

# Scientific visualization as a possible component of the imaginative part of academic drawing and painting in a process of industrial design teaching

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**Abstract.** The article raises the question of the conscious possibility of scientific visualization usage in a context of designers' education. The article considers the problem of mixing creativity (such as academic drawing) and computer technologies in the process of design students' education. This article underlines the priority of impressions and the secondariness of constructive specifications of images that may appear in the very beginning during the process of work with material. The material of the article covers such things like the nature of image appearance and presumable results of original ideas realization. The actual ideas of image appearance are given as a singularity of a gouache painting technique. According to the tradition of school of academic painting, aspiration to stand out by originality of smear, tone and color of stretch marks, relief, pasty painting are welcome.

## 1. Introduction

Let us start our conversation about industrial design by claiming it as a variable in a functional industrial object. The logic of creation of any mechanism reflects one simple rule – the simpler the construction, the more reliable and durable the device. This axiom works in a process of creation of optimal technology for a device function.

We can also say that industrial design, as applied component, which is secondary towards the current object in today's mediated and modern reality, which is virtualized by computer technologies in the process of creating an image and its embodiment in the design, has a lot of intermediate elements. One of these elements is a subject called «Academic drawing and painting», which is being studied by students on the eve of their specialty.

A full range of design manifestations is based on the principle of artistic design of objects around a person. The saturation of objects by elements of decor and applying such things like imagery, originality, soleness, recognition of an object or a series of objects without compromising the functioning of the technology – this is the appointment of any design, in particular: environment, interior design, industrial design and even the design of a costume [1].



## 2. An image in design

The concept of industrial design requires a competence of a creative professional able to transform the external shape of an industrial facility for the purpose of its aestheticization. The conditional nature of an image in its applied function of industrial design is a specific task, which is to create a nice appearance, which would be memorable and would generate positive emotions towards an object. The difficulty is that in the process of conversion, a direct, mechanical following the canons, such as The golden section (in the proportions of the shape), coloristics and chromatics (in a context of color presentation) etc. usually depersonalizes an object, and makes it formulaic in the area of industry and householding. Of course, the technological functionality just as the ergonomics remain unchanged components of initial conditions. These are parameters, which are already set, but regarding to an image itself, it is necessary to take a detailed look. An unforgettable and special image consists of the original way of interpretation of plastics of shape and colors, original compositional dominants, which are correctly found and based on an understanding of the process of object's functioning. If this process of functioning is a dynamic or a technological action, then the attempt of displaying this movement can give the most important task to dynamic art. But where to get these subjectively-objective professional subtleties, which are inconspicuous to a philistine, but which are necessary in the high professionalism. As a rule, the original simplicity of an image is a conglomerate of knowledge, experience, intelligence, common culture and professionalism of a designer, who implements the idea of a customer into his own.

The skill of creating a lightweight sketch, which can be trained in the long process of drawing, from nature is necessary for a dialogue between an artist and a customer concretely about the idea of a decoration plan [2]. In the closed cycle of creation of a design project, its artistic part certainly is meaningful and plays the main role. It is necessary to understand that the original artistic solution, which may look simple and primitively done, but which at the same time exactly corresponds to a figurative rhythm of the object's architectonics, just as it corresponds to the topic is not an accident, but the regularity of a purposeful professional search. The applied function of design is secondary towards the function of an object (which of course can exist without decorating in some extreme situation), but as an image, as a sign, as a symbol of existence and action, the appearance of an object allows gaining an advantage. After analyzing the closed cycle of creation of a design project, it is possible to state the change of the ratio of primary and secondary. Since an image, idea and scenario are embodied as pencil sketches. We can also say that technical implementation, like digital implementation, which is a presentational element, is secondary, because it shows the idea by providing a visual representation.

«Random» artistic discoveries that take place at the behest of the circumstances and in a specific psycho-physical condition, are essential. This is a result of a long practice of academic drawing. In the process of improvement of skills of using a pencil and a brush (just as it happens in music, when a student has to learn how to set his hands on the piano keyboard, by training gammas and arpeggio), a student accepts such things like the sense of composition, harmony, limitations of a color, understanding of traditional stylistic norms, sense of tact for psychological and stylistic experiments of different genres.

Experts in computer technologies, who have no drawing skills, are only able to teach computer technologies. Theoretically, it is possible to study design in a "contradictory" manner. A person, who is equipped with computer technologies, begins to learn the basics of fine arts, which are aimed at projectization specialization. But already at the stage of a full-scale drawing of simple geometric shapes, like a cube and a cylinder, it turns out that the main component of the drawing process is impression. The theoretical positions of the linear and aerial perspectives are so relative that the difference between terms of science and arts seems palpable. In fact, the process of drawing three-dimensional objects on the two-dimensional picture plane is a creation of illusion of space. It is not difficult to understand this transformation, using the theory of aerial perspective. According to this theory, in a process of a linear-constructivist painting, the closer the line is to a picture plane, the more

bright and saturated it is. In case of a particular front position of a straight line segment, a part of this segment is closer to the direction of view, and that is why it has to be drawn brighter.

### 3. Systematization of visual images

When it comes to diving into the routine of practical tasks, and the cognitive dissonance of incomprehension appears – like what exactly we study: the science or regularities of illusions and impressions, then it comes to the fact, that it is necessary to understand circumstances of the combination of these axioms – like the rules of accurate knowledge and detached, subjective impressions of perception of the form, which only seem to be «correct». The vision and perception of nature is individual for everyone and strongly related to our psychophysical, natural and acquired features. In accordance to this, the projection to a plane of a sheet of an object, which might be more or less complex, which can consist of smaller elements, might be very different. That is where the individuality appears! The question is how persuasively and tactfully the impression will fit professional rules. In the process of quite long and in fact individual exercises, there is an adaptation and understanding of this action. When the drawing, which follows to quite definite rules, is based initially on filing and on the systematic organisation of impressions, but not on «making photos» of nature.

The specifics of teaching painting for designers is that the installation is based on the hard geometric rhythm of the mutual arrangement of objects. The preparatory drawing for painting is adjusted constructively. In a process of work in color, this constructivism must be kept, even in case of gouache usage, which covers a pencil base, since we have a deal with industry, the production of which has a shape, which is technological and adjusted according to mathematical laws. Completed painting works have to correspond to the accuracy of geometric model's shape. The nature of search of an image in design is mainly based on drawing and the adaptive form of a character. Within this framework, the emotional search takes its place.

The ability of drawing does often mean the ability to see, to understand and implement own thoughts and plans in some form [3].

In the educational-creative works that are presented here, we can see the illustration of how different can be the vision of students, who studied within the strong framework of specific drawing (figures 1b – h).

The placement of an object in the area of mutual perpendicular-to-parallel placement of pipes and a carcass of a cube is initially concretely placed. Approached tonal ratios are not regulated, so initial conditions allow varying the color and contrasting while working with an installation (figure 1a).

We can see the attempt of stylization of entourage realized as flattening in picture 1b. In fact, this is a solution of a banner method as for black tablet, as for draperies and a background. The absence of an aerial perspective gives the impression of «naive art», corresponding to the style of «primitivism».

Let us have a look at mixed stylistic of painting with dominating of golden reflexes on a trumpet. There is an impression of a specific genre of conscious romanticizing of «attributes of arts», so this style is called «Romanticism» (figure 1c).

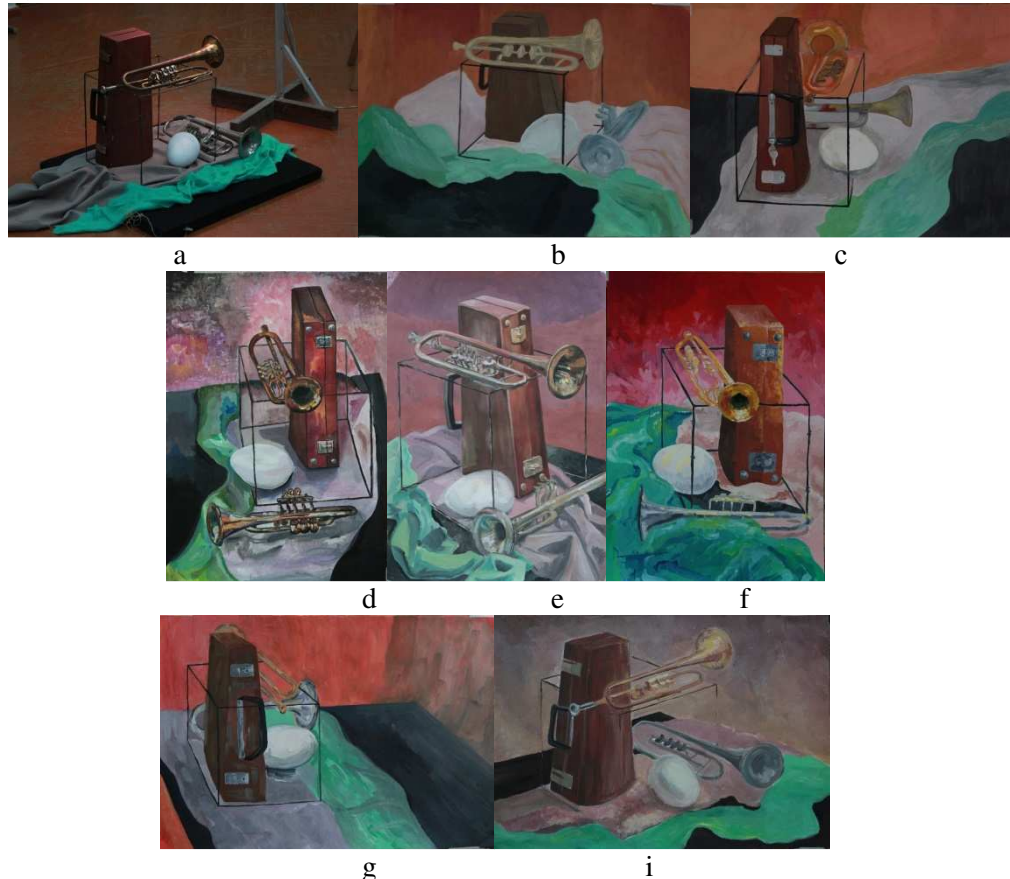
There is an expressive method (figure 1d) in meaning of molding the volume, on a lighting contrast of space, which has vibrations that create the state of anxiety and stress. This work can be marked as «Expressive realism».

There is also an academic method, which reflects absolutely accurate sense of shape and color, that allows perceiving the original composition realistically, without any pretension on stylization of color. So this style is «Realism» (figure 1e).

There is a realistic definition of shape in a contrast approach to the ratio of cold and warm. We can admit the absurd ratio of color and dynamics of the dominant red and pink colors, which are about to bring to front, which is (cold). This is a reflection of conscious fixation of an author's psycho-physical state. This work can be accepted as «Realism with elements of impressionism» (figure 1f).

There is a tough and expressive manner of painting with almost monochrome color perception (figure 1g). In this case, painting as graphic reminds the manner of painting and drawing of impressionist by the name of Henri de Toulouse-Lautrec.

Figure 1h represents a realistic method. There is a solution of gamma by a cold nature ratio. An evident incompleteness of this work (lost carcass of a cube) accidentally creates links to different art movements, such as dadaism, surrealism and others.



**Figure 1.** a – photo of an actual installation, b –h – samples of works

#### 4. Conclusion

One of the most important tasks of the process of teaching, at all stages of education is to save the individuality of an approach of a future designer specialist, in order to keep this person's originality and difference from others and keep the proper recognizable style of this person. In fact, the principle of «non-harming the originality in a process of formation of constructive perception» is a prerequisite of development of individuality.

Industrial design as an objective reality exists and develops in the connection of science and technological production, on the one hand, and art, on the other. There is no doubt, that the first two components are exposed to «scientific visualization» long before the statement, which brought such graphical method, which is digital in our days, into the section of scientific researches. The subject «Academic drawing and painting» in the program of designers training is one of the first stages, and it is surely based on the world's art history. If we take history of art as a historical science, then we will see that it uses «scientific visualization» as a toolset in systematic visual analysis of styles and directions. We do improve the efficiency and quality of training of future specialists by systematizing and thematically connecting psychological and formal visual expressions of students in accordance with already existing genres of arts.

## References

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