

PASTEL AS A SWIFT SKETCH TOOL FOR DESIGN EDUCATION AND PRACTICE: A QUALITATIVE REVIEW

Jan HOFTIJZER

Delft University of Technology, The Netherlands

ABSTRACT

Since the field of industrial design to a great extent concerns the creative development of three-dimensional objects, project communication is often a visual matter. The activity of design drawing enables to visually suggest ideas and solutions that don't exist yet. Drawing sharpens observation, increases perception and support visual imagination, is how art historian Buser describes it [1]. This paper will explore and discuss a specific drawing tool that seems to be suitable to utilize in various stages of the design process, and to a wide range of functional practices and educational exercises of design drawing. This drawing technique – applying scraped pastel powder to drawings – facilitates the visual depiction of an object's volume, and of the spaciousness of a certain scene. Besides, because of the pastel powder's smooth effect, it is also very suitable to very lightly and gradually describe a surface with a certain curvature or shininess (reflecting the sky).

Further, because of the remarkable similarities between the analogue pastel technique and the digital airbrush (e.g. in Photoshop), the pastel tool serves as a very helpful tool and technique to prepare students for the digital medium. For educational purposes, this paper will discuss the use and suitability of powdered pastel as a drawing tool, by evaluating its implementation in a range of specific drawing education exercises. These drawing exercises correspond to and represent the visualization of various design stages and subjects.

Keywords: Drawing, sketching, visualization, pastel, exploration, airbrush, digital sketching, design education, drawing education, chiaroscuro, observation, design, surface appearance, composition.

1 INTRODUCTION

According to literature and various scholars, the activity of drawing is one of fundamental relevance to human development [2-4]. Apart from depicting, preserving and communicating visual knowledge, drawing serves as basic means to support and express creativity and feelings [5]. The activity of drawing represents more than only depicting images; it is closely linked to the capacity to think and feel [6]. Representing thought and action while drawing helps developing people's understanding of numeracy and literacy [3]. It is for these reasons that drawing plays such an important role within the field of product design education: a field of analysis and conception of meaning and things. This paper focuses on the creative 'discipline' of design sketching used for exploration, communication and negotiating purposes, and the education thereof, as an integrated part of a university level industrial design program.

This paper will explore and discuss a range of existing drawing exercises in which the pastel technique is taught to students. This technique of smoothly rubbing scraped pastel powder onto drawings allows the depiction of colour, of values of lightness and darkness (compare 'chiaroscuro') and of contrast and gradients. The 'soft pastel' (or Conté, Rembrandt pastel, or pastel chalk) and its usefulness will be analysed in this paper, as will its value for both analogue and digital drawing education. The main question to be answered is: 'which functions and effects could be attributed to the design drawing tool of powdered pastel in an educational context?'

2 THE PASTEL DRAWING TOOL

2.1 A very brief history of drawing and pastel powder

As predecessors of chalk-like drawing tools and representing the origin of drawing, the animal drawings of the Chauvet Caves in France (32.000 years ago) are worth mentioning here. The black charcoal and red ochre chalk drawings show quite some similarities with today's use of pastel: in ancient times powdered pigment was for example blown through hollow bones to achieve internal colouring of the cave pictures [1], comparable to modern pastel effects.

The origin of pastel itself was much later. Around the end of the 15th Century, Leonardo da Vinci noted Jean Perreal as a maker of pastels, and was himself one of the first to use pastels for his drawings, as he added pastel tones to his chalk portrait of Esabelle d'Este [1]. In the 18th century pastel became rather popular and was used for portrait painting, sometimes combined with gouache. Well known pastel artists were Vivien, Perronneau, La Tour, Watteau and especially Carriera. Later, Delacroix, Boudin, Monet and Degas were important pastel artists [7]. Pastel was commercially available since the end of the 19th Century, however some artists still make pastels for themselves.

Pastels consist of almost pure pigments, mixed with chalk and gum, mostly fabricated under pressure. Like charcoal, pastel is easily smearable. Besides, it brought other advantages over oil paintings: pastel can apply true and rather intense colours because of the lack of oil (which has a yellowing effect), it provides the option to 'smudge': creating smooth gradients, it was however originally hardly erasable [1]. Pastel paintings typically include the paper as part of the art work: the pastel optically mixed with the lightness or darkness of the paper to achieve a certain value.

2.2 Design, visualization, education and pastel powder

Since design markers were introduced in the fields of advertising, car design and product design (the specific 'soft pastel' sketch tool has had an accompanying purpose, as originally the 'air marker' (air brush effect tool) had as well. Whereas in the visual arts field pastel is mostly utilized as a stick shaped drawing tool [1], in the design sketching field pastel is utilized in (scraped) powder condition.

Early scholars of marker- and visualization techniques for industrial design education as Powel [8, 9], Eissen [10] and Shimizu [11] have documented the use of pastel 'sticks' in combination with a solvent as a technique to create a colorized background. But most importantly, they also specifically described the use of pastel in powder condition, as a means to 'softly' add a white or colour effect to the body of a consumer product. Pastel in powder condition, enables the designer to apply a smooth even colour or gradient to a sketched surface. Specifically the pastel powder's dry ingredients of pigment, white chalk and gum, and the absence of oil, make it suitable for these drawing effects. By rubbing the scraped powder onto the medium paper, the pigment is applied to the drawing, either strongly, or softly and light. It is worth noting that the pastel tool originally was not invented to be utilized as a powder.

2.3 Pastel's traditional value for design visualization and education

The field of industrial design has changed a lot in the past 30 years, and so has design drawing and visualization. The pastel tool however still seems to have significant value for both practice and education. Since the early scholar descriptions and practices of applying powdered pastel to design sketches, it has mostly served as a method and technique to resemble a realistic effect of reflection on a shiny curved or top surface. Pastel's relevance today seems to cover a wider range of different situations of product design visualization.

3 METHODOLOGY

3.1 Reflecting on design drawing exercises

The goal of this paper is to analyse the functions and effects of using powdered pastel as a design drawing tool in an industrial design education context. In order to do so, a range of distinctive existing design drawing exercises was subject of this study. All included the use of pastel. Subsequently the value (§5) of the pastel technique for design education was explicitly noted, as an answer to the initial question.

3.2 Subjects of study: powdered pastel as drawing tool

In these exercise cases, the various product design stages are represented, as well as a range of object and subject visualizations. In order to be able to analyse and evaluate the pastel tool in its full

potential, only clear and representative drawings were subject to this study, partly made by students. **Figure 1** shows scans of these drawings, approximately on a 1:10 scale.

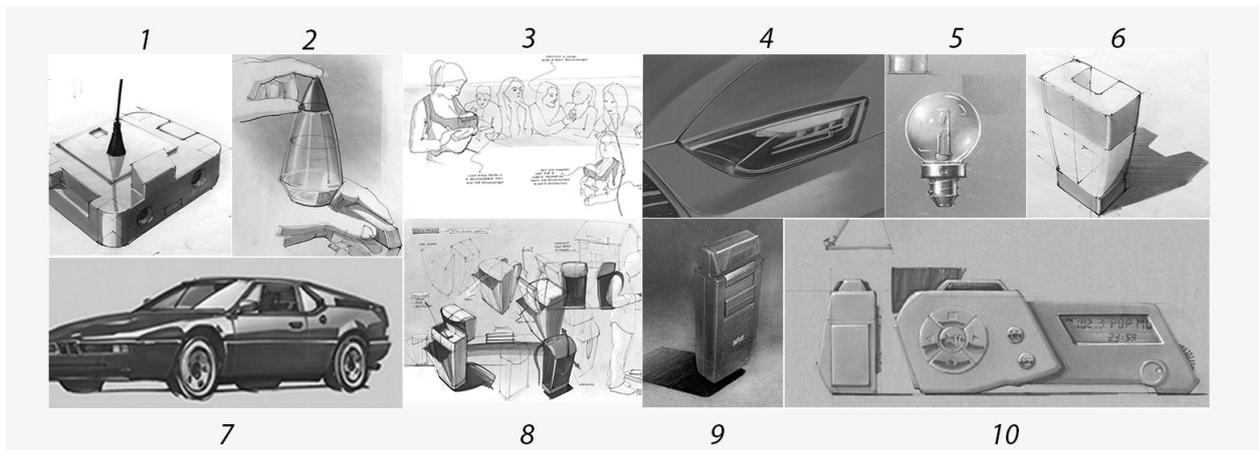


Figure 1. Cases of drawing exercises with pastel (authors Van der Schoor, Van Der Veen, Verbeek, Zhang, Sypesteyn, Brand, Hoftijzer)

3.3 Interviews

The qualitative investigation of the use of pastel as a drawing tool was executed with the help of a panel of experts. Interviewees were asked to reflect on the provided cases of drawing education in which the pastel tool was implemented (**Figure 1**) for each case separately and in general [12].

4 RESULTS

This section comprises the deduced descriptions of the pastel cases. These descriptions were the result of a thorough investigation and observation (with the help of expert interviews) of what was taught and of the visual representations thereof. Apart from these separate cases, some important general observations were noted, addressed in paragraphs 4.2 and 4.3.

4.1 Qualitative investigation and description of cases

In some of the cases it was merely the object representation that was enforced by the use of pastel. In other cases, pastel was applied to increase the spaciousness and improve the composition of the scene that is drawn on the whole.

Case 1: A cubic object. In this ‘basics’ exercise, the applied pastel provides information about a specific surface orientation, and about the reflective surface quality of the object. The top surface effect depicts a gradient that serves as a reflection of the bright environment, solely disturbed by the reflection of the antenna. Corresponding to the change of viewing angle upon the surface, colour gradually changes in vertical direction.

Case 2: Transparent or glass object in hands (study of materials and interaction). The little bottle drawing illustrates the background use of the spread pastel powder. At places where the glass requires reflection effects, the background colour is erased, resulting in a white ‘ambient’ and ‘highlight’ effect. The (erased) white areas actively push the glass to the foreground of the picture, at the same time help provide depth and volume. The pastel itself creates an even background effect. The case shows pastel’s suitability to be easily manipulated.

Case 3: Design and context (scenario exercise). As a means to distinguish the main design subject and its user from the context that surrounds them, that context is gently colorized in such a way that it creates an even and sober effect and pushes the context information (other people) backward. The context should fulfil a supporting purpose, not attract all attention. The highest contrast (white, erased from the pastel) and a subtle colour was applied to the main subjects of the scene (user and product), which creates a composition hierarchy from nearby to far away.

Case 4: Car body (study of tonal values): the combination of a mid-tone paper and lighter and dark tones of pastel allows describing shapes, geometry and subtle surface transitions. By literally observing and depicting the changes that occur, depth or ‘chiaroscuro’ is provided to the object. In this case, subtle though sharp changes of surface orientation are emphasized by white and dark blue pastels.

Case 5: Light bulb (material study): Glass visualization comprises the reflective surface effect, its transparency and the refraction of anything behind the glass. Pastel is applied here to draw the white reflective effect both on the outside and on the inside of the bulb. Pastel's soft and semi-transparent behaviour maintains the see-through character of glass. The white pastel spots represent a reflection of the imaginary light source which is on the left of the scene.

Case 6: Sketch of a bottle: This exercise specifically addressed the use of pastel as a tool to quickly provide a tone value to one or more surfaces of the object. Pastel allows applying tones that easily differentiate from the tones applied by marker, depending on the pressure applied. Besides, the blue-grey (727,5) Rembrandt pastel is a suitable tool to draw shading tones (form shadow) of a white object or part. In this example, pastel provides the lighter tone of a rather dark cap, and it depicts the rather dark side of the white main body. Erasing the pastel outside the objects contour is rather easy.

This monochromatic pastel drawing deliberately does not pay any attention to colour or surface appearance or product detail. This anticipated lack of product elaborateness or detail information ensures that the visualized product proposal solely communicates what it intends to do: its form.

Case 7: BMW M1 (observation and details exercise). Since the reflective side panels of the car form a segment of a cylindrical shape (a rather singular curved surface), it shows a converged reflection of the environment. This typically includes a reflected horizon (the line of high contrast), the full colour ground reflection underneath it, and sky reflection above it. As is the case for all glossy cylindrical shapes, the sky reflection is represented by a gradient effect in circular direction. The pastel powder effect is rubbed onto the drawing surface in the longitudinal direction of the car shape.

Case 8: Backpacks: The concept result of a design process is brought to the foreground, by deliberately colourizing the important elements, and covering the previous stages with pastel. Pastel adds to balance, story and reading comfort of the drawing. For this background effect, blue or cool tones, or desaturated tones are most suitable, whereas the human eye automatically puts red objects in the foreground.

Case 9: Shaving device (study of tonal value and details): As a didactic exercise, helping the student to search and experience differences in values and the working of light, this exercise is about the use of only white pencil and pastel to depict a product in perspective. The function of adding white pastel is threefold here: depicting surface orientation and positioning the object in its environment. An interesting element is the negative black space of the cast shadow, erased from the pastel area. The disappearing white on the ground establishes a certain aerial perspective.

Case 10: Clock radio (concept design on coloured paper): The use of a coloured background (paper) only requires adding a subtle pastel colour to the front surface of the object. Applying this hint of a colour is sufficient; the background colour is still visible. In this way the object and background have a better relationship. An even effect is most suitable, however a gentle gradient would do as well.

4.2 The value for design drawing education

When discussing the implementation of pastel as part of design drawing education not only the technique and effects of applying powder pastel are concerned, but it also concerns students' consideration why a certain effect would be suitable at a certain position, applied in certain direction. This includes differences in surface reflections, colour, tonal values and gradient directions. Applying the pastel technique supported students to learn, observe (objects and context), apply the observed and reflect on that.

Using pastel appeared to be a very communicative and interactive tool for demonstrations in class, which helped explaining and discussing surface behaviour aspects. Another effect of teaching how to draw with pastel was that students sometimes suddenly discovered pastels volume-establishing effect if applied properly in their drawing: the drawing 'came to life'.

4.3 Preparing for digital sketching

The typical effect attainable with pastel revealed a strong resemblance with digital sketching techniques. The correlation between the two media of drawing, when considering the smoothing brush effect of both, is exemplified Figure 2. The left figure presents an analogue drawing, and on the right a digital drawing made in Corel Painter is shown. A single stroke of pastel or airbrush immediately brings on a smooth effect of a gradient from a rather dense level to a level of less pigment density. Both tools have a character that allows for drawing transparently and applying gradients and smoothing transitions. Another of various interesting similarities between the two tools is the fact that both include a depiction of pigment or value depending on the pressure the design student applies. The

stronger the pressure, the more dense the resulting effect. Obviously, in case of the digital medium, this requires a pressure sensitive digital pen, typically in combination with a drawing tablet.

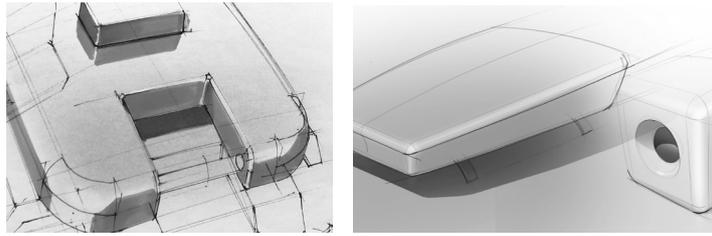


Figure 2. Example of the similarities between pastel and digital airbrush effects: a gradient describing the surface of a product

5 CONCLUSION

As a conclusion to this study, the pastel tool was evaluated directly from a drawing education perspective and from a rather didactical perspective. First, the value of the pastel in design drawing exercises is discussed. Consequently, its additional didactical value to design students will be described. The depiction of the cases of pastel implementation, based on investigation, observation and with the help of expert interviews, served as starting points for the definition of generic effects and functions of using pastel in design drawings. Ultimately, the definition of clustered generic effects and the didactic advantages will help improve design drawing education. Besides, the list will serve as a confirmation of pastel's value for design drawing education. These effects as listed below partly align with recent scholars in design drawing and sketching [1, 13-15]. The following pastel effects specifically concern the definition of what the pastel could represent.

I. Effects that concern the effective visualization of the objects volume

- a. The pastel effect can represent the gradient reflection on a horizontal flat surface.
- b. The pastel effect can represent the gradient reflection on a cylindrical or curved surface.
- c. The pastel effect can represent a certain relatively light or dark tone that helps to clarify the volume or shape of the visualized object.

II. Effects that concern the effective visualization of surface appearance

- a. The pastel effect can represent the colour of an object.
- b. The pastel effect can reveal the surface reflectiveness of an object.
- c. The pastel effect can help visualizing a transparent object.

III. Effects that concern an effective composition

- a. The pastel effect can establish a certain depth and hierarchy (focus) in a composition.
- b. The pastel effect can establish balance in the composition.

Applying pastel involves the subtle and tactile sense of adding tonal value to surface areas and parts, immediately linked to the plasticity and orientation of the object that is drawn. But there is more: working with pastel allows a certain 'claying' on a flat surface, facilitated by pastel's easy-to-be-manipulated character: change of colour or tone; creating gradients; strengthen; soften; erase; mix. This conclusion supports Louw [5] who stated that drawing is more than only depicting images: it is a way of thinking and feeling. The fact that students can manipulate easily when drawing with pastel also touches upon Csikszentihalyi's theory of Flow that (i.a.) says one needs immediate feedback and that there is a need for balance between challenges and skills [16]. Concerning the latter: applying pastel requires some effort to control the technique, however it is quite achievable and it provides numerous options to explore and improve. From an educational perspective, the observed functions of working with pastel (§4.2) clearly correlate to the main purposes of drawing education in general: train the perception of the object (to be), making representational decisions, develop motor skills, and the perception of one's own drawing [17]. "Drawing sharpens observation", as Buser has stated in his extensive study 'History of Drawing' [1]. Closely linked to Cohen's [17] aspect called 'perception of one's own drawing', applying the pastel technique in a correct way appeared to bring about pride and self-confidence: striving for and achieving a certain visual effect using pastel appeared to be very rewarding to students.

Considering the resemblances between the analogue and the digital drawing media (§4.3), it seems tenable that, in design education, the use of a pastel gradient could well serve as an analogue representation of a digital airbrush. Analogue drawing exercises instructions in education

simultaneously provide knowledge and skills that concern the digital medium. Conclusively, both educational media and according techniques support each other.

6 DISCUSSION

It is an interesting thought that pastel has such a long tradition in fields of art and design, and is still a very strong means of expression. It is clear that these fields can learn from each other. The translation of analogue skills and knowledge into the digital drawing universe of today's field of product design is an important aspect for design drawing education in general. It is strongly related to a didactic vision in which the analogue drawing medium serves as a crucial preparation for any further developments, improvements and specialization within the discipline of drawing and visualization. Taken the above into account, the didactic drawing tool of pastel helps teaching design students (and others) the various aspects of observing and drawing the observed, meanwhile practicing skills as vigour and motor, for both analogue and digital implementation. In further research it would be valuable to explore alternative drawing tools for design education as well. This research could include the balance between comfort and anxiety, and the search for other suitable tools to achieve that balance.

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