

NOTEBOOKS AS DIDACTIC TOOL IN DESIGN EDUCATION

Martin van den Toorn, Rein Have
m.w.m.vandentoorn@tudelft.nl
r.have@tudelft.nl

Faculty of Architecture
Delft University of Technology
POBox 5043
2600 GA DELFT
The Netherlands

Abstract. Notebooks are an important didactic tool both for students and teaching staff. The idea of notebooks is that the daily work and thinking is reflected in notes, drawings, sketches, diagrams. Keeping track of the content of daily work can give an idea of the evolution and development of ideas. Especially this last aspect is important; to have a specific place where you can play with ideas and where the experimental and explorative work can be done. Moreover the evolution of thinking on a longer time scale can also be overseen. Notebooks are not only used among designers, engineers but also by scientists; they call them mostly 'lab journals'. The goals are the same, only the content is different.

The central question in this paper how notebooks can be integrated in the curriculum in such a way that there is a more than personal advantage for the student in question.

The paper is organised in three parts. First an overview of goals, content and some examples of notebooks, both from literature and our own experience in teaching visualisation in a faculty of architecture. In the second part we will pay attention to the development of content and techniques to improve the quality of notebooks as teaching aid. These principles form also the basis for the criteria for assessment and marking of notebooks.

In the last part we will conclude how notebooks can be integrated in today's curricula for design schools. One of the conclusions is that notebooks combine the personal development of a student with the generic requirements that are part of every curriculum. The role of the teacher is crucial; only if the teaching staff as a whole fully supports and contributes to the idea, it can be successful. The result to strive for, is students that discover themselves the notebook as their personal idea generator and research tool.

1. INTRODUCTION. Notebooks have already been used for a long time. The notebooks of Leonardo da Vinci (Richter, 1970) are probably the best known notebooks of all times. Leonardo shows us visual thinking of the highest quality; you can almost follow his thinking by the drawings he made and the inventions he came up with. Whether he really kept a notebook with him all day, like we propose to our students, is not known but the results are still astonishing. Benesch (1943) speaks of 'scientific drawing' and states that Leonardo started with that.

A less known and more contemporary example of notebooks are the ones of Paul Klee (Klee, 1961; 1970). The content of his notebooks seem to be more of a research by drawing, an exploration into form, forming and giving form. Also in this case a fascinating example of drawing, thinking and invention.

In this paper we focus on the use of notebooks in design education, as a didactic tool. The methodology used is partly analysis of case-studies, partly literature research. In the conclusions and discussion we also bring in our own experiences on the use of notebooks that we had in teaching a course on 'Visualisation' at the Faculty of Architecture at Delft (Toorn, Have, 2010).

Terminology

Journals and notebooks have a character of a diary, a daily recording of impressions, experiences and ideas. The terms 'diary', 'notebook', 'journal', learning journal, log and nowadays 'blog' are mixed up frequently. There are certainly similarities; mainly in the recording, capturing at regular moments, for instance every day. 'Diary' is mostly used in the sense of personal, of private thoughts that are mostly not meant for others. The daybook of Anne Frank that she wrote during the Second World War is a well-known example since it was published after her death. Most daybooks are not published.

'Notebook' is a generic term with a more general meaning of writing down notes, making drawings and sketches. In this paper, we use this general term that can refer to any of the more specific terms.

'Journal' seems to be the most universal term that covers the primary goal of regular recording, capturing for working out later. The regularity is one principle of the availability at any time to capture ideas, images when you don't expect them. Journals are also kept in different types of working environments like in medical practice and on ships. Journals are used in schools as a didactic tool as well to allow children also for personal learning outside school and apart of the schedule, they are sometimes called 'learning journal'. Writing first outlines for texts, developing ideas for tasks at home, are often done by making use of journals.

'Logs' are probably the oldest forms of regular registration of activities on ships.

'Blogs' have become popular in the last years as part of the digital revolution and ubiquitous computing. In fact blogs are also a form of journal, but are only digital and they need internet. The core of blogs is the sharing of personal thoughts, commentaries, reactions and sharing them with others on the internet. Blogs are sometimes also used as digital travel logs to inform a larger audience. The audience can be selected or it can be open to anybody on the internet. Like all activities on the internet, the commercial aspect plays an important role.

What are notebooks, journals used for?

For designers, notebooks are used as daily companion for writing down ideas, making diagrams, sketch rough outlines and recording personal thoughts and ideas. Even though this daily discipline is very important in our version of use of notebooks for design students, the core of notebooks for us is also the availability of something for recording and analysing ideas, visions and situations in daily life. Ideas, concepts and visions never come at times you would need them, so you have to be prepared for capturing the moments that ideas come to mind. Another important aspect for us is to use the notebook as an experimental space for trying out, for developing ideas.

A wide variety of uses can be found; taking notes, writing texts, registering daily life, organising a scrapbook, researching form, outlining, capturing ideas, touching up drawings and without doubt more types of use can be found.

All have in common that internal thoughts, perceptions are made external in one or another form be it text, images or fragments of collected material. This making explicit, putting it on paper, has two functions. First of all it is a condition for reflection; secondly in learning to make explicit ideas, thoughts, perceptions.

2. NOTEBOOKS IN EDUCATION, RESEARCH AND PRACTICE. Notebooks are used in different disciplines and working domains and have different functions. We will describe some uses and functions in concise form to give an overview from cases and literature.

2.1 The use of notebooks and journals in general. One of the most extensive general studies

on notebooks has been written by New (2005). New has analysed a series of 31 cases from a wide range of users, not only from designers. The book comprises four main chapters; observation, reflection, exploration, creation. She makes clear that a great number of quite different professionals are using notebooks and that they are common among different disciplines (science, art and technology). Even though the title is 'Drawing from life, the journal as art', the forms are both textual and visual and the styles are very personal and distinct without emphasis on aesthetics.

Moon (2003) pays attention to the general use of notebooks and journal in teaching and education.

2.2 Use in science, art and technology. For this paper we have selected a limited number of examples from science, art and technology. The selection is by no means complete or even representative but only to show as an illustration. Publications on notebooks are rare but publications of notebooks are quite easy to find.

Science

In science the lab-journals are well-known and much used. Sometimes there is a strong focus on registration only. New (2005) shows in her book the journal of geologist Rick Hoblitt; it contains detailed observations and descriptions both in words and images. These observations are quite different from travel logs where the focus is much more on a different type of observation; impressions.

Art

Among artists, notebooks are quite common but not always published. Reff & Shoemaker (1989) assembled material from two of Cézanne's sketchbooks that gives an overview of working, viewpoints and thinking of the artist.

The notebooks of Oldenburg are an overwhelming proof of the 'power of drawing' (Oldenburg, 1971). Here we have selected one example of Oldenburg's notebooks but there are more published. Even for non-professionals the drawings, sketches are expressive and reflect the ideas and thinking process of the artist. Oldenburg, like many other sculptors, uses sketches as preliminary research for his sculpture, still in the conceptual phase. The same principle is used by painters as we have seen in the sketchbooks of Cézanne.

Engineering , technology

The sketchbooks of Nicolas Grimshaw (Grimshaw, 2009) are remarkable. First of all because Grimshaw was educated as an engineer and works as a designer. Notebooks used by engineers are not so easy to find. Secondly the way he uses his notebook. We see a mixture of sketches of spatial representations of buildings, bridges and calculations, working out of small details. Extremely rich in the relation between the design concept and the calculations. For Grimshaw this 'balancing' between the two makes up his thinking process during the design phase.

What seems to be common among all is the regularity of the use of the notebooks which enables 'looking back', reflection. In Grimshaw's and artist's notebooks the key issue is also on idea development, invention and searching for the right form through sketching and drawing; in fact experimenting.

2.3 Use in design. Design and art are two knowledge domains where notebooks are probably most used. Not by all but its use is quite common. Also in this case we have selected a number of cases and examples to give an idea and by no means an overview since that would be too vast.

Notebooks in architecture

Many architects use notebooks. The notebooks of Rossi (Portoghesi, 2000) are almost artbooks.

Especially for famous architects this tendency is apparent. In the context of this paper, we search not for notebooks as 'artbooks' but for examples from which the use and content can be analysed and derived.

Even though Herzberger is a famous Dutch architect, the publication that Bergeijk & Hauptmann (1998) made of Herzberger's notebooks is very interesting. Different types of uses can be distinguished. First of all Herzberger uses his notebooks while traveling, not only while making explicit study trips and excursions but also in daily traveling. Secondly, he uses his notebook to develop ideas and design concepts. The plan for an urban extension at Middelburg, the 'Veerse Poort' is a good example in which the conceptual phase is drawn out in his notebook. The realised plan shows the characteristics and basic layout that was developed in his notebook.

A similar approach can be seen in the notebooks of Jo Coenen (Coenen, 2001). The development of the 'C ramique area', a former industrial area on the right bank of the river Maas in Maastricht. A major part of the conceptual phase can be followed in his sketchbooks. Like Grimshaw (2009), Coenen also elaborates technical details while still in the conceptual phase. From the notebooks of Coenen, you can follow the content of the plan development for a large part. Moreover Coenen is very explicit about the role of drawing, sketching for architects; he considers it to be fundamental for all architectural design. The same goes for Riedijk, presently Professor of Architecture at Delft and influential contemporary Dutch architect. He states that drawing is the 'raison d' tre' of any architect; no architectural design without architecture. In all the examples mentioned the relation between sketching and the realised work is in most cases visible. In the sketchbooks of Dekkers (2005), this is not the case. Apparently Dekkers uses drawing, sketching as a type of her personal research for idea development and conceptual thinking, the relation with her realised projects is not directly visible in the notebooks.

Notebooks in landscape architecture

For Sullivan, an American landscape architect who teaches at Berkeley, drawing seems to be 'a way of life'. In his book 'Drawing the landscape' (Sullivan, 2004) he pays extensive attention to all aspects of drawing in landscape architecture including 'notebooks', 'sketchbooks', 'diaries' (Chapter 2). He emphasises the need for regularity; 'draw every day'. In his teaching he is stimulating and tries students let themselves discover their own potential in drawing, sketching and observation. Due to his teaching and publications it seems that drawing is very much integrated into the entire program of landscape architecture and eventually also architecture.

In another publication 'Garden and climate' (Sullivan, 2002) he shows how he uses drawing, fieldwork and notebooks in research. In this case how the four elements, earth, fire, air and water are used in Italian garden design. In this case the drawings are the main research tool, the text is complementary. The working process is not described extensively but it is clear that fieldwork, daily sketching in notebooks, and elaborating that all at night forms the core of the research approach.

Similar but in a different way, is the approach of Cathy Dee. A British landscape architect who teaches at Sheffield UK, published a book 'Form and fabric in landscape architecture' (Dee, 2001). Her approach to design in landscape architecture is visual and makes extensively use of drawings. Even though she doesn't mention the approach of making drawings and how it is or could be integrated in practice, education and research, it is clear that notebooks are used since the book is full of observation studies of daily environments, gardens, parks and landscapes. In the drawings, observation of form, experience of space and visual qualities are clearly analysed; drawing as a research tool. This a great inspiration for use in fieldwork as part of the design process in landscape architecture.

The landscape architect who has written most about his drawing experience and notebooks, is

probably Laurie Olin. Olin is an American landscape architect who has his own office, teaches at Penn and publishes regularly. Like Sullivan, for Olin drawing seems to be also a 'way of life'. He gives an extensive overview of his views of drawing, use of notebooks and the way he makes use of it in all his activities in a recent article (Olin, 2008). In one of his publications on selections from his sketchbooks (Olin, 1996) he pays special attention to sketchbooks from a personal point of view. Here the idea of 'drawing as a way of life' becomes apparent and is explained how it functions in the office. Although Olin has been teaching for a long time, he doesn't mention anything whether or how he introduces the subject in his teaching.

A short summary of how notebooks can be used:

- as an ideas book: useful at the outset of design. In graphically recording your initial and diagrammatic concepts along various design routes, it can be made public during critiques to explain objectives and approach to problem-solving.
- as a sketchbook: for freehand drawing and outdoor sketching. In documenting forms and spaces of interest, it functions as a memory store of images for future reference. Also useful for experimenting with unfamiliar mediums and techniques.
- as a scrapbook: a reference book in which photographs culled from newspapers and magazines are glued into collated sections. Pages could include compilations of human figures describing different poses, and various cross sections, tree types, building typologies which, when required, act as a visual dictionary to inform presentation drawings.
- as a workbook: setting up an outline of a design approach, developing ideas, concepts, design solutions.

All these activities comprise what we call 'visual thinking'; the core of what designers do during the design process. While working in this way, the developing of 'design knowledge' takes place which forms the core of design as a discipline. There are slight variations among the different design disciplines. This design knowledge is for a large part implicit and 'hidden' in realised projects, recordings of the design process and in the heads of designers. Also notebooks do contain design knowledge but mostly implicit.

Crowe & Laseau (1984) wrote a well-known book 'Visual notes for architects , designers' in which the work out some of the generic parts of design knowledge in the form of approach and methodology.

3. CONTENT AND TECHNIQUES. Notebooks can be used as a daybook; ideas, short notes, clippings from a newspaper, picture postcards should find their place. It also the best tool to use for fieldwork. Back home photocopies or scans of sketches, diagrams, sequences, sections can be made and can be reworked into more advanced products. So the notebook forms the starting point of worked out ideas, concepts, texts, planning of long term projects. Like articles are not written in one time, drawings have to be 'touched up', and notes have to be worked out. The more versions are made, the better it gets.

We require students to make use of a notebook during the courses in hand drawing and visualisation, to sketch, make short notes and first concepts as tryouts (Toorn & Have, 2010). Most students will already use one; they can just continue to work in it also for these courses. For these courses the use of a notebook is mandatory, those who don't have a notebook should get one and start using it right away. A number of studio teachers also require or advise to use notebooks but not all.

In the notebook all rough sketches, ideas, first concepts, examples can be collected, it is also used for trying out of design proposals or parts of it. Students should always have it with them, in the studio, during lectures, fieldtrips. It should be seen as a working book, not as a collection of finished work. Students also discuss their ideas, proposals and first sketches with teachers by using their notebook.

Techniques for using notebooks and journals

Techniques and use of notebooks is rarely taught as a subject and publications on the subject are even more rare. The book of Crowe & Laseau (1984) 'Visual notes for architects , designers' is one of the few publications that explicitly pays attention to techniques. Especially the principles of making use of diagrams are very useful in daily practice.

A specific use in this category is the use of notebooks while traveling. The notebooks of two famous architects Le Corbusier 'Journey to the east' and Kahn 'The travel sketches of Louis Kahn' are good examples (Kahn, 1978; Le Corbusier, 2007).

Both are examples of 'drawing as research'; on the spot they analyse their observations immediately by making a drawing, a sketch, a diagram or a section. The key point of the technique is abstraction, being able to derive the essentials of what is observed in a relatively limited time. These type of travel logs are also a way of learning to observe. A process that never ends; a lifelong learning process for all designers.

4. DIDACTICS, HOW TO USE NOTEBOOKS IN DESIGN EDUCATION? Moon (2003) pays attention to the use and role of notebooks, journals in teaching and learning in different types of education both academic and professional and from primary school to the university. In a didactic context notebooks offer an opportunity to learn from the process of teaching over time simply because notebooks enable to look back and to reflect. In this sense a notebook is vehicle for reflection. A second learning effect can be achieved because notebooks offer a type of 'free' learning, that means outside the predefined schedule and curriculum on an individual basis. Especially for those who are unable or not keen at learning in classroom, in groups or any other type of structured teaching, notebooks offer an individual solution that gives an opportunity for personal development. A third learning effect is possible because of the keeping of notebooks demands for an active participation; learning by doing. Also in this sense the student might discover personal capacities, competences that did not show in regular education. Finally notebooks offer opportunities to learn, discover and use other senses; develop sensory qualities that cannot be found in text-based instruction with mostly a rational basis. Altogether notebooks offer independent learning on an individual basis, something that is missing or lacking completely in most regular education at all levels.

Use of notebooks; learning to observe

Although notebooks are not necessary for doing fieldwork, they are the most practical solution. Fieldwork is of prime importance for landscape architects. All landscape architectural interventions start with the existing landscape. Perception and analysis of the form of the landscape as a living system is a complicated affair that can only be grasped by doing fieldwork and relate that to map analysis. In landscape architecture this is called 'observation studies' or 'visual research'. The importance of fieldwork and drawing can hardly be overrated. Lavoie (2005) spends extensive attention to this aspect. She claims that the direct experience of drawing in the field is the only way of really relating to the landscape as object of planning and design. All landscape architects have to be trained observers of the landscape as object of planning and design. Notebooks are important means for this but also for doing the same if you are not working on a project or a study.

Use of notebooks; learning to abstract

An underlying principle of the use of notebooks is learning to abstract. Not only for drawing, abstraction is a key issue, also for making explicit of personal thoughts, ideas. Abstraction is something that can hardly be learnt from books; you have to do it. The real learning, like most aspects of design is in the doing, in practice.

Discovering and developing a personal style

Notebook are perfectly fit for developing a personal style in visual language similar to

handwriting. Because it creates an overview in time of all notes, sketches, drawings together, it also shows clearly the development or progress that has been made in being able to express personal ideas, concepts and thoughts.

In general the didactic goals for use of notebooks in design education are: perception, conception and reflection. Reflection is made possible by feedback, by learning from doing and eventually the results of this feedback that come back in a new representation as a result of visual thinking.

We mark the notebooks (that are also used in other courses and studio's) on the following criteria:

- daily use, also outside the studios and courses
- the trying out, registration and visual researching of ideas
- use of different techniques and media; developing a personal way of working, with a personal style so that you don't have to think of how you are going to visualise.
- By far the most important criterion for marking is the matter of progress in the sense of discovery, development of personal style and curiosity

It demands special qualities of the teacher to integrate notebooks in the regular curriculum and schedule of education.

5. CONCLUSIONS AND DISCUSSION. Even though the use of notebooks among designers and artists is quite common, there is very little real teaching of use, content and techniques of keeping notebooks. Students learn it by doing and seeing other people (teachers, practitioners) use them. There is a need to put more attention on the use and usefulness of notebooks in design education but in an explicit way. Research and publications are badly needed.

We could conclude that three main types of use for notebooks can be distinguished.

First of all the idea of capturing ideas while you are not working on it. A major function also used by experienced designers. The technique is in most cases very personal and not understandable for others. Only after reworking and elaborating on this early notes, they can be made understandable for others.

Secondly there is the drawing and analysing of realised plans. The underlying premise is that you can learn from earlier examples (precedents) by carefully analysing them. Unwin (2009) goes so far to consider this as a condition for learning to design.

Thirdly there is the registration of what you see while travelling or doing fieldwork. It can be considered as a form of visual research where the itinerary brings you at places where you discover all kinds of phenomena, but also raises questions. The phenomenological aspects are in this case the core of the approach. As a technique you have to be time efficient and capable of abstracting the main principles of questions.

In landscape architecture the fieldwork plays a key role since you always intervene into an existing situation. Especially the recording of first impressions can be a rich source for design ideas in the first conceptual development of a project.

Many teachers, educators are convinced of the importance of notebooks but don't know how to integrate them into the regular curriculum; largely a didactic problem. It demands a flexible and personal approach of the teacher which has more a character of coaching and stimulating than following a preset course line.

For students it is extremely important to be introduced to the use of notebooks during their education. The use of notebooks is also a matter of getting used to and organising the use of it in daily life. It requires discipline and will then create conditions for reflection.

One of the problems with many architects's notebooks is that they are almost 'artbooks', first of all because of the beautiful drawings and secondly because of the 'designed and graphically manner of layout' like for instance the notebooks of Rossi (Portoghesi, 2000). Psychologically this can form a barrier for beginning students since they could get the idea that they are not capable of keeping a notebook in this way.

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