A design sketching guide
Design Visualization

Delft Design Drawing staff
Industrial Design Engineering
Delft University of Technology
Editor J.W. Hoftijzer
Colophon

Design Visualization:

Jan Willem Hoftijzer, editor
Susie Brand
Joost Kuiper
Mark Sypesteyn
Martijn Haans

Accompanying design drawing staff (per 2018):
Eleni Soerjo
Heidi Carelsberg
Malik Tas
Gianni Orsini
Robert Smit
Joep Trappenburg

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Contact info:

Delft Design Drawing staff

Visiting:
Delft University of Technology
Faculty of Industrial Design Engineering
Office: (Building 32) C-1-570

Digital:
j.w.hoftijzer@tudelft.nl
sketching-IO@tudelft.nl
www.delftdesigndrawing.com
Instagram:
Instagram: designsketchingSIG

Postal address:
J.W. Hoftijzer,
coordinator Delft Design Drawing
HICD/ Dept. of ID
Faculty of Industrial Design Engineering
Delft University of Technology
Landbergstraat 15
2628 CE Delft
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Needless to state that - in the field of design - it makes sense to communicate visually.

This visual format makes sense, since pictures can convey much information at the same time and can immediately show what something would look like (either concrete or abstract). As a consequence, an image can help avoid misinterpretation, at the same time it can support further imagination and development.

Although a ‘visual’ could be created or presented in many ways, it all starts with a sketch, or more specific: with the activity of ‘sketching’. Sketching is flexible (easy to add changes), fast, communicative, it allows for personal signature, it could bring information (push), or it could question a certain starting point, be open for interpretation (pull), or instigate discussion, etc.

In many design processes, the sketching stage forms the fundament for the subsequent stages that follow (once a concept is getting concrete), at the same time a sketch serves very well as a stand-alone output format. The following sections will consider a brief summation of functions of design sketches, today, and from a historic perspective.

Carelsberg, Zhang
In short, sketching helps to ‘externalize’ initial thoughts, to reflect, to develop, and/or to communicate with others. The word ‘visualization’ here would refer to the sketcher’s reciprocative activity of transferring an idea onto paper, reflect on it, improve, adjust, develop new directions or iterate, reflect again, etc.

Since products are inseparable from accompanying non-tangible support, and since products and services are - in many cases - part of a system design, the field of industrial or product design is undeniably broadening. Even more so since design agencies and -departments are regularly adding the fuzzy-front-end stages to their service portfolio. Closely related to these developments, the discipline of design sketching and visualization has broadened as well; section ‘drawing and design’ distinguishes and shows two dimensions.

Although design sketching and visualization is closely related to the field of Industrial Design, the activity of sketching - for exploring and clarifying - suits many other fields as well. Of course, architecture and fashion are examples of fields which have their own heritage and approaches for sketching, and there are more. But also in engineering contexts, sketching is clearly valuable and appreciated. Today, also studies such as social sciences are exploring the value of depicting stories and systems visually. We support this general interest in sketching and it’s many functions. We also strongly believe in the relation between these application fields for sketching. A methodological fundament could serve as a solid basis, which could help all who seek to professionalize their visual language of sketching.

The use of ‘drawing’ and ‘sketching’

Etymologically, ‘drawing’ means producing or tracing an image of (someone or something) by making lines and marks on paper. ‘Sketching’ is officially a preliminary depiction of something that is not concrete yet. And the definition of ‘visualization’ is: making something visual, which is; turning a non-visual thought or subject into something visual. In this booklet, the words drawing an sketching are both used, mostly meaning the same.
A very brief history of drawing

To be able to clearly describe the specific field of ‘design drawing’, first the generic activity of drawing will be discussed shortly.

Drawings are representations of either existing things and situations, or of rather conceptual thoughts and imaginary concepts. In David Hockney’s words: ‘With drawing you can express all kinds of ideas that might otherwise be lost – delight, frustrations, whatever torments you or pleases you’.

The activity of drawing has characterized human being since pre-historic times.

The ‘language’ of drawing was utilized long before writing was there. It is an expression of human’s unique creativity and an example of human’s near-exclusive usage of tools. As a representation of the origin of drawing, the animal drawings of the Chauvet Caves in France (approximately 32,000 years ago) need to be considered (figure left). Although theories of why they’ve been made vary, their communicative functions are obvious, even today. Experts consider the drawings to be there for documentation of knowledge about the animal species for when these would return after a long time of absence. Among other theories, the cave drawings are seen as a preliminary writing language. The preservation and transfer of knowledge has always been an important
function of drawing, from pre-historic times until the industrial age, in which patterns and shapes were recorded in 2d for later reproduction (see the section concerning ‘drawing and design’).

Apart from the rather practical purpose of the early cave drawings as well as the 18th Century drawings for reproduction, throughout history drawings were also a means to express artistry. Drawings can be expressions of creative intentions, of the identity of the artist, or the identity of a group, a people, a religion or a certain culture. Drawings in these cases can be depictions of stories and myths (see figure on this page). It is however important to emphasize and distinguish the analytical purpose of many of the works of artists such as Da Vinci, Michelangelo, Rafael and others (see figure on this page).

Top: Ostradamus, Ribeirão da Ilha, Florianopolis Brasil, bottom: Michelangelo: The resurrection of Christ, 1532
A very brief history of drawing perspective

Since spatiality, depth and volume are so important for a designer when representing something complex or simple, we need to consider the use of perspective in a drawing.

Originally, the use of perspective to represent objects and surroundings in a realistic way, was established slowly, by the work of artists, philosophers and mathematicians.

In ancient history, the represented size of objects and characters in drawings was typically not related with the distance from the viewer: no foreshortening was applied. In early paintings, hierarchic relationships between the subjects depicted were decisive for their relative size. Scholars state that serious attempts to develop perspective knowledge started in the classical antiquity, in ancient Greek art, around the fifth century BC, within the context of theatrical scenery. Panels on the stage of the theatre helped to provide the illusion of depth for the audience.

A true sign of early perspective awareness is e.g. visible in the roof beams in the Vatican Virgil (400 AD): these painted beams are converging.

Between classical antiquity and the Middle Ages, the use of perspective in drawings and paintings declined. In the Middle Ages, artists used oblique perspective to draw buildings. And attempts are found
of isometric projections of furniture, but not of single vanishing point perspective. In Byzantine art, so-called reverse perspective was used (see picture on the left).

Around 1413 Filippo Brunelleschi painted the outlines of a range of buildings in Florence onto a mirror. After doing that he noticed that all of the lines converged on the horizon line. Later, Piero della Francesca elaborated on Alberti’s work (‘Della Pittura’) in his ‘De Prospectiva Pingendi’ in 1474 (see figure on these pages). He was able to draw geometric objects in perspective in any area of the picture plane.

Page 13 from the Bordeaux manuscript of Della Francesca’s ‘De Prospectiva Pingendi’ (1474-1482)

Alberti’s diagram showing perspective lines leading to a vanishing point in Della Pittura (1435)
A very brief history of drawing perspective (2)

With his ‘De divina proportione’ Luca Pacioli established a summarizing book about the use of perspective for painters in 1509. It was illustrated by Leon-

In art and in architecture the use of perspective became common practice.

Today, in product design drawing, professionals apply perspective as an evident part of their visual language, which helps them to convey ideas, concepts and/or suggestions as clearly as possible. Using perspective enables one to apply depth and foreshortening in a drawing; it allows one to describe something in which 3 dimensions can be accurately represented, as if seen by the human eye. A drawing can be made using mostly a 1-, 2-, or 3-point perspective. Most common is 2-point perspective: vanishing points on one horizon, for all horizontal parallel lines to converge to. In 2-point perspective, all vertical lines are represented vertically.
A very brief history of light and dark

If one would have to define the one element of design drawing that is essential for all courses, and essential for learning how to draw, it would be ‘visualizing the volume (or plasticity) of an object or shape’, which starts at the fundamentals of applying (1) 3d perspective, and (2) applying light and dark tones.

Or in other words, it is most essential for students to learn see, and then be able to depict a 3-dimensional subject on a 2-dimensional paper canvas or tablet. A traditional name in art for the use of light and dark used to emphasize and distinguish shapes.

Rembrandt van Rijn, Bust of Rembrandt, ca. 1629, collection Germanisches Nationalmuseum, Nuremberg, Germany
is the Italian ‘chiaroscuro’, or in French ‘clair obscur’, literally light and dark. In history, ‘chiaroscuro’ has been an important element of the works of e.g. Da Vinci, Rembrandt and Watteau (see figures on these pages). With the help of dark respectively light tones of paint or pastel, suggestions of depth are created. In order to work efficiently, artists sometimes started from a mid-tone canvas, to which then dark tones respectively white had to be added for achieving ‘chiaroscuro’; volume.

Although such an intensive and time consuming painting technique obviously is not how product design sketches and drawings are executed, the goal and methodology are quite the same: virtually illuminate the subject suitably to clarify it’s volume. Both then and today, applying chiaroscuro distinguishes works of art respectively design drawings from graphic depictions without any depth.
When focusing on the field of Industrial Design, drawings have always played an important role in the exchange of information.

The specific field of ‘design drawing’ could be characterized as a hand made drawing format to represent products in the various stages of the design process. As such, drawings, and the activity of drawing, have and have had multiple functions.

One of the most important assets of drawing is the fact that it is a free and flexible tool for exploring and iterating thoughts and ideas. Leonardo Da Vinci’s sketches show great examples of explorative sketches, see the figure on the left.

Since industrialization took place, the ‘birth’ of Industrial Design so to say, drawing also took on a rather formal and commercial role. Drawings were used for reproduction, manufacturing and cataloguing or archiving purposes. Drawings were there to align the items that were to be manufactured, sometimes in different factories. Catalogues were there to display the products a manufacturer offered to the consumer. Especially in the early days of Industrialization drawings represented a mix of ornaments and objects, see figure on the right.

Da Vinci (1487), Sketch of a Flying machine
When considering the activity of sketching, its purposes contain more than only the depiction of something known. Drawing from observation in fact is a significant didactic stage in learning to draw something unknown, something fictitious.

According to John Ruskin, art critic and social thinker (i.a.), the discipline of drawing tunes the sensitivity of the drawer to a higher pitch; it refines the drawer’s vision. Instead of taking pictures, one should draw the observed, is what he pledged for. In short, drawing sharpens observation, it increases perception, and it supports visual imagination. According to literature and various scholars, the activity of drawing is one of fundamental relevance to human development. Representing thought and action while drawing helps developing children’s understanding of numeracy and literacy.

According to D.A. Louw, drawing serves as basic means to support and express creativity and feelings. It is closely linked to the capacity to think and feel. Some state drawing is a therapeutic tool that helps clearing one’s mind. The activity of capturing a scene or object with a line on a canvas is a very helpful way to better understand that very scene or object, and of how they’re affected by linear and aerial perspective.

John Ruskin: ‘There’s one thing we should do and that is ‘attempt to draw the interesting things we see, irrespective of whether we happen to have any talent for doing so’.

Matthew Boulton, Manufacturer’s Catalogue of Silver Plated Ware: Creamer and tea-pot, 1790, etched, cc, credits: The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1954
The activity of design drawing plays a considerate part throughout the design process. As was briefly addressed in the introduction, the scope of the Industrial Design field has broadened, and so has the discipline of design drawing.

The figure below indicates two dimensions in which extensions have taken place: (1) the content (addition of services and systems) and (2) the stages of the process (addition of strategic stages). Closely related to the design process stages, the character of a drawing needs to be aligned to the various situations and scenarios, and to communication with stakeholders. E.g. certain situations require sketches that explore and are open to suggestions (so-called pull sketches), while other situations require decisive and convincing sketches (push-function), helping the project move to the next stage. Some sketches are there to negotiate with the client, while other sketches support the communication between design and engineering departments. Each of these situations require their own output format: e.g. formal/informal, addition of details or not, material appearance or not, time available, etc. Many of these sketch functions and related output requirements were explored and concluded in a study carried out recently (see figures on these pages).

The breadth of the discipline of design drawing
Sketches: Nijhuis, Nieuwenhuis,

Case study with clustered sketches at Vanderveer Designers
(Sypesteyn, Hoftijzer, De Reuver on photo)
Drawing education: Delft Design Drawing

A Vision
‘Drawing’ can serve as a fundamental training activity and as a universal language for people, specifically for designers, to depict things and concepts on a 2d canvas. A methodological framework will support the practitioner/designer in acquiring skills and knowledge concerning the subject drawn, the activity and medium. Acquiring the skills and knowledge of drawing objects in perspective serves as a fundament for drawing and visualising nearly anything: from technical lay-out sketches to stories to journeys. The goal of IDE’s design drawing group is therefore to help students acquire and learn the visual language of drawing.

The purposes of design drawing education are the following:

Increase awareness of ones surroundings, space
Apart from preparing students for their future practice (section ‘drawing and design’): explore and design in a visual manner, sketching also teaches the mind: it helps to observe (proportions, tonal value), and it helps developing people’s spatial awareness and spatial perception.

Increase product design knowledge
In a design context, sketching also supports understanding constructions, how things are assembled and made.

Methodology of efficiently and effectively depicting objects and concepts
A methodological framework considers perspective, accurately constructing volumes, considering viewpoints and composition, applying shading and suggesting surface behaviour. Important to mention in the context of the design drawing vision: clarity and accurateness are more important than aesthetics of the drawing.

Learning to decide, and learn from mistakes
Making quick decisions enables the practitioner to reflect sooner, which increases the pace of learning.

Develop (motor) skills
When choosing and depicting a representation of the observed or an ‘expression’ of the imagined, at the same time student practice their motor skills: learn to apply vigour, dynamic, signature, eye-hand coordination.

Learning to reflect
Reflect on your own drawing. As proclaimed by many scholars, one of the best ways to learn is from reflecting on your own work: what went well, what went wrong, why? Reflecting obviously comes before redoing, adjusting, customizing, and reflection as a major aspect of learning to observe and anticipate.
Apply, Imagine
In order to be able to put thoughts on paper, to develop shapes and solutions from scratch, training in observation is necessary. In reality, imagining is not a separate activity or stage; it is an integrated part of design exploration, helped by drawing and analysing.

These learning aspects are summarized in a range of didactic stages, as depicted in the figure on this page; the didactic spiral of design drawing. In short: In order to be able to freely and comfortably apply drawing as a design language, the spiral model suggests to run a range of returning learning steps (1st cycle). Learning and applying go hand in hand (2nd cycle).
The role of sketching and visualization within IDE

Drawing and visualization has an integrative role at the faculty of IDE. The visual language of sketching resonates among many staff members and students, and all feel the urgency of communicating visually. The design drawing staff is happy to collaborate with a variety of disciplines and courses within the faculty.

We strongly believe that a visual approach suits all areas this faculty offers. This is why a ‘design sketching tree’ was established, which shows how the drawing discipline is linked (or could be linked) to other disciplines (figure on the right). The tree also represents a learning line in which students are guided in their development of skills and knowledge, starting with (1) fundamentals, then addressing (2) broadening and deepening topics and expertise, in order to - at the end - offer options to (3) specialize and choose.
Areas of expertise and application

In this section the various areas of expertise and areas of application will be briefly introduced and explained.

Many of the areas presented are related to one another. The order of appearance represents a certain constructive sequence of complexity, starting at the basis, however should not be taken too strictly. Examples of drawings and exercises are mostly obtained from drawing courses at IDE. Drawings are either authored by one of the design drawing staff of by a student of IDE.
Areas of expertise

1. Basic geometry in perspective
Aligned to what was previously stated, the basis of design drawing includes understanding and drawing of basic geometry in a perspective environment.

Part of this fundament is the ‘construction’ of cubic and cylindrical shapes, and combinations. Construction means: setting up a drawing with lines, utilizing and anticipating perspective principles. The lines used for construction have various functions, of which some are: scaffolds, contour lines and cross sections lines. It is recommendable to preserve all of the initial construction lines that are drawn, in order to increase the clarity of the shape’s geometry.

The other important aspect to consider when clarifying a shape is the influence of a fictive light source. Methodology of shading and applying cast shadows is aligned to the chosen light direction. Shading of an object helps to confirm and clarify the subject of a drawing. A cast shadow is also used to confirm the shape which it represents. Besides, a cast shadow gives the shape a position in relation to its environment.

By constructing existing objects one acquires the skills and knowledge needed to construct (design) something that does not exist yet.
2. Cross sections

Cross sections refer to a rather advanced construction method in which a certain shape geometry is either developed, confirmed, or clarified, by the use of cross sectional lines.

Literally, a cross section visualizes the object as if it was cut through a certain plane. The cross section method allows to draw objects of a rather complex nature: the cross sectional lines indicate the characteristics of an object, the surface behaviour, at specif-
ic positions. Several parallel cross sections, connected by one or more cross sections in a perpendicular plane, together form a shape. Perpendicularity is not a necessity. For a drawing, sometimes cross sectional lines are necessary in order to add shading effects.
Areas of expertise

3. Advanced perspective

Since many objects typical for the Industrial Design field are smaller in size than the people observing them, mostly a normal birds-eye perspective is taught and applied; that is because the observer’s eye height (= horizon) has a higher position than the object.

But if an object or scene is higher than the observer’s eye, a different approach is required, because the chosen viewpoint should relate to what the viewer of the sketch expects.

In architecture, eye-height perspective is common since most of the buildings and public spaces are much bigger and higher than the people observing them. An interesting exercise is the translation a birds-eye perspective drawing into eye-height perspective. Examples are shown on this page.

Vrooman, Matevosjan, Heijltjes
These example drawings show another type of advanced perspective: frog perspective.

Since spaceships mostly manoeuvre at a certain height above us, people would view them from a frog perspective viewpoint: from underneath the subject. In the examples shown on this page, a 5-point perspective is used, in order to emphasize the enormous size of the vehicle flying over. A 5-point perspective, which is curvilinear, refers to vanishing points both left and right to the drawer, one above, one underneath, and one in the centre.
Areas of expertise

4. Free form shapes

When understanding the principles of perspective and cross sectional construction, a next stage of complexity could be the imaginative creation of free form shapes.

This method starts with a random contour line. Next, one has to decide how cross sections could help describe the shape that is being developed. Cross sections should be added in three somewhat perpendicular directions, and as many as needed to convey the intention of the design. The next step requires applying shading, preferably using a soft medium such as pastel or a digital airbrush, probably accompanied by dark a core shadow and or suggestions of cast shadow reflection. The drawing can be finalized by adding details, emphasizing contour lines and adding global- and highlights. This method could help to spark your imagination when designing shapes.
Areas of expertise

5. Light and dark

In line with the light and dark techniques applied by painters in the past, the drawing staff offers a range of exercises using colour backgrounds, spread over the various courses.

Generally, dark and black tones are added for shading and contrast, while white is to be added for confirming the shape according the light direction and for highlights. The exercises allow to concentrate on the shape and the contrasts needed, without the need to address surface appearance in detail.
Areas of expertise

5. Light and dark (2)

The specific technique of only applying black or white on a ‘negative’ canvas, helps (and forces) the drawer to capture the essence of the 3d object to be depicted (either imaginary of existing).

Smooth transitions and high contrasts can be created, which helps to increase product clarity and surface behaviour. Using a colourized background as a starting point for a drawing has some clear advantages. Most importantly, the canvas provides a mid-tone (tonal value), to which both dark and light can be added.
Van Bussel, Sypesteyn, De Dreu, Hoftijzer
Areas of expertise

6. Shading and material expression

In order to be perceived as a 3d object, a representational drawing must convey the characteristics of such an object, one would more or less expect in reality.

Additionally to applying a suitable perspective (see section ‘basic shapes’), the depicted object should behave in correspondence with the chosen light direction. Some specific rules and methods need to be considered when visualizing some specific materials. Observation of realistic material behaviour is always the first step, before applying in a drawing or implementing in a design visualization. These pages show some examples of reflective behaviour of high gloss plastics and of the body of a car; of transparency, reflection and distortion of glass, and of full reflection of a chromium object.

Quartel, Van Der Veen, Luppens, Wang
Areas of expertise

7. Colour

In visualisations, colour is often the last consideration. It’s power however is considerable. Colour can set the tone; vibrant and energetic, or cool and subdued.

Colour helps to convey a certain atmospheres, emotions, it speaks directly to the heart. Combining colours is something that comes natural to some people, but it is a challenge for most. Here we present some of the colour harmonies of Johannes Ittens “the art of color”. Johannes Itten was a teacher at Bauhaus. These harmonies can support designers when searching for effective colour combinations.

Hue, brightness and saturation

Before addressing Itten’s colour harmonies, we need to understand three “terms”: hue, brightness and saturation. These are explained below.

Hue
The actual colour; red, yellow and blue are different hues.

Brightness
The extent to which white or black is added to the hue.

Saturation
The intensity of the hue, 100% saturation means the full colour, 0% saturation means grey.
**Colour harmonies**

**Monochrome**
Use variations in brightness and saturation of a single hue. Easy to use and good for establishing a mood. Since it lacks colour contrast, it’s the least vibrant of all colour harmonies.

**Analogue**
Like the monochrome colour harmony, but now using hues that are right next to each other on the colour wheel. More variation then monochrome, but still easy to manage.
Areas of expertise

7. Colour (2)

Patsey, Kuiper
Complementary
Complementary colours are exactly opposite colours on the colour wheel. Combining these colours gives a vibrant result that is pleasing to the eye. Using both colours in full saturation is usually not a good idea since the effect will be very strong. Supporting a colour with its complementary colour that is less saturated usually works very well. Do not use complementary colours for text.

Split complementary
A hue is not combined with its complementary colour, but with the two hues right next to it on either side. The result is as rich looking as the complementary colour harmony, but has less tension.

Finally, there are three more colour harmonies that we will not go into here, but we don't want to leave them unmentioned either. They are more complex and harder to balance than the other harmonies.

Rectangular  Triad  Square
Areas of expertise

8. Human Figure sketching

The human figure is one of the most complex things to draw from imagination, due to the organic forms and its mobility.

On top of that, everybody knows very well what the human figure looks like. This makes everyone an expert critic on the topic. For design, drawing the human figure is essential. Especially non-product oriented fields of design like service and interaction design might not require product sketches, but the human factor instead. Drawing from reference therefore offers great practicing ground for learning to understand the human figure, its range of motion and its proportions. Exercises at IDE focus on drawing from observation through live model drawing. Besides, the course offers basic theoretical knowledge on observation and drawing methods, as well as elementary anatomical principles. Through observation, students learn how to simplify the complexity.
Areas of expertise

8. Human Figure sketching (2)

Simplifying the human body helps greatly in capturing the essence in a gestural fashion.

Dividing the body
If we divide the body into the parts that can independently move from one another, we can draw the simplified objects that describe those parts.

Head
Egg or (oblong) spherical shape. Indicate eye line, nose and ears to establish orientation

Torso & pelvis
The torso and pelvis can be grouped into one big flat rectangular volume.

Limbs
The arms and legs consist of two parts each, and can be represented by tubes.

Hands & feet
Very complex when drawn from up close, but unless explicit gestures of the extremities are paramount, they can be simplified to rectangular volumes.
9. Intuitive sketching

Probably everyone has at some point in their lives stared at the clouds and started seeing shapes in them, faces, animals, and so on. Our brain is constantly interpreting the information it receives from the eyes. Even in random shapes, we often start recognising things. The Rorschach test is a psychological test where a person is shown a series of inkblots, and is asked what he or she sees in it. The psychologist then interprets the results. Simply said; were one person sees a butterfly, another sees a skull. In art we also find this phenomenon. Leonardo da Vinci recommended that artists should look for inspiration in stains or marks on old walls. The eighteenth century English painter Alexander Cozens used several techniques with paint and charcoal to create blots and smudges in which he found inspiration for his landscape paintings. The German surrealist Max Ernst, with his grattage and frottage techniques, transferred textures of for example wood to his paper and canvas, and found inspiration in the unexpected shapes that appeared. In design, we can also use this technique to kick-start our imagination.

The method of intuitive sketching is there to unexpectedly see the beginning of a potential shape. The method includes the stages: observing, deciding, reflecting, adjusting, and reflecting again, until a shape is born. The steps to follow: Use lines to depict cross sections and boundaries; then concretize the shape further; provide and confirm volume by extra shading and contrast in dark and white. Finally: cast shadow.
Areas of application

10. Ideation and iteration

The ideation stage represents one of the first stages in a synthesis process: trying to freely develop preliminary solutions to a design problem.

There are many ways how to manage and execute this stage, including all kinds of creativity techniques. Although many would say that sketches merely concern the depiction of thoughts, the opposite is true: sketching as such can trigger the mind! It is important to recognize this synthesizing and explorative role of drawing; drawing creates insights by reflecting on it, which can be used to improve, iterate, explore and develop concepts further.

Lotgering, Matevosjan
Ideation sketches, or ‘exploration’ sketches can help spark creativity in all directions: they could concern aesthetics, functional solutions, options for assembly, colour combinations, interfaces, lay out, exploration of scenarios, etc. Of course an ideation sketch should not include too many details yet; it is just the first stage. But, although quick and sketchy, these ideation sketches should be clear and accurate; they need to convey the right information and they should allow for reflection and discussion.
Areas of application

11. Exploring and emphasizing

Time is limited and sparse in most design projects. The approach shown on these pages suggests to use time efficiently.

It is recommended to not throw away or overlook drawings you made while exploring and iterating. Keep them and use them. Simply by ‘masking’ the entire sheet of sketches, and by subsequently taking away (erasing) this mask at specific places, certain areas and sketches are highlighted. Next, the chosen sketches can be concretized further, using the same initial sketches. The level of concreteness depends on the information and elaborateness that is required. These steps are most easy to take in a digital environment, but they are very well applicable when sketching analogue.
Areas of application

12. Tactics

Sometimes it is a challenge to find the best way for communicating a certain idea.

The picture needs to capture the design intention, the message to be told. When succeeding, an accurate drawing could save lots of time, effort and discussion. As an additional recommendation to using aforementioned methodologies and techniques, this section suggests to consider specific tactical decisions when drawing. E.g. consider:

**Viewpoint**
Choose the perspective viewpoint that suits the size and position of the subject of your drawing.

**Recognizability**
When drawing a specific object, try to anticipate what will be recognized: a typical position of an object, typical features, a typical context, scale elements.

**Spatiality**
Consider line width, shading or hatching, cast shadow, add a background, use frames.
Hoftijzer, Sypesteyn
Areas of application

13. Motion, transformation (arrows)

One of the ways to show movement, direction, translation, rotation, transition or transformation, is by the use of arrows.

Sometimes a simple line-arrow is sufficient, but sometimes it is recommendable to add width and even thickness to an arrow, which will help to clarify its intention; its direction and orientation. For product design, systems and mechanisms, arrows support the communication of working principles, different situations, or instructions to follow. In a rather abstract context, arrows support the communication of a sequence of actions, of a creativity process, or of a trajectory a patient has to bear. The arrow’s shape (circular, straight, going up, or different) indicates its meaning as part of the abstract picture. Arrows of a rather abstract nature can be found in section ‘Process sketching’.
Areas of application

14. User-product interaction

Designers are taught to consider the end user of the product or service which they’re developing. That is why in many sketches and visualizations, the actual end-user plays a significant part.

A concept drawing is a very suitable medium to convey the intended use of a product concept or service. Such a drawing could address either the user interface, the working of a product, its size, the use of the product by the end user, the emotional response when using the product, or the product and user as part of their social context. A very efficient way of including a person in a drawing is the use of an underlay; tracing a photo (of a hand or full person, etc.)
can be achieved very quickly and accurately. Please consider the importance of the human figure drawn, in relation to the rest of the visualization. If it is the product design that needs to be conveyed or supported, then don’t emphasize the person using it. In case the use plays a central role in communicating the design proposal, one might want to add some colour or detail to him or her.
Areas of application

14. User-product interaction (2)
Breeuwer, Van Der Schoor
Areas of expertise

15. Story boards, journeys

In each design process, there is more to consider than solely the tangible final product. Each project is characterized by a specific use scenario, in which context and stakeholders need to be addressed.

One reason to draw a storyboard is to present a final solution as part of a full scenario. Another reason is e.g. to prepare for the making of a movie that has the same purpose. The purpose of drawing a patient journey is clearly to analyse a situation or a preliminary solution scenario, and reflect on the depicted stages and problem areas.

Generally, drawing a scenario or journey serves three
goals: developing, reflecting and presenting. Always consider: the message to convey, the audience, time slots, changing of location, best viewpoints for a certain scene, and the character of the story (is it playful, or formal, or?).

Lotgering, Licina, Zhang
Areas of application

16. Process sketching, visual thinking

Design sketching is a well established tool and skill in product design. With design thinking spreading across other industries the value of sketching, as a process or as a means, is gaining popularity. This trend can be linked to the fact that screens and portable screens are ubiquitous in our society. People are getting better and more used at interpreting imagery than wordily pieces.
The use of sketching to help visualize and understand complex processes or situations has emerged as very valuable skill. IDE alumni have helped spreading this skill through a range of companies, using their background in design thinking linked to drawing and analytical skills.

The strength of visual thinking is not just getting to an image that helps communicate complexity in a more easy to digest fashion (the image) but more so the process getting there. Thinking and discussing will lead to a better understanding of the complexity and seeing the bigger picture. Drawing and thinking together will align thoughts within organisation and create mutual understanding of strategies and vision.

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Notes and sketches

Members of the team of Design Drawing, IDE TU Delft, and teaching assistants, June 2018

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