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THE SIGNIFICANCE OF FREEHAND DRAWING IN THE TEACHING PROCESS IN GENERAL CONSTRUCTION PROJECT CLASSES

ZNACZENIE RYSUNKU ODREČZNEGO W PROCESIE DYDAKTYCZNY NA ZAJĘCIACH PROJEKTOWYCH Z PRZEDMIOTU BUDOWNICTWO OGÓLNE

Abstract

As you know, the first requirement faced by the candidate wishing to study at the Faculty of Architecture is freehand drawing; passing the examination in it is the basis for admission. Freehand drawing in both the teaching process, and then in the professional activity is an expression of artistic and spatial sensitivity of every student and architect. It also has a high priority in the design process, especially at the stage of an idea, concept and architectural creation. Before there appeared the possibility of using the computer, concepts and student projects had been performed manually during the teaching of all design subjects. It was a rule to prepare designs in pencil techniques, in ink, and other tools and techniques – e.g. watercolor, tempera, feather, etc. The creative process required understanding and analysis of the developed vision or architectural issue in the context of brain – eye – hand relations. In the era of universal computerization these relations and correlations have been weakened, which, as can be seen in practice, does not always produce good – expected – results in the teaching process. First of all, probably, due to the deterioration of the function of **imagination** (including aesthetic one) among entrants and the strengthening of their tendency to **laziness** (including taking “shortcuts”), which in a sense is – for artistic professions – even murderous. Therefore, observing messages of creativity among students of architecture, one can state that the computer can, of course, be an aid, but it cannot be the main tool in mental, emotional and creative development process.

Keywords: brain, eye, hand, sketch, imagination, computer, language of communication

Streszczenie

Jak wiadomo, pierwszym wymogiem, z którym styka się kandydat do studiów na Wydziale Architektury, jest rysunek odręczny; zdanie z niego egzaminu jest podstawą przyjęcia na studia. Rysunek odręczny w procesie dydaktycznym i w działalności zawodowej jest wyrazem wrażliwości plastycznej i przestrzennej każdego studenta i architekta. Ma też priorytetowe znaczenie w procesie projektowym, a zwłaszcza na etapie pomysłu, koncepcji i kreacji architektonicznej. Do momentu pojawienia się możliwości użycia komputera koncepcje i projekty studenckie wykonywane były manualnie w trakcie nauczania wszystkich przedmiotów projektowych. Obowiązywała zasada wykonywania projektów w technikach ołówkowych, w tuszu oraz innych narzędziach i technikach plastycznych – np. akwareli, tempery, piórka itp. Proces tworzenia wymagał pojmowania i analizy opracowywanej wizji lub zagadnienia architektonicznego w kontekście relacji mózg–oko–ręka. W dobie powszechnej komputeryzacji te relacje i korelacje zostają osłabione, co, jak widać w praktyce, nie zawsze przynosi w procesie dydaktycznym dobre – oczekiwane – rezultaty. Przede wszystkim, prawdopodobnie, na skutek osłabienia u adeptów zawodu funkcji **wyobraźni** (także estetycznej) oraz wzmacniania w nich tendencji do **wygodnictwa** (w tym obierania dróg „na skróty”), które w pewnym sensie jest – dla zwodów artystycznych – wręcz mordercze. Dlatego, obserwując przekazy inwencji twórczej studentów na studiach architektonicznych, stwierdza się, że komputer może być, oczywiście, narzędziem pomocniczym, ale nie może stanowić narzędzia głównego przy procesie myślowo-emocjonalnego i twórczego rozwoju.

Słowa kluczowe: mózg, oko, ręka, szkic, wyobraźnia, komputer, język komunikacji

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1. Introduction

People have used drawing and sketch drawing (or various forms of graphic messages) for thousands of years. Given the centuries-old legacy (in a different dimension of the message) of drawing achievements of the human population, it can be argued that drawing is one of the most primal (if not the original) expression of the aesthetic and cognitive needs as well as human talent and emotions. It serves as a specific form of language in many cultural and scientific areas and it is certainly a precursor of all writing systems.

Every man, to a greater or lesser extent, has the ability to draw and sketch. Obviously, the quality of a picture (including accuracy, readability, aesthetic and even artistic values) requires some talent and personal emotional predispositions. Together they make up the so-called artistic personality. However, such personality not always reveals itself on its own; it is often necessary to discover someone's talent, then it is necessary to work on its development whether it be under the guidance of a teacher-master or through self-education.

The so-called graphic message, which is reflected in a drawing is going to be different for each author – individual. This feature of individuality is the most valuable one of a drawing, being the expression of the author's creative design and intuition.

A drawing or a sketch can become a substantial medium of communicating both humanistic and technical issues. The Institute of Building Design at the Faculty of Architecture of Cracow University of Technology organizes a course in "general construction". This is a subject of architectural, construction and technical nature. Before each academic year commencing cyclically, the scope of technical and practical nature of teaching design classes is clarified. There are discussions on the introduction of new methods of teaching, as well as ways to maintain the existing perennial teaching process.

We are fully aware that the opportunities that computer programs and technology offer now are solutions which were absolutely unimaginable, for example, thirty ago. We also believe that the potential of computerization and development of digital technologies will be continually expanded and will even surprise us with revolutionary ideas and inventions. Progress in this area is incredibly dynamic and fast. In the wake of human thought progress, processes of miniaturization of computing devices follow¹. Computer programs are created for all specialties related to education, work and other areas of life. Various problems are solved with their aid. Using the computer, as one knows, we can draw, design, paint, create design systems, visualizations, copy, create graphic compositions, photographs, make all sorts of picture treatments, paste, compile, reproduce, etc. These briefly mentioned possibilities of computers constitute only a small portion. Knowledge related to the ability to use computers must be constantly reviewed and supplemented, because the process of its development, experts believe, is only the beginning of the possibility of human thought.

In the light of this technical progress a question might be asked: And what about all the things produced by human thought over thousands of years? Have they already lost

¹ *Systems that work together can fit in a single miniature chip and be mass produced very cheaply*, Wolszczan A., *Nowoczesna komunikacja – NAUKAEKSTRA*, Biblioteka Gazety Wyborczej 20, Agora 2012, pp. 9-10.

their relevance? How, then, to understand and to “set” the teaching process in the context of these opportunities, which the computer gives man today? These are the questions which we are constantly looking for answers to.

Working with students – particularly in the first years of study – verifies these concerns and even “orders” us to approach the previously-developed processes of teaching students of architecture in a humble way.

2. The purpose and significance of freehand drawing

Drawing can also be classified as one of universal areas of human life (despite the different ways of presentations and graphic communication). Owing to this kind of “genetic” universality it is a common language of communication and comprehensible to all social groups and cultural areas. Since childhood, and later in adulthood, we customarily, ludically, artistically or scientifically draw, sketch, paint. One can even be delighted with different graphic forms usually created spontaneously by means of emotion – reviewing e.g. used phone books or calendars whose pages are covered with doodles. An interesting phenomenon (probably mostly psychological) from the scope of this method of drawing are pictures on the trees in the forest, on the walls, and even in toilets.

Freehand drawing, depending on what we want to present to the recipient, may be very expressive (impressionistic-realistic or surreal) or of a technical nature e.g. in the architectural and construction documentation. Especially in the case of technical drawing, freehand drawing skill is an important tool for clear communication of substantive message. Robert Gill, who cites various definitions of the significance of drawing, rightly notices that. Two of them have been selected here².

The analysis of the literature in the field of drawing, allows one to identify and characterize the basic objectives, that define the essence of its meaning, especially in the artistic and technical fields³. When it comes to architecture, good graphic message of a freehand drawing is essential. It is in fact the basic form of information to explain the architectural and construction systems, materials, details, structure and technology. Drawing is therefore a fundamental base in preparation for the profession of an architect. Within the interdisciplinary methods of preparation of project documentation and execution process, drawing is in fact the main form of recording a work of architecture. It is also a necessary tool for effective communication with “people from the industry” and contractors of various professional qualifications. For instance, A perspective (spatial) projection of a detail is

² Gill R., *Zasady rysunku realistycznego, Książka dla projektantów, ilustratorów i artystów*, Galaktyka, Spółka z o.o., Łódź 1997, p. 12: “(...) Drawing is the process of graphical interpretation of what one sees and knows. (...) Knowledge and learned skills are necessary condition for a good drawing, practice – for an even better one”.

³ Jan Knothe accurately describes the usefulness of drawing; he states among other things: “Drawing is a utility tool as some of its categories have become a form of language in international communication, e.g. technical drawing (drawing standards and graphic designations) and signs (e.g. road and cartographic)”; Knothe J., *Z żabiej perspektywy*, Nasza Księgarnia, Warszawa 1977, p. 138.

more readable and understandable than its flat presentation. Obviously one should also take the addressee of the graphic record in the form of a drawing into account.

3. The usefulness of teaching freehand drawing in the implementation of the curriculum of “general construction”

Drawing is commonly understood to belong mainly to one of the areas of visual arts. In the context of the work and technical solutions it would seem that drawing as such has no special application. The specificity of the construction and technical issues in architecture is presented, however, mainly through technical drawing⁴. Each technical drawing is completed with technical word written as a substantive piece of information. Technical drawings require technical writing, which is done by hand, with a template or using a computer. Construction processes are typically based on different technologies subject to such design and executive modules as: the size of a brick, ceramic brick, precast slab element. Modern technological solutions apply various system modules. The synchronization of knowledge of these modular design and material systems and skill of matching proportions in created freehand sketches exercises spatial imagination useful, or even essential, for understanding a construction problem (e.g. in regard to design: foundations, walls, stairs, floors, roofs, flat roofs, building structure, finishing details, etc.).

As it is generally accepted, teaching students in the first phase of architectural education involves, inter alia, teaching the basics of technical drawing – based on learning the types and characteristics of building materials and of existing standards of construction law regarding graphic signs⁵. Even at this first stage of studying, it can be noticed that students –despite having no knowledge related to technical drawing – have a special artistic sensitivity and skills developed in preparation for studying architecture or otherwise. They are then fixed and further developed in the first years of studying in classes at the Institute of Drawing, Painting and Sculpture.

The process of formation of drawing and artistic skills and spatial imagination is, as one knows, constantly reviewed in relation to the requirements and needs posed in changing curricula⁶. Referring to my personal experience, I can state that almost all the elements of knowledge and artistic skills that I gained while studying at the Faculty of Architecture

⁴ Technical drawing for the most part is made with the use of drawing tools, and is now mainly based on computer graphics. Graphic standards, scale and dimensioning of individual technical drawings should be used in technical drawing, e.g.: projections, sections, elevations, details, etc.

⁵ Speaking of drawing J. Knothe poses the question, which is also the answer: “Is drawing the art or a skill (...) drawing is information (...) drawing always recreates something (...) drawing is the name embracing so many things (...) a pattern on the fabric and architectural plan and a typeface of written and printed words (...)”; Knothe J., *Z żabiej...*, *op. cit.*, p. 137.

⁶ The process of teaching the evolution of artistic sensitivity of architects, from the beginning of the formation of the Faculty of Architecture of Cracow, in a scientific manner and very informative on the background of European training methods, was introduced by A. Białkiewicz, *Rola rysunku w warsztacie architekta. Szkoła krakowska w kontekście dokonań wybranych uczelni europejskich i polskich*, Monograph 315, Politechnika Krakowska, Kraków 2004.

of Cracow University of Technology, are strictly necessary to me in general construction issues. To this day, I have been using them in virtually every class with students during critiques.

The design course of “general construction” is commonly referred to as mainly technical one. And that is the case. But also here, as it turns out, in the course of implementation of the educational process in different semesters, freehand drawing skills are always a basic requirement in addressing the building issues and technical “conversation” between a lecturer and a student. As it follows from teaching practice and general architectural experience, the use of freehand drawing skills is also necessary in the phase, which precedes the diagnosis of selection of different concepts to solve technical problems.

The above mentioned teaching process involved in “general building” course and verified after each semester, shows educators how important in teaching the technical subject is the element of freehand drawing. Developed for many years, the system of the implementation of the program assumes that technical drawings are made with the use of drawing tools and computer devices. In contrast, the acquired construction knowledge is checked during tests in freehand drawing. These tests are based on the graphical handwritten transmission of construction issues in a clear way, keeping proportions, scale and required graphic and material standards (III. 1).

An analysis and evaluation of students’ work indicates that students have great difficulty in expressing their knowledge through freehand drawing. As in every test of this type, different level of knowledge is mastered by students, which probably also affects the possibility of expressing it with a drawing. Students’ works can be very different regarding the level. The outstanding ones present substantive content expressed through a well presented freehand drawing skill, taking account of clarity, the proportions, well-chosen lines, spatial imagination, projection drawing skills. A notable feature of good solutions that demonstrate the understanding of the topic is also an individual way of drawing the presentation which complies with the criteria and construction standards. Such elaborations can be described as ones presenting good eye – brain – eye – hand correlation, and further demonstrate the artistic and individual personality of the author (III. 2).

In evaluating the effects of end of semester technical projects made by students, it can be observed in most of the examples that good and correct works both in terms of content and graphics coincide with good proficiency in freehand drawing.

4. Freehand drawing during inventories

An important part of the educational process is to teach the student the correct mapping of the actual state of a building, or making the so called architectural and building inventory. To carry out such diagnoses and study, one uses both freehand drawing techniques, as well as currently available computer measurement methods (and more precisely: laser and geodetic which are later subjected to computer treatment); however, they are not widely available due to the high cost of such equipment and its susceptibility to damage. And they will not probably be available for students for a long time.

Inventory refers in particular to historic buildings which are to be repaired or regenerated (III. 3).

Spatial imagination is also necessary in inventory. It allows the execution of drawings of the inventoried parts of a building or its details (sometimes very difficult to access even for laser equipment) and the application (onto these drawings) of the performed measurements (obtained values). In particular the execution of a large inventory of historic roof rafters, as well as church towers and signatures, tends to be difficult. As the practice teaches, the complex inventory drawings also consist of sketches, which are often used to identify structural schema of an inventoried facility.

In the course of construction apprenticeship students are required to take notes in the form of drawing of construction processes. This method preserves the knowledge of the observed processes, while deepening specific, detailed cognition – of e.g. non-standard construction and building systems, etc.

5. Conclusions

Using computer programs to perform architectural projects and compile documentation has extremely facilitated the work of architects. The computer gives the universal potential for replication of projects and their possible compilation or modification on the basis of prepared solutions. However, such work with a computer can also lower the level of abilities (**and readiness**) to come up with individual and creative solutions, and therefore also weaken the development of personality and destroy the exploratory project creativity.

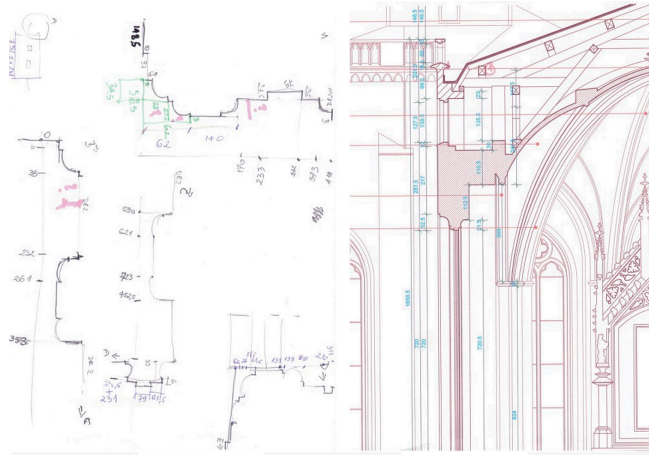
Computer technologies are and will be an even more perfect working tool. But there is no substitute, it seems, for the natural “neuro” connection between the head and the hand of man, which is reflected in the extraordinary abilities (possibilities), that lie at the origin of all use of the tools and their creation (including handcrafts, arts, playing instruments, martial arts, acrobatics, games, etc.).

The author thinks that the validity of the above opinions (shared by many architects-practitioners and theorists, including educators) should be constantly taken into account and nurtured in the departments of architecture.

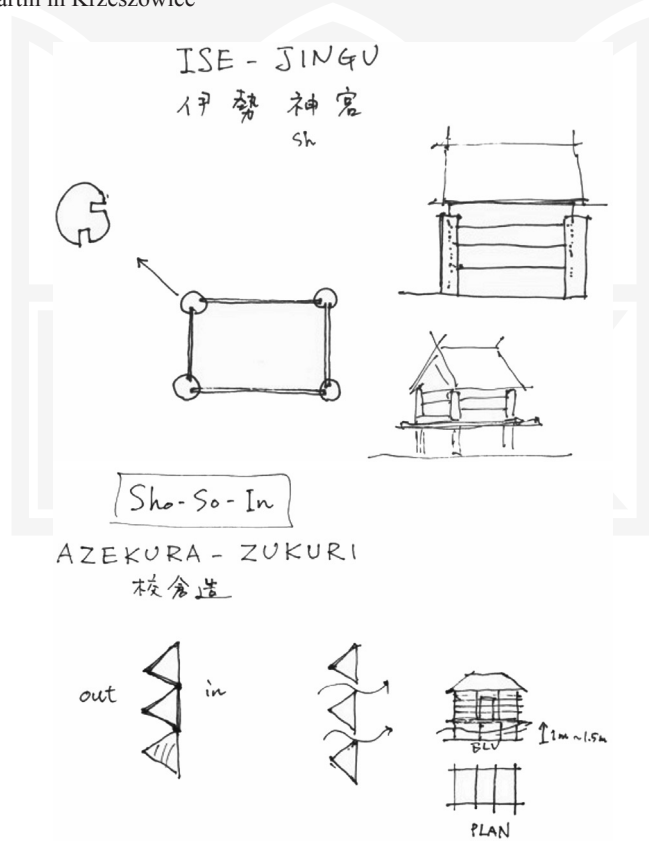
A prominent Japanese professor Akio Hizume of Ryukoku University in Japan gave lectures and workshops for students of architecture in January 2015 at Cracow University of Technology, Faculty of Architecture. In his research on structures and solutions of spatial structures he used the latest computer techniques. And yet (or perhaps because of this) professor frequently stressed the need to use freehand drawing and not to separate science from art during various lectures. In his opinion, both of these areas are in fact the same humanistic forms of creativity. Even when explaining complex issues buildings’ durability in seismic areas, he used sophisticated, great, freehand sketches (III. 4–5).

At the same time, he pointed out that individual drawing is highly valued in the teaching process in Japan and that it is combined with manual workshops for the designed architectural visions.

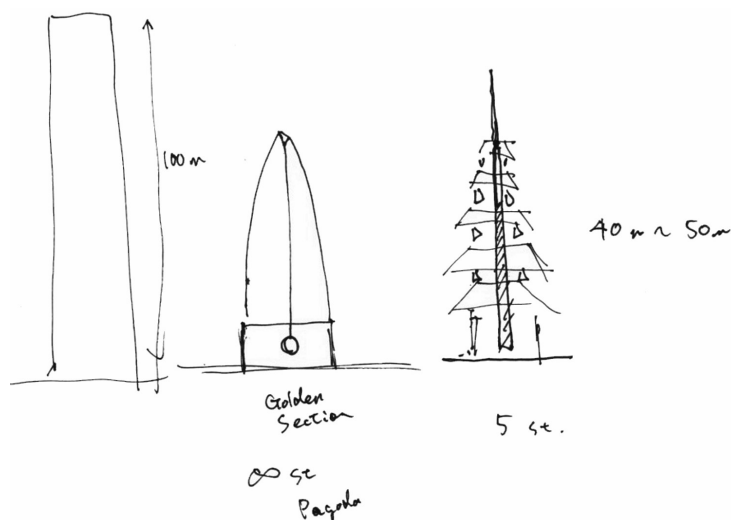
Considering the work of outstanding creators of architecture – from the earliest times to the present day – one can draw the conclusion that the showcase of their creative mastery were and still are *inter alia*, excellent drawings showing their talents and personality.



III. 3. Inventory sketches phase and final drawing of the part of inventory in the parish church of St. Martin in Krzeszowice



III. 4. Professor Akio Hizume's sketches, explaining the structures of historic houses in Japan



III. 5. Professor Akio Hizume's sketches, explaining the principle of statics of historic buildings in seismic areas in Japan

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