quality of their sketches (for example, see figure 2).

Students that participated in the workshop, generally performed better in the experiment and were in the following design classes willing to put in more effort in producing their visualisations.

Sketchnotes in lectures

Using sketchnotes as the basis for lectures proved a useful channel for providing motivation and inspiration to students. However, re-inventing your style or demonstrating a new technique every week, on top of actually producing a visualization of a 45 minutes lecture requires substantial effort, including courage to part with the traditional

Powerpoint format, on behalf of the presenter.

Critique of assignments

While writing individual reviews proved time consuming, and did not help the sharing of styles and technical tips between students, the plenum critiques proved a great opportunity to show how effort and attention to detail matters in visual communication. Students instinctively agreed on which were good sketchnotes, and trying to articulate which qualities made a good sketchnotes stand out, helped students improve praxis.

Critique and knowledge sharing is a time consuming matter, however. In a course dedicated to teaching, for example, shape changing interfaces, rather than sketching skills specifically, dedicating an hour a week to improve students' skills, seem too much if solid demonstration of sketching skills is not a clear learning goal for the course.

While discussing examples of good student work is easy, it is hard to talk about the poor submissions, especially for students who are learning how to critique. Accordingly, the teacher must take responsibility and make sure that negative critique is articulated in proper terms and related to composition, finish, information content, etc., to avoid unconstructive critique.

Specific results related to visual quality

Seemingly, students should be told very specifically to experiment with materials or use certain tools. They do not follow open instruction to experiment with various tools to get to know their

Figure 3: Examples of a sketchnote with information content of a high abstraction level (right) and a sketchnote that make use of a series of simple unrelated icon-like illustrations - a 'bullet point' sketchnote (left).

Figure 4: Examples of successful novice sketchnotes. The examples show use of techniques to improve both form and informational content, for example the use of proportions to create a dynamic visualization or the use of colour to code for which elements belong together.

different limitations. For example, after several critique sessions about half the students still used worn down pencils on low quality paper. Specific instructions as to which tools to use and which level of finish is expected are needed, as well as a continuous focus on form and finish in the critique sessions.

Students' understanding for how to compose and critique a sketchnote was supposed to be inspired by the vast material available on for example sketchnotearmy.com, by the use of sketchnotes in lectures, and by the critique provided in class. However, concepts like spatial composition and contrast in scale and saturation seemed too difficult to understand and should probably be trained in dedicated assignments.

The critiques proved a fine arena for repeating the basics taught in the workshop. To provide inspiration for the students motivated to train and learn more, critiquing sketchnotes made by more practised sketchers, such as ones found at online fora, would prove valuable. The sketchnotes used in lectures should be crafted to support and provide examples of what is meant by for example 'balancing solid and void', or show the difference between including or excluding shadows and outline in a presentation.

Specific results related to informational quality
In critique sessions, all students valued the

sketchnotes that reflected effort and a fine use of compositional techniques. However, one thing is to be able to identify a well-made sketchnote, it is quite another thing to be able to say why it works well, and be able to use such insight to improve one's own sketchnoting. Students need more training with giving critique in order to be able to articulate what separates the good from the poor contributions, so that they can use these insights to improve own work.

I expected that students would develop from being able to illustrate, say, a text, with simple icons, serving to decorate rather than provide information, to experiment with creating a more complex drawing that captured the same text in one visualization showing a higher abstraction level.

While the correct use of tools and the training of fairly simple techniques to create an interesting composition are valuable in terms of presenting ideas in visualizations that are appetizing to look at, the sketch's qualities related to reflection in action, new thinking and re-framing relate specifically to what (information) is sketched rather than how (drawing technique) it is sketched.

Accordingly, my overall hope was to help move novice sketchers from producing sketchnotes, which in effect are nothing but decorated bullet point notes, to start experimenting with and being able to create visualizations at a higher level of

abstraction.

Of the 55 students a handful moved from producing sketchnotes consisting of several simple low abstraction level icons to more complex visualizations, that showed the ability to condensate complex information into one coherent visualisation. In figure 3 (right) a student has depicted a man that controls a puppet. It is a visualization of how a designer, through his design choices, can control what the user does. The designer is depicted above the user and is proportionally larger, and the strings with which he controls the user makes him appear a puppet master, but somewhat out of control. Such a visualization is different form the example shown to the right, where a series of simple icons almost chronologically follows the points made in a research paper. In effect, this example is sketchnotes' equivalent to a bullet point list, the icons do little to interpret the claims in the text which leaves their contribution limited.Other examples of sketchnotes with a high information content included the use of spatial arrangement, arrows and colour to show relations, or the use of soft tones and arrows to show movement or design components otherwise hidden to the eye (see, figure 4).

DISCUSSION

The question remains: is it doable to improve computer science students' sketching skills using weekly training in sketchnoting technique over 7 weeks, and with very little practical teaching? Based on the experienced described in this paper I dare say that it is possible to move most students to a level where they can produce visualizations superior to what is shown in Figure 1, and provide them with a vocabulary then can a) help them critique sketchnotes and b) inspire their own training in specific areas, such as balancing the spatial layout in a composition. But still – as already mentioned – this is not the overall goal of sketching. Are the activities enough to help students move from 'bullet point' sketchnotes of little information value to producing sketches and sketchnotes that are exploratory, proposing and tentative, to borrow from Buxton's description of sketch qualities? With weekly assignments, inspiration and critique, and using a genre such as sketchnotes which is accessible and where exercises are fairly easy to integrate in an academic course, it is possible to put the quality of visual presentations on the agenda. True, some (maybe up to half the) students will consider the exercises a useless chore and put next to no effort in training, And they will not move from 'bullet point' sketchnotes to visualizations with more complex information content. But some will discover that they are learning a new language, which is not only useful for helping them reflect and re-frame their own ideas, but also help them communicate visually with others, and use sketches to spark dialogue. They will not reach this level of expertise without practising over a longer period of time, but having experienced a slight upgrade in skills and having learnt a basic vocabulary that helps them articulate and see qualities in sketchnotes, many of them will continue training. After all, once you can produce tsketchnotes at the level of the examples shown in figure 4, the activity starts becoming enjoyable.

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