

Picture is basic subject of russian education in sphere of art, architecture and design in xxi century

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Abstract. The article briefly describes the traditions of the realistic picture in the Russian art and industrial education in the XIX-XXI centuries. There are some main features and the reasons of insufficiently effective application in design and production. You can see the importance of the picture during the fourth industrial revolution in the sphere of design and architecture. The importance won't decrease, it will increase. Actions are treated to criticism by individuals and organizations which activity promotes loss of leadership of Russia in the sphere of the realistic drawing in the international sphere. There are some offers to overcome a gap between the received skills of the realistic drawing in the course of training and its effective application in design express. It's very popular for engineers to have skills of painting to improve their professional competences and stimulation of inventive activity, effective participation in cross-disciplinary design. There are rates of development of the Russian art industry and architecture with the level of development of industrial production, rates of new technologies introduction and creative capacity of designers.

1. Introduction

The humanity has endured three industrial revolutions. The first has been called "an industrial revolution" and was characterized by transition from manual skills to mechanical production. The second revolution was connected with emergence of electricity, the invention of the conveyor, the advent of mass production. The third industrial revolution was characterized by development of electronics and information technologies. Development of digital technologies brings humanity to a new stage – the fourth industrial revolution which results from the third and is caused by rapid development of technologies which gradually erase borders between spheres [1]. This article is devoted to research of prospects of existence of the realistic design picture in Russia and to show its importance in design, architecture and art of the XXI century.

2. Problem of conservation of leadership of the Russian school of the realistic picture and it's adaptation to applied tasks.

Works of the following authors have formed scientific base for this article: U. Ayzekson, A.M. Aleksankov, A.F. Gartvig, V.P. Grakhov, S.A. Mokhnachev, O.V. Borozdov, E. Chernevich, K. Schwab, D.A. Zaytsev, I. Zbritskaya, N.S. Zaytsev, E.I. Nikolaeva, N.V. Bryzgov, E.V. Zherdev. There are a number of problems which are constrained by development of the Russian art and industrial education and exert indirect negative impact on the Russian economy:



1. Saving of Russia's leadership on the international scene in the sphere of traditions of the realistic drawing.

2. A gap between the received skills of the drawing in the course of training and their practical application in the conditions of project design and production.

The fourth industrial revolution in the world it's a call of Russia to economically independent state in general and the Russian educational system in particular [2]. One of the main competitive advantages of design education in Russia in the XXI century is the school of the realistic drawing, best in the world, which exists since times of the USSR. This leadership needs to be kept. According to art critics, this phenomenon is the fact that all Russian art of the second half of the XIX century is generation of the Russian literature. One characteristic of domestic tradition is the attention to the "literature-substantial" part of works is bigger than to "visual and formal". It's the course of its originality, but also at the same time it serves as an explanation for the inertness shown by artists to questions of specifics of his language. The traditions of the subject realistic drawing are strongly expressed in the Russian and Soviet graphic art [3].

In Russia experts are continue to trained on the basis of lost in the west of academic art where classical canons are constantly subverted for the sphere of production of goods [4]. Artist Fedorovsky F. F. in 1909 taught a course of "creative drawing" in an art workshops of Stroganov Art School and complained about the insufficient amount of time given there to the academic drawing: "Creative arbitrariness drawing is not constrained in advance imparted n abilities and abilities to transfer precisely visible without preliminary mastering the culture of the drawing eventually could develop only into formalistic stunting and helpless primitivism" [5]. That has actually occurred in the West European education.

On the other hand it is necessary to recognize that the Russian academic drawing doesn't solve those tasks which exist in the domestic economy during the fourth industrial revolution. There is a gap between requirements of cross-disciplinary design, invention, needs of industrial production and curricula, programs for the drawing. The last of them are traditionally aimed at students' skills formation as easel-painters in the XIX century. That's why high-quality drawing preparation of the Russian students isn't demanded in their further professional design activity.

In this circumstances the Ministry of Education and Science of the Russian Federation develops the politics of reduction of the hours allotted on the drawing and redistribution of school hours in favor of "introduction of new technologies in educational process" and increases the number of "independent work of students". For example, in the State educational standard of higher education (SES HE) in culture and art in the direction: 530400 "Design" for bachelors for 2003 in the requirement to an obligatory minimum in point 4, OPD.F.03 the number of hours for the drawing is 960 with "classroom lessons with the teacher". In point 6.3 educational and methodical associations of the educational organizations (EMA) recommend forming groups of all-professional disciplines by 7-10 people. The number of students for one teacher of special subjects without theoretical of day form of education is 4 students [6]. In the Federal State educational standard of higher education (FSES HE) in the direction: 072500 Design for bachelors for 2009 there are no such requirements any more [7]. Changes in the standard provide to heads of higher education institutions cultural divisions to define the number of the classes and students in groups. In practice it leads to loss of drawing skills among the students and to degradation of competitive advantage of domestic design education.

No doubt that the reforming of the basic subject "drawing" in education is very important. The vector of transformations has to be directed not to reduction of the subject hours, but to the high-quality updating in connection with the future global changes in the world. It is necessary to change not "how much to draw" and "how to draw", and "whereby to draw" and "what to draw". First of all educational tasks have to develop such skills as ability to the generalized perception, development of volume and spatial thinking, designing in imagination, development of feeling of proportions, a ratio of scales, analytical drawing on the basis of data, stylization of biological objects, understanding of laws of ergonomics and features of visual perception.

Future designers and architects have to know various graphic technicians of realistic drawing by using markers, felt-tip pens and other graphic tools. They need to use various auxiliary electronic devices to manual drawing: graphic tablets, light tables, scanners. They have to work in the equipment of a collage and to competently use the borrowed images (cliparts), to combine effectively technology of manual drawing and a possibility of technical devices, ways of circulation and the press. They need to have skills of calligraphy.

For example, in the speech at Stanford University, one of founders and heads of the hi-tech company "Apple" Stephen Jobs said: "There are the best courses of calligraphy in the country in Reed College. All posters, inscriptions on all banners have been faultlessly drawn manually in the campus ... I have learned ... why the typography is called science ... Nothing from this seemed useful to my life. But ten years later, when we developed the first Macintosh, everything was useful" [8]. And Walter Isaacson considers that organically combination of technical solutions, refined design, ergonomics, clarity and simplicity is not accidentally in Apple products. Jobs S. is one of the first who has created the innovative graphic solution of the interface of the user, because of his skills of distinguished, art perception received on a calligraphy course [9].

One of signs of the fourth industrial revolution is the dynamic development of additive technologies – layer-by-layer process of compound materials for creation of objects on the basis of these three-dimensional models. Using of 3D technologies gives the chance to create buildings of any form. It gives to designers and architects an opportunity to think freely, without driving itself into a certain framework. For example, the construction 3D-printer in the work uses technology of extruding at which each new layer of construction material is squeezed out from the printer over the previous layer on the contour put by the program, growing up building walls [10]. Such technology is called FDM (Fused Deposition Modeling – modeling by a thread sedimentation method. Additive technologies are used also for creation of physical models, prototypes, samples, the tool equipment and production of plastic, metal, ceramic, glass, composite components and components from biomaterials.

Possibly in the future the wide range of users will have an opportunity to digitize and copy things. Problem of protection the intellectual property will become especially important. An opportunity to print any products will change the culture of possession. Worthy is not to have a thing but its information model and opportunity to print it by means of unique materials. It means to have the digital information which will allow to reproduce a product again [10].

The digital basis for additive production is software product allowing creating three-dimensional graphics. Unfortunately in public and students consciousness there is a popular opinion that process of three-dimensional modeling and possession of the corresponding software product gives the chance effectively to replace absence even of basic skills of the realistic drawing at the architect and the designer. The similar point of view is probably shared by officials in the Ministry of Education and Science of the Russian Federation. The basis for a similar statement is the fact of consecutive reduction of hours on basic creative disciplines (the drawing, painting, a sculpture).

There is a substitution of concepts: the purposes are replaced by means. The main idea of the owner of a creative profession (the artist, the architect, the designer) is a creation of an artistic image or the concept. Instead, the purpose actually proclaims skills of work in the software product and creation of detailed virtual model of an object. But creation of the qualitative concept (artistic image) is possible only thanks to process of creative search, sketches. This mission is most effectively carried out by the designer who has skills of the realistic drawing. Search sketches have nothing in common with process of mechanical creation of virtual model on the set system of coordinates, and methodical work in the software product which follows the set algorithms. Three-dimensional modeling is admissible to use in creative process on closing stages of search of an image, but only after preliminary sketches.

Process of drawing can be divided into stages (for convenience of training). This is the whole process depends on the individual projects. It is impossible to predict as the final product after his projection from imagination, for example, on paper will look. A number of factors do creative process not giving in to the analysis of the most powerful computers.

Some researchers consider creativity process as the highest form of intellectual activity, the profound knowledge arising when the person solving a problem does by the purpose not only this end result, but also process of knowledge. He seeks to expand a task framework as allows him to find "unforeseen". Original creativity is characterized by the fact that his result is broader, than the purpose which has initially been stated. Creativity doesn't dependent on external requirements and as an internal emotional desire, free action. Therefore creativity is the property of the complete personality reflecting interaction of her informative and emotional spheres in their unity [11].

In the XVIII century in Russia the concept "design" was used in the context close to a concept the drawing or the project concerning the images of graphic character intended for repeated reproduction [12]. And founder of the Russian art and industrial education count Stroganov of C. G. assigned to the drawing a key part in art and industrial education and in creative process: "... drawing is language of the worker, only with its help can reach that purity of forms and confidence in performance without which nowadays arts and crafts an essence nothing" [13].

The president and the founder of the World Economic Forum in Davos Claus Schwab in the book "Fourth Industrial Revolution" persistently reminds that all new technologies are, first of all, the means created by people for people. And innovations and technologies are aimed at the benefit of humanity and at ensuring his requirements [14]. Therefore, in the competitive environment of the future success of the enterprise will be caused not by scales of production, but quality and originality of the ideas. In other words, development of concepts, but not production [10] will become the world basis of the economy after "the third industrial revolution". And the most effective instrument of visualization of the concept is the drawing.

Need "to draw close attention to training in the field of engineering and industrial design", as well as the relevance of design in economy of the XXI century is unanimously recognized by researchers, but at the same time some of them call in question a role of stage-by-stage, long-term vocational training of the industrial designer. For example, the CEO of Fund of industry development, the head of department of enterprise leadership of Moscow school of management "Skolkovo" Alexey Komissarov noticing that "...industrial designers are generally prepared on the basis of art schools", claims that "to teach drawing the good engineer more simply, than to teach the artist to fundamentals of study of the strength of materials and the theory of cars and mechanisms" [15].

The statement of the rector of Academy of Arts Kakorinov A.F. isn't less characteristic, which in 1764 has made the official report probably addressed to the president of Academy of Arts Betsky I.I. (comment. Chernyh). In this report Kakorinov A.F., recognizing relevance of applied art (the engendering design), offered for these purposes to use pupils of Academy "who doesn't able to do arts make small success". Complaining about expenses which establishment had incurred from inefficiency of this category of pupils, the rector suggests them to use them in the art industry because for years of studying in the Academy they "a little in drawing are taught" [13].

Comparing Kakorinov A.F. (XVIII century) and Komissarov A. (XXI century) statements we can come to the following disputable conclusions:

1) Everybody can be taught to draw at any age. For example, at the age of 25 years (average age of diploma university graduate with qualification "engineer").

2) In the sphere of design it is quite enough to be "a little in drawing taught" and to have small creative potential.

In 1825 the colonel of a cavalry count Stroganov S. G. wrote "Drawing school in the connection with art and profession". In Moscow he proclaimed: "... young people from 10 till 16 years old, devoted themselves to different crafts and skills, can study drawing art ..." [13]. At that time when future technical specialists began to learn elements of the profession future designer in the USSR had not diplomas about the termination of art school and about the termination of children's art school. They were going to continue the training in art and industrial academy, and in addition was engaged in drawing at specialized classes.

On the other hand, during the coming era of revolutionary changes when borders between sectors and professions have artificial character and all more show the counterefficiency, it becomes important

to eliminate cross-disciplinary barriers, to promote establishing effective partnership [14]. Respectively, the ability by means of the drawing to record the thoughts, "to create" a design image and to carry him the partner shouldn't be the privilege of a narrow circle of experts in the sphere of art. It is necessary to develop special "creative and technical" training programs according to the drawing for students of design engineers and, perhaps, builders within so-called elite education, with the purpose to help them with the solution of the professional tasks.

Engineers have to develop volume vision (three-dimensional vision) — ability to perceive in a three-dimensional object his volume characteristics as priority [16], feeling of proportions, understanding of laws of ergonomics. It is possible to carry out it if the system of preparation provides rather plain material for educational exercises. These are elementary geometrical forms, or daily objects. The requirement of simplicity of material is connected with availability of these or those exercises to the audience which doesn't have artist's experience. In work at fundamental on the zero level the individual taste, technical skills, esthetic reasons aren't important for experiment [17]. Similar approach, will stimulate inventive activity, promote establishment of effective cross-disciplinary communications.

In the 20th of the XX century the artist constructivist Rodchenko has formulated the principle of community of methods of work of the design engineer and artist constructivist who becomes relevant in relation to designers in the XXI century: "Inventors are also artists, and the artist is an inventor" [18]. One of the example of harmonious synthesis of humanitarian and technical competences is the genius of Renaissance — Leonardo da Vinci (1452 — 1519). Art and science have been connected indissolubly for him. His creativity in the field of the equipment founded the project design. He was the painter, the sculptor, the architect, the scientist, the engineer. A source for studying of his heritage is his seven thousand sheets manuscripts. As the scientist and the engineer he has enriched with basic observations almost all fields of science of that time, considering the notes and drawings as preparation sketches to the huge encyclopedia of human knowledge. The idea of using knowledge of wildlife for the solution of engineering tasks belongs to Leonardo da Vinci. He became the founder of project design in the XX century, such as bionics as engineering science and a biomorphism as the stylistic direction in design [19]. The person of similar outlook will be the most popular during an era of the fourth industrial revolution.

3. Conclusion

Identification of the mechanism and extent of influence of creative potential of the personality on his inventive opportunities in the technical sphere still needs additional researches. There is a direct connection between design of an innovative product and creative competences of the designer – it is undoubted. The main means of expression of creative potential during the establishing cross-disciplinary communications and creation of innovative projects is the realistic drawing which and in the XXI century will remain the best project chip of the designer and architect. But initial skills of possession of the drawing are relevant also for the technical specialist. It is difficult for the engineer imprisoned within the narrow specialization, "one-sidedly" trained, having undeveloped imagination to go beyond stereotypes, to create something essentially new in the specialty. Its efficiency and public advantage is a timely implementation of orders of the higher management and implementation of the activity, according to the received competences within duty regulations and the legislation that becomes insufficiently during the coming era of the fourth industrial revolution.

References

- [1] Zaytsev D A, Zbritskaya I, Zaytseva N S 2016 Russia in the run-up to the fourth industrial revolution *Innov: online scientific magazine* **1** (26) <http://www.innov.ru/science/economy/rossiyavpreddveriichetyertoypr/>
- [2] Aleksankov A M 2017 Fourth industrial revolution and modernization of education: international experience *Strategic priorities* (Moscow: LLC Analytical Center of Strategic Researches SOKOL) **1** (13) pp 53–69

- [3] Chernevich E 1997 *Russian Graphic Design 1880-1917* (Moscow: Vneshsigma LLP)
- [4] Nazarov Y 2002 *Post-Soviet design (1987-2002)* (Moscow)
- [5] Shulgina E N and Pronina I A 2002 *History of Stroganov School 1825-1918* (Moscow: Trade and Publishing House Russkoe Slovo-RS, LLC)
- [6] Russian education 2003 State educational standard of higher professional education in the field of culture and art *Federal Portal* http://www.edu.ru/db/portal/spe/os_zip/530400b_2003.html
- [7] Portal of Federal State Educational Standards of Higher Education 2009 Federal state educational standard of higher professional education 072500 design (qualification (degree) "Bachelor") <http://fgosvo.ru/uploadfiles/fgos/7/20111115133628.pdf>
- [8] Steve Jobs The Performance before graduates of the university of Stanford in 2005 year *Calligraphy is the success secret!* (National Union of Calligraphers) URL: <http://calligraphy-union.ru/rus/NewsOfCalligraphy/334.aspx>
- [9] Isaacson W 2011 *Steve Jobs* Translation D Goryanina, Y Poleshchuk, A Tsyruhnikova, A Cherednichenko (Moscow: LLC Astrel Publishing House, CORPUS Publishing house)
- [10] Grakhov V P, Mokhnachev S A, Borozdov O V 2014 Influence of development 3D-tekhology on construction economy *Basic researches* (11-12) pp 2673–2676 <http://www.fundamental-research.ru/ru/article/view?id=36044>
- [11] Nikolaeva E I 2010 *Psychology of children's creativity 2nd prod.* (St. Petersburg: St. Petersburg)
- [12] Glinernik E M 2001 *Historical self-determination of graphic design in the project culture of Russia (1880 - 1980's)* Thesis for a Doctor of Arts degree (St. Petersburg)
- [13] Gartvig A F 1901 *Drawing School Related to Arts and Crafts Founded in 1825 by Count S G Stroganov: Establishment and Development until 1860* (Moscow: Pashkov's Publishing house)
- [14] Schwab K 2016 *The fourth industrial revolution* (Moscow: Top Business Awards)
- [15] Komissarov A 2015 Fourth industrial revolution *The Portal of the Union of young engineers of Russia* <http://техноспецназ.рф/2015/10/15/a-komissarov-chetvertaya-promyshlennaya-revolutsiya/>
- [16] Vashchenko S I, Perkhun V V 2016 Terms in the academic picture *Design and artistic creation: theory, methodology, practice Materials of the 1-st international. sci. Conf. II* (St. Petersburg)
- [17] Lavrentyev A N 2010 VHUTEMAS-VHUTEIN: problems of interaction of art and technical cultures *Decorative art and subject and spatial environment. MGHPU bulletin* (Moscow: S.G. Stroganov Moscow State Academy of Arts and Industry) **3** pp 3–23
- [18] Lavrentyev A N 2012 The Art of the Street: the domestic experience of urban design of the 1920s and 1930s on the example of constructivism *Collective monograph. Historical traditions and forms of artistic and imaginative and spatial-environment interaction of architecture, design and decorative and applied art* (Moscow: Publication. «Foluk») pp 231–252
- [19] Bryzgov N V, Zherdev E V 2015 *Industrial Design: History, Modernity, Futurology* (Moscow: S.G. Stroganov Moscow State Academy of Arts and Industry)

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract no. 02.A03.21.0011.