The evolution of illustration methods in the process of teaching design

Maria J. Żychowska & Anna Barańska

Cracow University of Technology
Kraków, Poland

ABSTRACT: The goal of this article is to outline the scale of changes in the methods of illustration in the teaching of architecture students over the years. Particularly noteworthy are qualitative changes that have occurred in the teaching of freehand drawing. They are all the more visible because they are broadened by students' ability to select and assess quantitative and qualitative learning. The freedom to choose courses and the affirmation of contemporary graphical means often encourages a preference for fashionable imaging techniques, often coupled with the abandonment of the opportunity to master earlier working techniques. In fact, such assessments are most often not an accurate interpretation of the current state and the ways of illustrating the design process. This is because the methods of working in imaging the proposed architecture and its presentation are highly diverse and dependent on the client's preferences. Manual drawing techniques and traditionally constructed models do not lose their significance.

INTRODUCTION

Until recently, architectural design documents consisted of a set of drawings that featured information about the future building, and were often accompanied by a physical model. At present, this representation is being replaced with a three-dimensional digital model that includes all kinds of information about the designer's intent, and similarly, physical models have been replaced by digital renderings. This form of communication represents the future work and is a contemporary model of the architectural record. However, using the digital medium, the engineering graphics becomes encoded and can be read by professionals.

There is also the possibility that such a visual message can be merely an interpretation of the design idea to a stakeholder and will not always be identical to what the architect intends. In this context, the ability to produce high-quality images of architecture that are veritable, convincing and visually appealing, is a highly desired and relevant skill. Meanwhile, the task of teachers is to include various methods of illustrating the design process with the use of digital media, drawing and traditional modelling in the curriculum.

THE FIRST REPRESENTATIONS OF ARCHITECTURE

The history of the origins of architectural graphics and its use in didactics can be traced back to the Accademia di San Luca (Academy of St. Luke) in Rome, founded in 1577, where, from the beginning, drawing was the primary means of expression. Key views on drawing with reference to the architect's work skills were presented by Federico Zuccari. He introduced the terms: internal drawing, which was a type of idea-concept and the external drawing, which was the graphical representation of this idea [1].

The role of drawing in the architect's skillset was particularly emphasised by Giovanni Bottari. His views had a significant influence on the formation of academic teaching at the Academy of St. Luke in Rome. Bottari believed that an architect should master drawing to such an extent that they

> *...should be able to express painting and sculpture. Whoever has mastered this type [of drawing] well can call themselves an architect. (...) It is certain that making many drawings and reaching perfection in them, makes a person subtle and most inventive, which cannot be avoided, just as the one who walks in the sun cannot avoid a tan. (...) A good draughtsman (...) will do a better job of planning the flats, staircases, workshops, courtyards and other parts of the palace than others* [2].

Over time, the Academia became a model for architectural education in Europe. Considering the applied didactic principles from the 17th century up to the present day, one can conclude that drawing has always been given special significance (Figure 1).
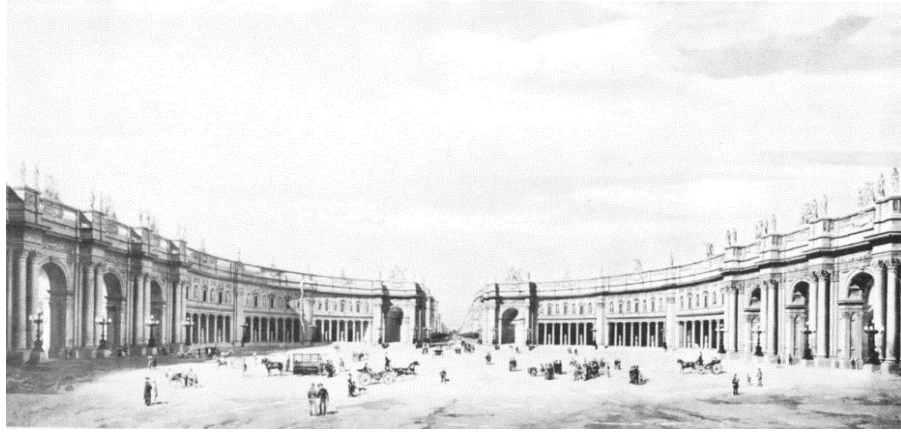
Figure 1: G. Montiroli, Perspective view of the pizza to the entrance of via Nazionale (no. kat. 2364). Reproduced from A. Białkiewicz [1].

Afterwards, for many decades, both in architecture schools and art academies, manual drawing was an essential form of teaching until the late 1990s, when opportunities were created to work in a digital environment.

THE DRAWING AS A DOCUMENT

It must also be noted that the drawing is also valuable as a timeless messaging tool for use between inventors, engineers and architects. Such a record of ideas, despite the apparent impermanence of the paper, remains clear and comprehensible; it is a universal document in which the synthetic graphics of hand-drawn lines are legible in any era.

One excellent example of this are Leonardo da Vinci's drawings of a single-span bridge with a span of 240 m, made in 1502 for Sultan Bayazet II as a proposal for a crossing over the Golden Horn in Istanbul, at the mouth of the Bosphorus. After 494 years, Norwegian painter Sand Vebjørn saw the drawings in 1996. This synthetic message inspired such interest in him that it resulted in a re-reading of the idea and the construction of a contemporary replica of the project. And so, in 2001, a footbridge was open, which became the sole engineering work by Leonardo to be built, alas over the E18 motorway that connects Oslo and Stockholm, in the township of Ås in Norway [3].

The Norwegian project was fitting of the period of Leonardo's visionary design and entered history as a special cultural creation that combines Renaissance versatility and ingenuity with contemporary technical potentials, and most importantly, the timeless idea contained in the hand-drawn sketch.

THE DRAWING AS A WORK OF ART

The principles of teaching, using and treating freehand drawing as the primary medium for communicating architecture were similar up to the 1980s. But, the first and special expression of the appreciation of drawing was the creation of the Howard and Charles Gilman Foundation collection. Creating a collection of contemporary art for the New York company seat at the Time-Life Building became its statutory goal. The collection included visionary architectural drawings of mainly unbuilt buildings that had been created up to 1976. In 1980, it was almost entirely completed thanks to the efforts of its founder, art historian Pierre Apraxine, who selected drawings that were suitable and had a distinct expressive force [4].

The drawings, mostly hand-drawn, contained visionary perspectives and proposals for, among other things, megastructures supported by the changes in engineering and technology of the time and, above all, expressed the need for transformation in architecture, so characteristic of early Postmodernism. Most of the proposals expressed attempts to make architecture more individually unique, to attribute poetic, memory-like features to it, which referenced past periods. Today, these drawings appear as unique documents of the times in which they were created, celebrating the well-known names of great architects, while at the same time elevating the importance of sketches of future architecture to the status of works of art worthy of preservation and exhibition.

It is worth emphasising that, at the time these works were created, drawings were treated solely as illustrations of certain ideas and intentions and with little attention paid to their intrinsic artistic qualities. There have been times when architects, such as Peter Cook and Aldo Rossi have had difficulty even locating their sketches, let alone the idea of collecting them. By contrast, James Stirling or Robert Venturi *always* collected their works in their own personal collections [5].

IMAGES OF ARCHITECTURE

It has always been known that architects do not create architecture, but merely a vision of it, and that its image is presented on paper either in the form of a drawing or a visual art piece produced using any technique. Designers create

visions of the future and shape ideas about non-existent buildings. Such an image carries messages and values, and the more it corresponds to the client's needs, the more effective and clear is its record by its author.

This begets the question of the role and significance of changes in illustrating the design process. At present, in a period of overwhelming competitiveness in every activity in public life, there is the matter of the quality of images that present architecture-to-be. In addition, available techniques and technologies allow the creation of convincing illusions, ones that are not always buildable. Thus, methods of presenting designs and producing images of architecture have become the subject of studies by many architects [6][7].

The impact on the production of images that reach potential clients can be an element of marketing plans. With the appearance of additional and often improved digital visualisation tools, creating increasingly effective graphical messages became the subject of research. Methods of producing such illustrations include both choosing the proper tools and profiling the message. Determining factors include the requirements of clients and future users of a project. For instance, visualisations of housing developments feature preferential profiling for potential residents, whether young couples with children or seniors.

Images intended for presentation as architectural competition entries are extraordinarily unique in character and use. Competition guidelines usually define how to visualise ideas, including imposing limits on the number of presentation boards. Such rigors determine potential exposition and necessitate a synthetic and effective graphical visualisation of design proposals. In this case, the type of idea record, the quality and clarity of illustration and its readability can pave the way to success.

Nowadays, the image of architecture as a vehicle for a specific idea can be presented using various digital and manual tools. In architecture schools, thesis project supervisors decide how the messaging is produced, while it is the direct target audience of the message that actually defines the choice of the correct visual language and quality of this message, which carries over to aesthetic qualities. This is why preparing students to create the most diverse scope of architectural representations possible is included in the curriculum of final semesters of architecture programmes.

TEACHING

One of the aims of teaching in the Chair of Drawing, Painting and Sculpture in the Faculty of Architecture at Cracow University of Technology, Kraków, Poland, was to develop spatial imagination, while facilitating gaining experience in the conscious and objective perception of spatial phenomena, both existing and those in the realm of design, with the possibility of recording them. The history of the current Chair of Drawing, Painting and Sculpture must be derived from the individual artists and figures who have worked there. There has always been an unwritten rule of continuity, which creates curriculum continuity while testifying to the traditions of the university [8].

In the late 1990s, opportunities were created to work in a digital environment. Over time, the fascination with the potential and possibilities of new techniques made the teaching of freehand drawing in its previous form unfashionable and unnecessary. Meanwhile, digital techniques became an expected and essentially necessary element in teaching at architecture schools.

COMPUTER LABORATORY

As a result of these expectations, the curriculum for architecture students was also modified. For example, as a part of the first-cycle programme, during semester 3, academic year 2023/2024, the course Integrated Architectural Presentation Tools was enhanced with contemporary digital methods that allow students to employ digital graphics to tasks previously done using solely freehand drawing. This created an opportunity to choose the same class at a computer laboratory to continue an already completed task, but this time with the use of a computer and Adobe Photoshop, Inkscape and SketchUp software (Figure 2 and Figure 3, next page).

During semester 3 (academic year 2023/24, first-cycle programme), 253 students took the course (248 full-time and five part-time). Out of this number of students, only 148 students voluntarily took the opportunity to work digitally or just 58%. In the English-language group, even fewer students were interested in the computer laboratory. During semester 3 of year 2 (academic year 2023/24, first-cycle programme) in a combined group with Erasmus students (22 English + 11 Erasmus), a total of 33 students passed the semester. Of the English-language group, nine students participated in the computer laboratory, i.e. only 40.9% took part in the proposed course. Erasmus students were not interested in the course, not a single Erasmus student participated in the exercises.

In conclusion, there is surprisingly little interest in computer graphics and the opportunities to learn it effectively. In the Polish group, only more than half of the group attempted the project. In the English-language group, even fewer students showed an interest in the computer laboratory. Additionally, the skills of students are an important aspect. Only a small number of students have the relevant knowledge, and most only engage in learning because their potential is low. The fascination with computers as sources of entertainment does not coincide with the ability to use them as a working tool. Therefore, opening up additional opportunities to enhance knowledge with up-to-date illustration methods is certainly a much-needed direction.

Figure 2: Drawings: sketches of an exhibition site (l), open-air exhibition of the Igor Mitoraj sculpture (r) (author: Z. Wilk, student, semester 3).

Figure 3: Digital view of the exhibition (author: Z. Wilk, student, semester 3).

In addition, it should be noted that students who relied on good drawings that they had made earlier also achieved better results in digital graphics. So, it turned out that reinterpreting a better work that has been done manually results in an equally better solution in digital techniques.

One can therefore argue that a good visual artist is also a better digital artist and designer, with a better sense of space, proportions, with more interesting composition proposals and presentations of ideas (Figure 4).
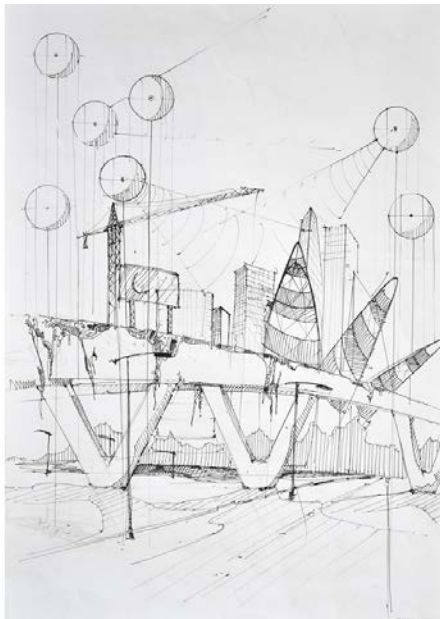

Figure 4. During the Integrated Architectural Presentation Tools course, students employ digital graphics to tasks previously done using solely freehand drawing (author: O. Walczak, student).

IMAGING ARCHITECTURE

Another proposal for the use of computer technology in the learning process is the course on illustrating the design process. It is scheduled for the final semesters and, as intended by its designers, should be an effective support for thesis project authors in terms of graphically presenting their designs. Therefore, opportunities have been created to improve expression in traditional illustration techniques, such as freehand drawing and modelling, as well as digital techniques.

To this end, the students were divided into three groups, each set to work on an analogous project using three techniques: first they prepared a drawing, then they made a model, and then they worked on computers. One of the tasks was to express the ideas of own project using three words and present them in three sketches. Based on the best of them, a digital poster proposal was created and then a cardboard model using the *cut & fold* technique, which, when photographed, also constituted one of the illustrations of the given problem.

As a result, each course participant had three solutions to the same visual project. The opportunity to choose and compare graphic techniques, to test one's own abilities and potential for expression, seems to be an important aspect concerning the quality of preparing one's actual design. Experience shows that there is more interest in the subject and its information potential among Master's students than among Bachelor's students (Figure 5).
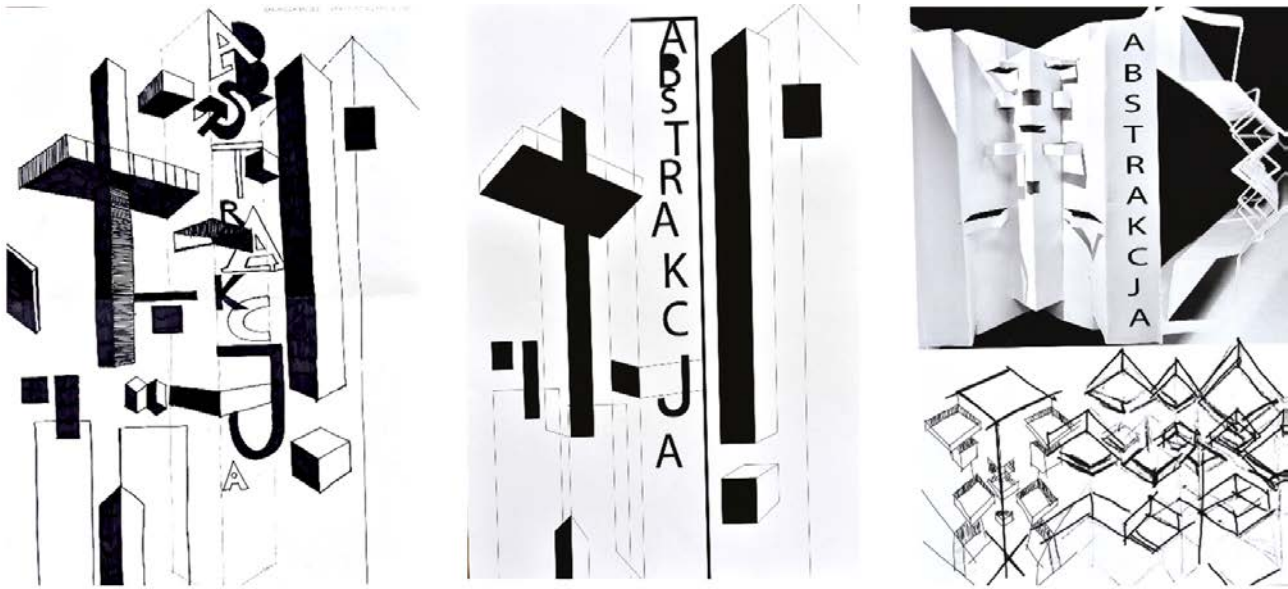

Figure 5: In the Illustrating the Design Process course, each participant had three solutions to the same visual project. From l-r: poster, digital poster, spatial poster using the *cut & fold* technique (author: A. Byczek, student).

Concerning the course, the laboratory and software standard is worth noting. With high numbers of students, the tutors noted an important aspect of their teaching. They found that students often had computers that hindered their progress, and that software should be accessible off-campus, so that course tasks could be worked on outside of class hours. This is why it was decided to use software that is available free of charge, so that every student could have equal access to it, and the quality of their work would not be hindered by having to pay for software licences.

Access to generative AI software was also an important aspect of the computer classes. Such software allows one to explore fascinating potential of artistic expression, in which creativity is stimulated by integrating artificial intelligence. It appears that fusing one's own artistic ingenuity and AI enhances design and creative potential. This AI-powered bolstering of creativity can lead to unique formal results, while also allowing students to explore innovation in architecture. The course presented employed Stable Diffusion.

CONCLUSIONS

The scale of the transformation that is taking place in the curricula for architecture students is significant and substantial. They mainly concern design assisted by emerging programmes, such as the New European Bauhaus (NEB) [9]. There are also new tools for executing design tasks. Therefore, creating the opportunity to work in a modern digital environment is an educational necessity, an offer that is expected, and all the more so as the skills of students are poor in this area. As highlighted earlier, the fascination with computers as sources of entertainment does not coincide with the ability to use them as a working tool. Creating opportunities to enhance one's knowledge with up-to-date illustration methods should most certainly be implemented.

Nevertheless, it can be said that architecture cannot exist without imagery and sketching, be it a simple drawing or an impressive digital study, it is the language of architecture that is indispensable. Each architect uses drawing as a means of creating space. It is a significant and very distinctive means in their work.

At the same time, as freehand drawing is now considered redundant in many architecture schools and CAD software has become a common tool, the Museum of Architectural Drawing run by the Sergei Tchoban Foundation was established in 2009 [10]. Its aim is to encourage and support young architects and to exhibit images of hand-drawn architecture, primarily by presenting to the general public a collection of architectural drawings by some of the most outstanding contemporary artists. The drawings are treated as a distinct genre of art that is an expression of creative design, always requiring thought and a skilled hand. It is created by lines in a specific shape and form to eventually become architecture. This is how a place was created where architectural drawing contributed to establishing an extensive forum for dialogue with the exciting world of architects and architecture.

In the context of the commentary above, an observer of drawing, visual arts, painting and sculpture courses at a school of architecture may ask *and so what?* The answer is not simple, as both traditional paintings and digital art are accepted,

and measures to introduce innovative illustration methods, including AI, are taken in with interest. Artistically excellent presentations are created alongside each other, whose production technique mostly depends on the wishes of the author. The main priority is that the illustration should correspond to the proposed architecture, so that it communicates the essence of its designer's idea. Overall, it is a creative work, a vision of a future building, its interpretation visualised in images and its implementation.

In reality, these three elements are rarely identical, but pursuing perfection in visualising designs and the architect's idea has been practiced ever since the Academy of St. Luke and continues to be practiced today. For instance, in architectural competition submissions or in areas where various ideas and designs included in synthetic images are confronted with each other, one can see a formal evolution of illustrating the design process.

It is clear that every period prefers a different means of imaging architecture, but it is always, and most importantly, understandable to professionals. However, in the present, it appears that extraordinarily diverse presentation methods are accepted, as the perfectly executed hand-drawn images collected and presented at the Museum of Architectural Drawing in Berlin are equally admired, as are physical models preferred by Chinese sponsors of European projects, while the limitless use of the potential offered by artificial intelligence exists alongside them. In this context, the programmatic preparation of future architects for perceiving all manners of complexities that may appear during the choice of illustrating the design process is justified.

REFERENCES

1. Białkiewicz, A., Academy of St. Luke in Rome as a symbol of architectural schools. *Czasopismo Techniczne. Architektura*, 111, **9-A**, 25-40 (2014) (in Polish).
2. Marconi, P., Cipriani, A. and Valeriani, E., I disegni di architettura dell'Archivo storico dell'Accademia di San Luca, Roma (1974) (in Italian), quoted after: Białkiewicz, A., Education of architects: historical and contemporary aspects of teaching freehand drawing. *World Trans. on Engng. and Technol. Educ.,*17, **1**, 17-22 (2019).
3. Hall, P., Leonardo, if You Could Only Have Lived to See This Day. *The New York Times*; Nov. 8 (2001), 13 April 2024, https://www.nytimes.com/2001/11/08/garden/currents-scandinavia-architecture-leonardo-if-you-could-only-have-lived-see-this.html,
4. Żychowska, M. and Białkiewicz, A., Architecture and its language. History and modernity. *Proc. Contemporary Discussions and Design Methodologies in Architecture. ARCHDESIGN '14,* Istanbul, Turkey, 309-317 (2014).
5. The Changing of the Avant-Garde. New York, USA: The Museum of Modern Art (2002).
6. Slyk, J., *Źródła Architektury Informacyjnej.* Warszawa, Poland: Oficyna Politechniki Warszawskiej (2012) (in Polish).
7. Koszewski, K., *Obrazy Architektury. Reprezentacja Idei Architektonicznej w Kontekście Współczesnej Kultury Wizualnej.* Warszawa, Poland: Oficyna Politechniki Warszawskiej (2019) (in Polish).
8. Białkiewicz, A., *Rola Rysunku w Warsztacie Architekta, Szkoła Krakowska w Kontekście Dokonań Wybranych Uczelni Europejskich i Polskich.* Kraków, Poland: Wydawnictwo Politechniki Krakowskiej (2004) (in Polish).
9. Taraszkiewicz, A. and Taraszkiewicz. K., Ideas of the New European Bauhaus (NEB) in architectural education. *World Trans. on Engng. and Technol. Educ.*, 22, **1**, 12-17 (2024).
10. Tchoban, S., The art of architectural drawing. *Proc. II Inter. Conf. from the cycle Teaching Drawing, Painting and Sculpture in Architectural Educ. Challenges of the 21st century: to Draw, to Paint or to Use a Computer*, Kraków, Poland: Wydawnictwo Politechniki Krakowskiej (2015).