DOI: 10.23817/2026.defarch.4-6

MARCIN GŁUCHOWSKI
ORCID: 0000-0002-8959-5375
PK Krakow University of Technology, Poland

ON THE NEED AND SIGNIFICANCE OF FREEHAND DRAWING AND PHYSICAL MODEL IN THE AGE OF DIGITALISATION OF THE PROCESS OF DESIGNING AND TEACHING ARCHITECTURE

O POTRZEBIE I ZNACZENIU RYSUNKU ODRĘCZNEGO I MAKIETY FIZYCZNEJ W DOBIE CYFRYZACJI PROCESU PROJEKTOWANIA I NAUCZANIA ARCHITEKTURY

Abstract

The subject of this research is the issue of the need for and significance of freehand drawing and the physical model in relation to the contemporary problem of digitalisation. The aim of the research is to demonstrate that, in the context of a multisensory experience of architecture, the use of these manual techniques is now more necessary than ever before. The research methods include an analysis of the relevant literature and interviews with architects, the researcher's own design experiences, and an analysis of how digital methods work. The findings and results of the research confirm the stated goal, demonstrating the exceptional importance of the multisensory experience of architecture in the age of digitalisation, as essential to the architectural creation and education.

Keywords: *digitisation, experience of architecture, freehand drawing, physical model*

Streszczenie

Tematem badań jest odnoszące się do współczesnego problemu cyfryzacji zagadnienie potrzeby i znaczenia rysunku odręcznego i makiety fizycznej. Badanie ma na celu wykazać, iż współcześnie bardziej potrzebne niż kiedyś jest stosowanie tych manualnych technik w kontekście wielozmysłowego doświadczania architektury. Metody badawcze to analiza literatury przedmiotu i wywiadów z architektami, własne doświadczenia projektowe oraz analiza sposobu działania metod cyfrowych. Rezultaty badania potwierdziły założony cel, stanowiąc tym samym o wyjątkowo dużym znaczeniu wielozmysłowego doświadczania architektury w dobie cyfryzacji procesów jako istocie w tworzeniu i nauczaniu architektury.

Słowa kluczowe: *cyfryzacja, doświadczanie architektury, makieta fizyczna, rysunek odręczny*

1. INTRODUCTION

The fact that freehand drawing and the physical model are extremely important to architecture has long been known. Today, as digitisation becomes increasingly integrated into the

design process and architectural education, the freehand expression of ideas becomes all the more necessary and significant. The dominance or exclusive use of digital tools limits the ability to experience architecture even at the stage of its creation; thus, during its subsequent use, it becomes difficult to generate emotion, and the object loses its cognitive depth. The same problem also applies to the teaching of architecture, where, without the use of the methods discussed here, we are unable to adequately prepare students for their future work as architects.

The proportion of freehand drawing and the physical model in the overall design process is constantly shifting toward a decline. We are now at a point where, by entering appropriate instructions in the form of prompts, an artificial intelligence algorithm is capable of generating proposed design solutions. Of course, this is not a complete conceptual design, just loose suggestions for the building's appearance. The problem is that, as designers, we can now go through the entire design process without making any creative contributions. Of course, project documentation requires many aspects of an architect's work, such as preparing detailed drawings, ensuring the project complies with building regulations, consulting and incorporating feedback from the client and industry designers, and navigating the formal process with government agencies. However, by using the latest digital tools, we may no longer contribute to the project, or we may significantly limit our participation in shaping architecture as an art form.

The aim of the research is to demonstrate that, today more than ever, the use of manual techniques, namely freehand drawing and the physical model, is essential in the context of the multisensory experience of architecture. The research methods include an analysis of the relevant literature and interviews with architects, the researcher's own design experience, and an analysis of how digital methods operate.

2. ON EXPERIENCING ARCHITECTURE – TODAY

The experience of architecture concerns all its users and observers, including architects and students, for whom it is doubly relevant, as it relates to both the design process and their studies. The word *experience* itself has several meanings. According to the Dictionary of the Polish Language, we can say that it refers, amongst other things, to "the body of knowledge acquired through observation and personal experience;", "the induction or reproduction of a phenomenon under artificial conditions;", or, ultimately, "the totality of the process of perceiving reality or the sum of perceived facts; an epistemological category; Inner experience a. rational, intellectual, mental. External experience a. sensual."[1] The final part of the definition leads us directly to a meaning relating to architecture. The term is understood here in the sense of experiencing something; it is a cognitive engagement with a given object that is more than merely seeing, looking at or gazing at something. It is a real sensation, both external and internal, a participation in a process or in a matter.

Experiencing architecture is an engagement with art and within art itself, which takes place not only visually but also through the use of other senses. Juhani Pallasmaa explains this in his book, writing that "Architectural works are not experienced as a collection of

[1] *Doświadczenie*, [in:] M. Szymczak (ed.), *Słownik Języka Polskiego,* t. 1, *A-K*, Państwowe Wydawnictwo Naukowe, Warszawa 1983, p. 440.

isolated visual images, but through the fully bodily, material and spiritual presence of the work. An architectural work encompasses both physical and mental structures."[2] We read on:

> The authenticity of the architectural experience is rooted in the tectonics of the building's language and in the comprehensibility of the act of building to the senses. We perceive, touch, listen to and measure the world through the full extent of our physical being, and the world of our experience is organised and expressed around a centre defined by our body.[3]

We also know that the way we experience things depends on a person's level of perception, which stems primarily from their skills, level of knowledge and habits acquired throughout their life. Time also influences the way we experience architecture. We experience a given architectural feature differently depending on whether we are a child or an adult. Architecture also has a different effect on people depending on the time at which we experience it. Architecture also goes through certain phases, one might say that it becomes more mature over time.

Designing architecture that engages both the designer and the future user on a multisensory level requires not only hard work and a keen design sensibility, but also the wealth of knowledge and skills that the architect possesses at that moment. For Peter Zumthor, it looks like this:

> When I focus my attention on a specific place where I am to design something, when I try to explore that place, to grasp its form, its history and its sensory qualities, then images of other places soon begin to enter this process of close observation – images of places I know, which once made an impression on me, images of ordinary or extraordinary places, whose form I carry within me as a model for certain moods and qualities; and also images of places or architectural situations drawn from the worlds of the visual arts, film, literature and theatre.[4]

To experience architecture, we need two specific elements: architecture that we can experience and the ability to experience it. Let's start with architecture, which, unfortunately, is increasingly being created solely as a commercial product, designed only to catch the viewer's attention. It is created quickly, without much reflection, and without the creative process typical of a work of art. New supporting tools are constantly being developed to streamline the design process, which is, of course, inherently beneficial. However, at a certain point, when these tools ceased to be merely about streamlining the design process and began to supplant the architect's decisions regarding the appearance of the proposed structure at the conceptual stage, a process began in which there was a loss of complete control over the concept and the multisensory experience of architecture within the creative process. Artificial intelligence has increasingly become an integral partner for the architect in the creative process. And it is not, as some architects claim, merely a consultant with whom one can consult while designing, but is now being used to generate architectural concepts. The role of the human being is, of course, still very important; however, there is no question here of the architect experiencing the work during the design stage, and consequently, of the user experiencing it afterwards. Exploring the structure of a building while designing its form allows us to control the multisensory nature of the structure. We work with form and void, which influence, amongst other

[2] J. Pallasmaa, *Oczy skóry: Architektura i zmysły*, Instytut Architektury, Kraków 2022, p. 54.
[3] *Ibidem*, p. 76.
[4] P. Zumthor, *Myślenie architekturą*, Karakter, Kraków 2010, p. 41.

things, sound and silence. We plan the size and layout of the windows, already sensing the temperature of the future interiors at this stage. The way light is channelled through the space establishes a hierarchy of importance amongst the various architectural elements. The building's location in a specific spot on the plot, alongside particular plants, creates the intended scents and ensures the right airflow. The textures of the walls appeal to the sense of touch. All these creative assumptions form a single, coherent narrative, dependent on the architect. They create a place. The countless combinations of individual parameters and the countless revisions to these principles constitute the architect's creative process. Artificial intelligence algorithms disrupt the purity of such a process; moreover, the results of their work are, to a certain extent, merely modifications of publicly available materials.

Just as the upbringing of a young child should take place without access to addictive digital devices and social media, so too should the process of teaching students be free from the influence of algorithms that steer work and learning in a random direction that is, to some extent, independent of the student and the lecturer. In both cases, the overuse of the elements mentioned above leads to significant limitations in young children's ability to learn about the world and in students' understanding of architecture. This may prevent the development of the necessary sensory sensitivity, the lack of which will, in the future, hinder them from making appropriate choices and decisions, or may also hinder creative thinking. If, from the very outset of the teaching process, we rely on various forms of support, or even outright substitution, for creative thinking amongst students, this will stifle their courage and willingness to engage in independent and creative work. By relying on the suggestions of algorithms, they will rely primarily on public opinion, that is, on online content that is popular and trendy. It goes without saying that both architects and architecture students need to draw inspiration, explore and gain experience; this shapes them and forms the basis for their future design ideas. The difference, however, is that inspiration drawn from high-quality content stimulates creativity, whereas the use of algorithms that suggest ready-made conceptual solutions narrows one's intellectual horizons and is merely imitative.

The above considerations are very well complemented by Walter Gropius's words: "Good architecture should be a reflection of life itself, which requires a thorough understanding of biological, social, technical and artistic issues."[5] The author of the book *The Fullness of Architecture* highlights the areas in which architects must continually develop their knowledge and skills. Only then will we truly be able to speak of a multisensory experience of architecture, both in terms of design and teaching.

3. FREEHAND DRAWING AND PHYSICAL MODEL

A designer's work consists primarily of channelling their skills, intuition, knowledge, experience, memory, sensitivity, and history into a project as part of the process of achieving the goal of designing architecture. It is a process of interpreting past experiences. It is also an original approach to the problem. As in many other fields of art or craft, the outcome of work in architecture depends to a large extent on the use of the appropriate tools. The issue of negatively affecting architecture through design solely using only computer programmes, raised in the first chapter of this work, was previously discussed by Juhani Pallasmaa. Significantly,

[5] W. Gropius, *Pełnia architektury*, Wydawnictwo Karakter, Kraków 2014, p. 23.

the author included this idea in a book written at a time when most people did not believe that such a thing as artificial intelligence could ever exist. It states that "Designs created entirely on a computer may exude a deceptive, superficial charm, but in reality they exist in a world where the observer has no skin, no hands or body. The designer remains outside their own design and body."[6] Now, 17 years on from the publication of the book *The Thinking Hand: Existential and Embodied Wisdom in Architecture,* the digitisation of the design process has reached a completely different level. We can certainly say that, nowadays, the creative input of a human being is no longer required to complete a design project. An AI algorithm can present us with all conceptual proposals, whether minor or major, and the designer simply selects one of the suggested approaches and continues with the project. Should we reach a point during the design process where another conceptual decision needs to be made, we can once again request assistance from the AI. And when an investor asks for a particular element of the project to be redesigned, AI will do that too. Some might say that this is a possibility. Analysing the changing laws governing the economy, we can assume that, unfortunately, one day this will no longer be a matter of choice but of necessity, dictated perhaps not always by the architect's decision but by economic conditions. In today's world, all professions are required to optimise costs, which can be achieved primarily by increasing the pace of work, and this is happening thanks to the increasing digitisation of the design process.

Incorporating the architect's personal ideas into the design process ensures that architecture is created as an art form, not just a service. This gives us real influence and control over the work. One might wonder whether freehand drawing and the physical model are really the only means necessary to fulfil this condition. It can be agreed that drawing using simple tools in computer programmes still allows an architect's ideas to be translated into a design, and this is indeed the case. However, it should be emphasised here that, firstly, sketching and modelling during the key phases of a project are always far more beneficial to architecture than a design produced entirely using computer tools, even simple ones. This enables us to significantly shorten the path from the conception of an idea to its recording, thereby minimising distortions as much as possible. Secondly, we now live in a world of extensive digitalisation, so the use of manual tools at key stages of the design process and in the teaching of architecture should already be a necessity. This is the final path to the multisensory experience of architecture described by Juhani Pallasmaa.

In architecture, the architect's intuition is of paramount importance. Intuition is the result of a subconscious and ongoing analysis of a range of data, both current and historical, and the synthesis and application of this data to the task at hand. The creative process in architecture involves making decisions based on intuition, which acts as a catalyst in this context. That is why freehand drawing and the physical model are an excellent way of giving tangible form to intuition during the architectural design process. The circumstances in which a drawing is created, or the material from which a model is made, are also extremely important. Time, experience and the time of day at which we work all matter. Another aspect is the level of detail, that is, the precision of the drawing and the model. The level of detail influences the further development of the architectural concept. We have the grand drawings of great architects. At first glance, one might think that most of them are unfinished works. But nothing could be further from the truth: the recording of thoughts and ideas, as we can see, depends

[6] J. Pallasmaa, *Myśląca dłoń. Egzystencjalna i ucieleśniona mądrość w architekturze*, Instytut Architektury, Kraków 2015, p. 107.

on many factors, and above all on the intuition and working methods of the individual architect. The imprecision of a freehand drawing or a physical model is not a problem, but rather an advantage in the design process. A freehand drawing and a physical model are not always the final stage of a concept presentation, but often serve as a catalyst for concepts, ideas, or even the first step on the path to discovering architecture. This is something that AI-assisted conceptual design cannot provide. This manual catalyst generates various paths and directions depending on a wide range of parameters.

Architecture is a continuous process. It involves constantly honing skills and striving for perfection in every project. The results produced by digital tools, particularly AI algorithms, look like finished images. Intervening in these graphics is not a natural process. However, with freehand drawing and the physical model, at every stage of the work we are dealing with raw material that can and should be modified at any time. This process is a defining feature unique to the tools discussed here.

4. CONCLUSION

> Of course, human needs tools and instruments – as many and as perfect as possible. However they remain merely an aid: they expand the scope of perception and action of the human senses, thereby helping them to see further and more clearly, to hear better, to interact, to grasp and to control. The boundaries within which human can experience direct, vivid sensations remain intact.[7]

Referring to the words of Romano Guardini, written almost 100 years ago in his book *Letters from Lake Como*, it can be said that this boundary has now been crossed. Tools have been developed which, when used in an architect's work, prevent people from experiencing architecture through multiple senses.

To summarise the research carried out as part of this article and its findings, the following conclusions can be drawn:

1. Architecture is an art form. For it to be art, there must be an artist; for there to be an artist, there must be personal, unique elements in the work they create.
2. The sophistication of the digital tools used in the design process has reached a point where the creative element no longer needs to be the sole preserve of humans, as artificial intelligence algorithms can generate ready-made proposals for conceptual solutions.
3. By using freehand drawing and the physical model while working on architecture, we have greater agency and control over the work in progress, particularly with regard to its essence. By using manual tools when creating architecture, it is easier for us to maintain clarity in our design decisions.
4. Nowadays, construction is generally expected to be cheap and quick, and the design is also expected to be cheap and quick. Sometimes it is simply meant to stand out. Architecture often becomes a competition for clients and for the number of conceptual proposals; unfortunately, all this will force the use of artificial intelligence to an ever-greater extent, even if the architect does not want to do so.

[7] R. Guardini, *Listy znad jeziora Como*, Narodowy Instytut Architektury i Urbanistyki, Warszawa 2021, p. 70.

5. In the case of contemporary projects involving large-scale spatial concepts, where the use of sophisticated digital tools is, to a certain extent, essential, we often observe a tendency to over-complicate the form, the façade or the detailing. One sometimes gets the impression that this is done solely to demonstrate the possibilities offered by digital tools.
6. The reliance of architectural design and teaching on advanced digital tools, particularly artificial intelligence algorithms, points to a threat to the future of architecture as an art form, through the erosion of a creative approach to design. And the absence of art imbued with profound human values could mark the beginning of the end of our civilisation.
7. Freehand drawing and the physical model are manual tools in the architect's hands; in this age of digitalisation, their use during the key stages of a project's development constitutes the sole and indispensable bridge between the mind and the design. They enable a multisensory experience of architecture. This provides real influence and control over the work during the creative process, thereby ensuring that authorship remains with the architect.
8. The use of advanced artificial intelligence algorithms in the teaching of architecture, without the concurrent use of freehand drawing and the physical model, effectively bars students from acquiring architectural design skills. Given that there is no turning back from the use of AI tools, it is absolutely essential to continue using freehand drawings and physical models in architectural design and teaching.

References

[1] *Doświadczenie*, [in:] Szymczak M. (ed.), *Słownik Języka Polskiego, Tom Pierwszy A-K*, Państwowe Wydawnictwo Naukowe, Warszawa 1983.
[2] Gropius W., *Pełnia architektury*, Wydawnictwo Karakter, Kraków 2014.
[3] Guardini R., *Listy znad jeziora Como*, Narodowy Instytut Architektury i Urbanistyki, Warszawa 2021.
[4] Pallasmaa J., *Myśląca dłoń. Egzystencjalna i ucieleśniona mądrość w architekturze*, Instytut Architektury, Kraków 2015.
[5] Pallasmaa J., *Oczy skóry: Architektura i zmysły*, Instytut Architektury, Kraków 2022.
[6] Zumthor P., *Myślenie architekturą*, Karakter, Kraków 2010.

Author's Note

Marcin Gluchowski, PhD, Architect

Assistant Professor at the Department of Architectural Design, Faculty of Architecture, PK Krakow University of Technology; Member of the Chamber of Architects of the Republic of Poland; Member of the Association of Polish Architects; Partner, CEO, and architect at GŁUCHOWSKI STUDIO sp. z o.o. architectural studio.

marcin.gluchowski@pk.edu.pl