re-thinking the way we draw

The following is an account of our first attempt to reapproach the drawing and visualisation courses within our [1] architectural department. As we are writing this we are over three thirds within the process of implementing a first run of the exercises. Our first exercise (14mm) being finished last January and our second one (24mm) entering its final phases. The design and concept of both exercises was inspired by the research project: "Extended Drawing". "Extended Drawing" aims to expand the notion of designerly drawing within (preliminary) design processes through researching the layering and sequencing of generative media within design- driven drawing and thinking processes. Central to the project's thesis is whether changing and combining different media and representational systems changes designerly conceptions and, subsequently the thinking, within design based graphical processes. While the project inquires designerly processes through practice based approaches one of the project's peripheral goals is to gain understanding in order to re-approach learning processes within design based drawing courses.

exploring the designerly games through sketches

A brief (and slightly personal tinted) history:

Only a couple of decades ago computers were hailed into our architectural practices and subsequently our schools as a new feat which would eventually enable designers to move away from the laborious drawing process which up until then characterised designerly production. Computers made it possible to work and rework drawings without the hassle of having to redraw everything as things changed. As such computers facilitated designerly production processes, changed the way we communicate through images and made image editing and graphical design accessible for everyone. On the other hand computers also brought sheer unlimited calculation speed and storage space and by doing so opened up new areas of design and designerly thinking. Computers have, since, enabled designers to design, visualise, calculate and, more importantly materialise complex geometries, shapes and/ or processes. As the hard- and software matured, evolved and proliferated computers gradually established a firm place within our practices as one of the indispensable tools to– and for designing. But while computers happily kept getting better in performing a wide variety of actions, views and approaches upon creative design related drawing had a hard time keeping pace and adapting to this new digital reality. While no one seems to question the computer's supremacy within (designerly) production we see a growing concern as to the seeming decline of the practice of "manual" drawing and sketching within design.[2] While most sources seem to agree upon the unparalleled power of (freehand) drawing within design the question remains: do we have to search for novel ways to learn novices how to explore spatial concepts by hand now that working digits has made drawing easier than ever...

"Extended Drawing" starts from the premiss that –as digital activities gradually replaced drawing boards within our working environments, we somehow started ignoring specific movements and extensions which might be possibly characteristic to design and graphical thinking within design. Amongst the above mentioned sources there is a mutual agreement that changing the protocols within designerly production affects the way we perceive and conceptualise design, the eventual effect of those changes upon our (designed) surroundings remains manifestly unclear and a reoccuring topic for debate. Researching the activity of design based drawing appears to be a complex business drawing from distinct areas of investigation.[3] Now that digital drawing has established itself a firm place within our practices "*Extended Drawing*" started looking back in reverse in order to examine the gains and the losses of the whole transformation process and in order to look forward again to be able to redefine and rethink at least some views upon expressing design. As opposed to a romanticised, nostalgic view towards the craft, "*Extended Drawing*" explores ways to re-allign distinct modes of graphical thinking within the designerly process in order to explore and expand the thinking tools driving design cognition.

The exercises and their processes (14mm&24mm)

In 2010 our investigations within possible approaches towards teaching designerly drawing became an urgency. A major change within our curricular structure opened an opportunity within the Brussels curriculum to start exploring future developments within our "media"-curriculum. Central to the Brussels development within our curriculum is to– first of all search for ways to investigate the design driven teaching of designerly media, secondly the implementation of the generative tools should consciously try to blur the boundaries between handmade and digitally processed.

While introducing design within the drawing classes seems like an obvious thing to do within a design school, the fact of the matter reveals it's less obvious than it appears to be. First of all drawing classes are about teaching people how to draw, ultimately a matter of changing one's perception and teaching and practising techniques to draw what one sees. Weighing too heavy on perception tends to ignore the creative thinking which drives designerly drawing and weighing too heavy on design diverts attention from drawing to aspects such as form, space and functionality. Finding a balance is the major concern there. While trying to keep far from the things our participants[4] are developing within their design studios we have attempted to incorporate design as a generator of the drawing processes through searching for drawing and modelling processes which shape design. Researching a design driven approach resulted in experimenting with the idea of "*design drawing games*" as a backbone for our drawing courses. Within the games a spatial structure is developed through working and reworking an array of cubes towards an abstracted architectural form.[5] While the structures avoid overt functionality and architectural content they do incorporate scale and anthropometric concepts to enhance spatial awareness and thinking. Each step within the process is designed to incorporate a specific drawing or modelling technique and the introduction of those techniques search for self-evident places as generators within the designing processes. The games' formal and spatial guiding rules were defined open enough to leave enough space for creativity and interpretation. As such the games would enable us, the drawing instructors to quickly review the designerly aspects within the developing models (a rule is followed or not) to quickly move on to the individual drawings technically and the visual aspects of the drawings theoretically.

Re-thinking the courses:

Our curriculum offered two units within two semesters to introduce a wide variety of architectural tools: 14mm (design drawing basics) and 24mm (expanding upon designerly media). As mentioned the courses deal with novices within design with a limited experience in drawing and design related representation. As such every new tool, technique or representationsal concept the process offers is somehow alien to them. Through introducing the tools as catalysts of thinking and designing processes within phases of the game enabled us to move away from abstracted technical introductions of techniques and interfaces because the tools we introduce are instantly applicable within the process in order to generate form and space. In general 14mm is about exploring drawing and modelling basics; visualising a solitary architectural subject. 24mm expands and widens the available tools, techniques and visualisation vocabulary while adding a notion of context through developping an abstracted (designed) landscape. 14mm is mainly dedicated to analogue techniques with a comprised CAD and modelling component, 24mm introduces a wider array of digital media and is dedicated to switching and layering analogue and digital media and to visualising (designerly) processes. Now how does it work?

Both exercises start off from a grid of thirty tactile cubes and follow a process where modelling inspires the drawing and/or drawing inspires the modelling. Doing so forces the participants to actively switch between modelling, drawing, and different modes of (designerly) representation. The most complex part of designing the exercises was how to organise a comprised design process shaped by the tools necessary to execute the phases while keeping an overview of the tools we intended to introduce within the curriculum. *Figure 1* recalls the overview of the possible tools we devised within the preliminary meetings preparing for the new structure. While it was obviously impossible to introduce all of those tools within a structure of 24 weeks we eventually searched to incorporate the most important ones and touch upon a few others.
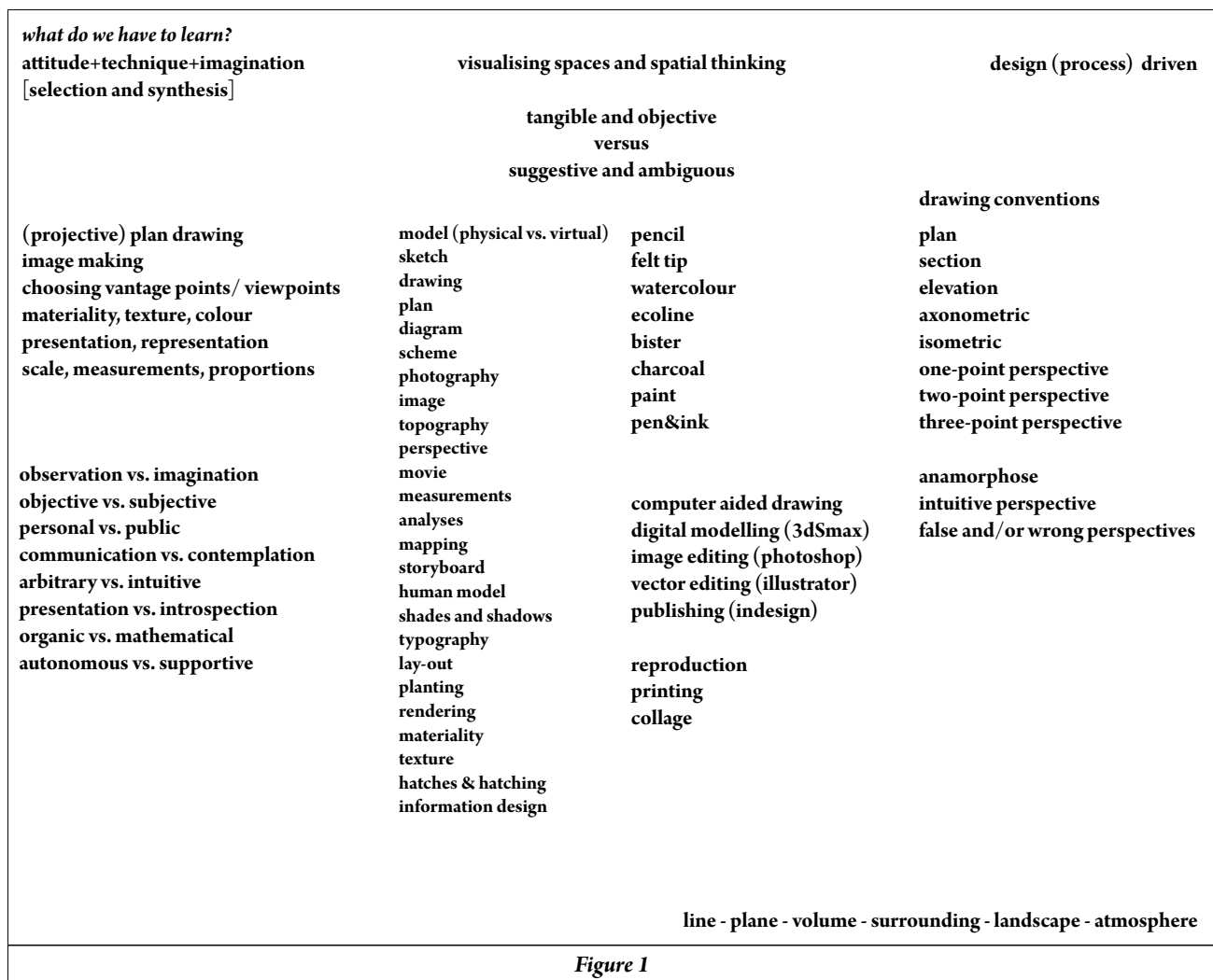
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what do we have to learn?

attitude+technique+imagination
[selection and synthesis]

visualising spaces and spatial thinking

design (process) driven

tangible and objective
versus
suggestive and ambiguous

drawing conventions

(projective) plan drawing	**model (physical vs. virtual)**	**pencil**	**plan**
image making	**sketch**	**felt tip**	**section**
choosing vantage points/ viewpoints	**drawing**	**watercolour**	**elevation**
materiality, texture, colour	**plan**	**ecoline**	**axonometric**
presentation, representation	**diagram**	**bister**	**isometric**
scale, measurements, proportions	**scheme**	**charcoal**	**one-point perspective**
	photography	**paint**	**two-point perspective**
	image	**pen&ink**	**three-point perspective**
	topography		
	perspective		
observation vs. imagination	**movie**		**anamorphose**
objective vs. subjective	**measurements**	**computer aided drawing**	**intuitive perspective**
personal vs. public	**analyses**	**digital modelling (3dSmax)**	**false and/or wrong perspectives**
communication vs. contemplation	**mapping**	**image editing (photoshop)**	
arbitrary vs. intuitive	**storyboard**	**vector editing (illustrator)**	
presentation vs. introspection	**human model**	**publishing (indesign)**	
organic vs. mathematical	**shades and shadows**		
autonomous vs. supportive	**typography**	**reproduction**	
	lay-out	**printing**	
	planting	**collage**	
	rendering		
	materiality		
	texture		
	hatches & hatching		
	information design		

line - plane - volume - surrounding - landscape - atmosphere

Figure 1

The games (an overview):

Exercise **14mm** (see *figure 2*) is made up out of 4 key steps: carving one's way through an arbitrary model, creating space within the solid model, introducing human scale and finally synthesising the created data into some large scale (re-)presentations. (1) Within the first session a configuration of 30 cubes are realigned to create a solid model. To create a circulation route through the model cubes have to be retrieved and reintroduced either on top of the model or, above the first layer on the short side of the model. (2) Next to delineating horizontal and vertical circulation, this step defines a basic geometry of the model leading to a first solid design. (3) The discovering of an individual rudimentary architectural model lends itself to introduce basic model building, projective drawing and basic perspective theory. (4) After the introduction of drawing basics a new problem is given: the solid model is to be remodelled as two folded strips which respect the basic geometry of the start-up model. The new model keeps the circulation route, the two strips have to touch the back and front of the defining planes, and the strips may touch each other but can't overlap. In order to fold this new model, the participants have to switch between plan, section, model and sketches. Through switching between the different representational systems our participants are confronted with the differences and possibilities between these systems through actively using them instead of merely learning what they are. (5) The folding process generates a model which consists of walls, floors and a circulation system at which point a notion of human scale is introduced through adding parapets, human silhouettes and (optionally) abstracted furniture. Within a final workshop the folded model is reworked within a large scale presentation which visualises the architectural and spatial qualities of the final within plans and perspectives. This presentation is accompanied by a sketchbook showing the intermediary operations, working models and studies which concern human scale and user objects.
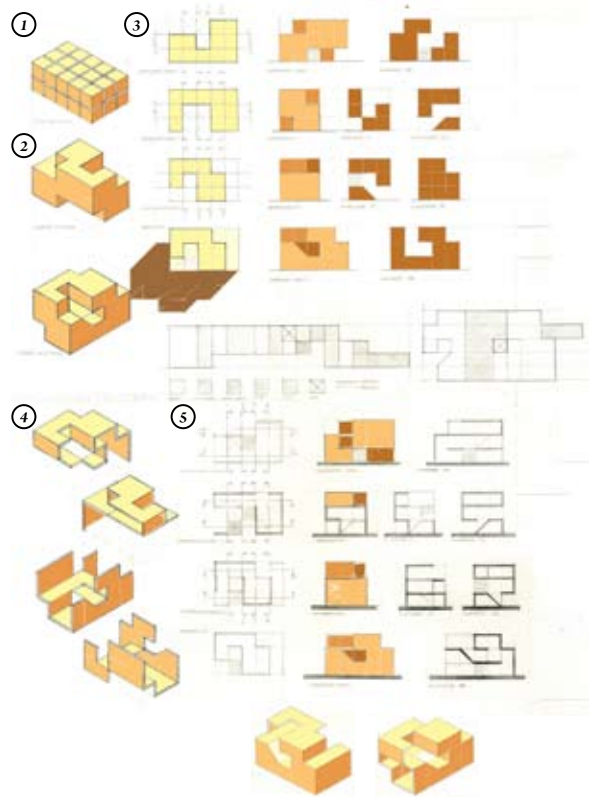

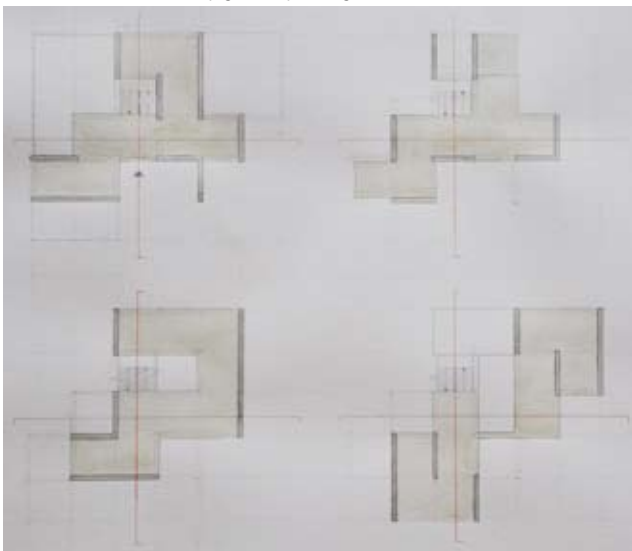*figure 2: 14mm's process*

figure 3: folding a model

figure 4: exploring space

Exercise **24mm** develops in less linear manner than its predecessor but can be broadly split up in two phases: designerly production and graphical presentation. The exercise is dedicated to visualising (design) processes, otherwise, telling a design related story through images. Again 30 cubes are modelled towards a three dimensional spatial structure but following a different set of guiding rules. A grid of five by six cubes is divided in three separate sections which then have to be spatially folded and recombined to become a three dimensional, solid, structure (see *figure 3*). The route which leads to this preliminary solid structure has to be visualised as a kind of a manual to explicit every step taken and the manual and the model serve as a visual aid to explore the structure within a first set of perspective drawings. From this session a set of projective drawings are derived which explore the spatiality within the model and map a circulation route through the structure. (see *figure 4*)

Within the next session a new model is developed. This model translates the basic geometry of the solid model towards a new model executed in an array of "found" modelling materials. This phase introduces a notion of textures, materiality and the human scale within the models and designs. Whereupon a set of drawn expressions executed upon– and within "odd" media mirror and explore the new model's materialty and textures.

Parallel to the drawing and expressive exploration sessions the participants are introduced within CAD-drawing and modelling software. The hand-drawn structures are translated within digital software to alternatively study and control interior and exterior spatial compositions. Context is added through developing a virtual hill-scape within digital modelling software. The context follows a set of three dimensional parameters within a predetermined bounding box. Through "slicing" the virtual model horizontally a framework is generated to build the landscape as a tactile model on scale of 1/500 after which the tactile model serves as a base to study landscaping and plantation specifics to surround the designed structure. (see *figure 5*)

Because 24mm is dedicated to visualising (design) processes and shifting between different generating media we decided to introduce publishing software as soon as possible to offer a way to archive and explicit the different steps within the process. Within the publishing software the participants develop a virtual sketchbook which accounts for the evolutions within the exercise. On top of that the graphical software confronts the participants with notions of graphical design, lay-out and typography for a first time. The software's early introduction provides enough time to follow and review the developments of the document. The first phase of the exercise is concluded with an introduction within image editing software wherein the participants manipulate and extend the graphics and data developed during the exercise. The participants are then invited to finalise all material in order to prepare for the presentation phase.

The (final) presentation mode starts off with two workshops: an analogue workshop where experimental rendering and reproduction techniques are explored, and a digital workshop were we explore similar techniques digitally and introduce the participants within vector based image editing. The main idea is to show the participants how to treat and manipulate drawings and images in order to prepare and appropriate them for final presentations. The final sessions of the exercise develop two presentations: one large scale information chard which explicits the process through using and annotating the key frames developed within the process. A second medium reworks the virtual sketchbook as a printed and bound A5 booklet to explicit the process through selecting the images necessary to tell the complete story.

figure 5: landscaping

What have we learned so far?

Reviewing exercise 14mm revealed that the *gamesque* structure not only performed well in providing a guiding framework to introduce drawing techniques; on top of that the exercise's designing process proved that students gradually improvised their way towards a spatial structure seemingly through intuitively working with form and space within a predetermined structure. Through switching between styles and techniques within the drawing classes the participants seemed to have reached a high level of personality within exploring their spatial structures and within the ways to visualise those structures. Although 24mm is only two thirds away the exercise showed more growing pains than its predecessor. During the teaching process we discovered we have been a little overambitious when it comes to introducing new media at short notice. At a certain point we had the impression our serial introductions of digital novelties (publishing software, modelling software, image editing software, advanced autocad,...), combined with drawing techniques and designerly drawing conventions was drowning the participants within tools and techniques. This hampered the creative appropriation of the possibilities of those very tools within the process of discovering design. Relative to the media related abundances 24mm also showed some process-related inconsistencies relating to the follow-up and exchanges of material between the different teachers involved. Our virtual landscape model, for example, was introduced a fraction too late thereby leaving little space to design and develop it fully. Searching to allign the digital and analogue modules into a consistent whole should avoid discrepancies between the two. We are now rethinking the process of interplay between analogue and digital techniques within both exercises in order to search for a balance between the two exercises, their processes and media. As such 14mm searches for a firmer base and repositioning of the CAD and digital modelling techniques so that these techniques can be become a guiding tool within the design process as well and we will probably redirect the (digital) image editing tools from 24mm to 14mm. Doing so not only will relieve 24mm from some digital techniques but will also help to introduce software specific notions somewhat earlier. With 24mm still running, we still have a major chunk of input and time ahead of us to help us to perfect and rework the seeming fragmented material.

Next to some of the a fore mentioned media- and organisational related inconsistencies there's a bunch of unanswered questions regarding specific drawing pedagogics. Bringing design based thinking within drawing classes shifted our attention 180º degrees from perception to invention. It enabled us to focus more on the media and tools which shape design but at the same time we seem to have lost precious time to spend upon analysing and exploring the world out there. Apart from the above mentioned "growing pains" both games still have to search for digital and analogue perception-related components to generate form(-s) because, even within design, drawing is more than invention and exploration. Drawing is partly driven by seeing and analysing through the combined activity of drawing and looking intensively. Within 14mm we have tried to insert a module which studied human scale and user objects but the additional assignments were treated as an obligatory nuisance rather than the study it was supposed to be. Within 24mm we will have to look to include materiality on a more directed base, combined with natural studies concerning landscaping and elements making up public spaces in order to enliven an awareness for contextual thinking.

Another worry is that both exercises unduly ignored elliptical drawing theory, necessary to draw circles and more complex geometric shapes. Not that we haven't tried to include round edges, shapes and/ or forms within the exercises but it seemed that every attempt somehow appeared as a superfluous intervention which hampered creativity through forcing the designs and the participants to insert round-shaped architectural forms within their embryonic structures. Somehow we will have to look for a similar self evident "chaotic" phase as within 14mm's folding phase so that the introduction of circular/ elliptical geometrics redirects design through adding spatial quality.

Within the exercises we have searched for a designerly approach for the drawing courses in order to avoid approaching drawing as a technical craft or as a matter of "*how to*". Drawing within design is specific business or, to paraphrase Bryan Lawson: "*Designers do not draw for the sake of the effect they create, they are not artists in that sense. They are making marks on paper, or in a computer, in order to think about what they represent.*" [6] Our courses deal with design based drawing but consciously avoid being about learning how to design. The courses intend to structure an array of designerly tools to explore design, by making design and through appropriating media as generators of the creative processes. As such the exercises explore notions of form and space by means of modelling, graphics and drawings, both analogue and digital. In the end drawing within design and architecture is not about the individual drawings but about the route a set of drawings take to become (a) design. Admittedly we are still a long way from our initial thesis which searches for the influence of designerly media upon the designed artifact through (re-)working, layering and exchanging different media but the involvement of our team and precariousness of the situation offers great opportunities to develop the project's thinking within a teaching environment. The one thing we can hope for is that during the sessions and assignments our participants will have gradually acquired a broader awareness for the tools and their inherent creative powers in order to start exploring them within design processes and their designerly representations.
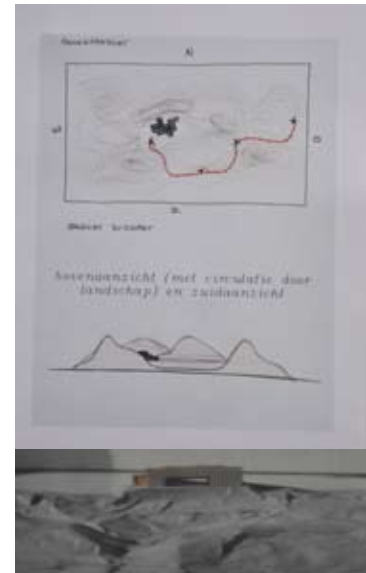
from the participants' sketchbooks some examples developed within exercise 14mm

from the participants' virtual sketchbooks some examples developed within exercise 24mm