dsignn

scientific magazine on graphic
design and new media

#Typography #Accessibility #3Dprinting
#NeurocognitiveScience #InclusiveDesign

WIT ACADEMY

Massive Action Exclusively

Dear readers.

In today's world, where the conveyance of information is based on interactions and the level of complexity constantly increases, the role of the designer becomes crucial in creating effective communication and building relationships with users. In this issue, we have gathered articles on various aspects of the fascinating realm that combines science with design. These works are filled with reflections and questions concerning social changes and the practical aspects of information design and typography. We believe that the material gathered in this issue constitutes a valuable source of knowledge.

We invite you to contemplate the essence of design, examining how global authorities Bruce Mau and Bisi Williams create the vision of MASSIVE ACTION, inspiring an approach to designing on a massive scale. Their article offers a profound analysis of the shift in thinking and creation that can influence the global perception of our surroundings.

Other topics addressed in this issue include the practical aspects of graphic design – analyzing teaching methods and defining typography in Polish universities and design courses. The authors present typography as a design area with unlimited scope, not subjected to unequivocal frameworks, but flexible and surprisingly versatile. In the context of design and characters, there is also room for visual considerations on the construction of Chinese characters and the expression of typographic posters.

We also delve into the functioning of the human mind and its relationship with design as well as visual information. In the article "Design as an Element of the Extended Human Mind", the author explores the interdisciplinary nature of this issue, referencing the theory of neurocognitive science.

This edition also covers the topic of developing designer-accessibility relationships and the issue of universal information, which focuses on creating understandable and useful informational systems, with particular emphasis on the needs of users with special needs. The challenges associated with designing spaces and technologies accessible to all without restrictions provide an ideal opportunity for considerations on changing design practices in the context of accessibility.

Another section of the journal is dedicated to multimedia. One of the articles presents the role of error in the creative process – the author analyzes its evolution in the context of modern media, showing how errors can inspire to create graphical forms. The second introduces the world of motion and its interpretation, the nature of dynamics – it is also an attempt to find new ways of expression in the field of visual arts.

As the editorial team, we hope that this edition of dsignn will be an inspiring source of knowledge, encouraging further exploration of creative solutions and research in the topics we have addressed, and creating a new perspective on the world of digital design.

Wishing you enjoyable reading.
With respect,

Magdalena Mirkowicz, PhD
Chief Editor of **dsignn**

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IDEA

prof. **Rafał Strent**

Initiation

We all know how important a good beginning is. Birds and para-gliders choose high slopes where suitable thermals can be found which then lift and carry them almost effort-lessly. But first thing: a take-off level that is high enough.

For years I have been promoting the defi-nition of culture as the unity of science, technology, art, and also good practice. We know many diverse terms, from science, technological, political, and artistic culture – to bacterial culture. All these stand out due to the fact that they require attention, precision, time and good will so that they can be evaluated later based on their results. Just like a farmer is only certain of his good fortunes after the harvest, because one of the sources of the word is cultura agri – cultivation of land…

Fragmented specialisation is a great problem of our times. Artificial barriers between fields and disciplines of science, art and life have been built on the one hand in the natural course of research on ever smaller, more precise aspects of reality, and on the other hand – due to inhibitions. Yes. Riskily, but with conviction, I can say that scientists and scholars (there is such thin differentiation in the Polish lan-guage) hold a grudge against artists for their unmeasurable successes, and the latter are cross about the others hiding behind a screen of scientific "lingo" – because even the most difficult matters can be explained simply and accessibly,

which was postulated by the eminent philosopher Władysław Tatarkiewicz. This is because it is not true that artists are discomfited by a trick question how much is seven times eight... In the half century I have spent in the Warsaw Academy of Fine Arts, the thing I value the most is the inauguration lecture given there by Prof. Piotr Węgleński, specialist in bioge-netics, the then Vice-Chancellor of Warsaw University. This is also proof that science and art are close and related areas of human activity, and a human being con-stitutes unity, both emotional and rational.

The patron of WIT Academy is the Polish Academy of Sciences (PAN), which guarantees the University an appropriate level of activity and an efficient organi-sational structure. The predecessor of PAN was the Friends of Science Society established in 1800. During those times, difficult for Poland, science was not divided as meticulously as it was later – as it has been so far. Sciences and "unmeasurable" humanities operated side by side and with mutual benefits. There were no artists there in the strict sense of the word, but the Warsaw School of Mathematics, renowned in the later world, could not have existed without any contact with art where the outstanding artworks are characterised by mathematical precision of composition. I hope that the rapid development of digi-tal tools will soon enable us to prove this thought, because objective evaluation of

the so-called artistic values definitely surpasses its current capabilities.

It is worth reminding you of a thought that has been known for centuries in the world of art: progress does not concern it – progress in art does not exist. Indeed, functions of art change, and therefore tools and means of expression change – but the paintings from Chauvet Cave or the mysterious petroglyphs from thousands of years ago have the same value as the most outstanding productions of our generations created yesterday. All of the announced areas of artistic activity that our periodical is to deal with cannot exist without sophisticated digital tools which themselves are developing at an exponential rate. But if suddenly there is no electricity, then what? And you can still practise some sort of creation using your hand on the wall, or your foot in the sand or clay…

I had the 1904 graphic art curriculum from the Warsaw School of Fine Arts of the time in my hands. It contained, as an unquestioned dogma, a thought on unity of art and design. Bauhaus came into existence fifteen years later, in 1919, in German Weimar, from the merger of the Weimar Academy of Fine Arts and the School of Handicrafts, and it is known worldwide for its revolutionary thought on unity of art and design! This is the power of public relations, the creation of image. We are not proficient in this. I am reminding you of this because today we have an excellent opportunity to enter the circle of the best, both thanks to the existing, continuously modernised tools, and placing the creative artistic milieu among just as creative and just as ambitious information technology specialists. Such combination constitutes a unique opportunity for both, seemingly so distant, worlds. If incentives are created in the Silicon Valley to encourage artists to settle there, to create unrest, to inspire brainstorming and submit unfeasible ideas, then we have such conditions here! I am dreaming of graphic artists not just using digital tools (this is common today), but writing programs for their own needs, for a specific task – to create a state of

ferment among equable people that those dealing with sciences are regarded to be. On the other hand, an aesthetically sensitive mathematician or engineer is not a phenomenon of any kind, I know many of those. In American education it is a standard that a student completes a semester or more in a field that is apparently quite distant, which makes accelerated learning more flexible (precise scoring) and is recognised during credit awards.

We are living in peculiar times. The panic caused by the potentiality of artificial intelligence seems to threaten us with all plagues of the world, whereas this is only a quantitative leap in the capabilities of an incredibly fast calculator. It only operates in the way we tell it to by pressing appropriate keys. Reactions were similar to the invention of the steam engine, and earlier even simpler inventions, starting with the wheel. Let us not be afraid, we have to face it and harness it to fulfil our, hopefully socially sensible, needs. During her Nobel Prize award ceremony, Olga Tokarczuk used the word "sensitivity". In electronics, it means the response of a system to a stimulus of an appropriate size, however here the writer meant tenderness, empathy and open response to good and evil. And such things can be taken into consideration when exploiting the staggering (today) capabilities of AI. Each novelty gives rise to concern in the older people and curiosity in the younger. So, give a chance to those who believe it to be a natural challenge. I repeat this to young people: do what is universally known to be impossible to do. This is the only way to create new paths, sometimes fascinating, sometimes wrong, but true. There are always interesting unknowns beyond the horizon…

Let us assume, then, that AI is our thermal, and WIT Academy is a very high slope. At the beginning, let's close our eyes and jump. And it is just possible that we will then see a world that we have not been brave enough to even dream of. Jump!

prof. **Rafał Strent**
WIT Academy

by **Will Novosedlik**

What if **life** itself became a **design project?**

Bruce Mau and Aiyemobisi "Bisi" Williams' plan to design a better future

"Your life is a designed life. And the beauty of that is that since it is designed, it can be redesigned to be more beautiful, more sustainable, more intelligent, more compelling, more humane. Therefore we have the capacity to change the world."

— Bruce Mau

"When I look around and see how everything in the world needs to be redesigned and that people are actually open to it, it makes me super optimistic. Realizing that the challenges we face are great but not actually taking the time to think about it or pursue it would be a missed opportunity."

— Bisi Williams

Bisi Williams and Bruce Mau are designers who consider systems on a massive scale. However, in 2004 perhaps for the first time, that vision was questioned by a 13 year-old high school student no less. As a result of that remarkable encounter, the lens through which they viewed the world was forever changed, and today they are visioning on such a grand scale that their viewpoint encompasses a change in the global mindset. They are thinking in terms of MASSIVE ACTION.

What is MASSIVE ACTION? To tell that story it is necessary to tell the story of MASSIVE CHANGE. To tell the story of MASSIVE CHANGE it is necessary to tell you about these two extraordinary individuals, their accomplishments, and how they arrived at the grand plan that they are currently in the process of iterating and enacting.

Williams and Mau are global thought leaders, visionaries and most importantly, designers.

Williams has spent a lifetime being deeply curious about the socio-emotional effects of how change is embraced and absorbed. Her unique design approach has holistically bridged the worlds of data, stories and the humanities to probe new ways of thinking and doing.

She was born in Canada to Nigerian and Jamaican parents. When considering the world around her she muses, *"I grew up in Winnipeg and the open prairies, and I used to always imagine the whole universe in front of me, especially in the wintertime when you look at the open plain. I would just imagine worlds and solutions and people."*

For Williams the notion that we can do anything and we can bet on everyone was like mother's milk. She started by pursuing a career in journalism and became a researcher. After meeting the man who would become both the love of her life and her partner in business, Bruce Mau, everything changed.

▸▸

Growing up in Sudbury, a sizable mining city in northern Ontario, Canada, Mau never imagined he would grow up to become one of the design world's most influential and innovative creators. In the documentary film MAU, directed by Benjamin and Jono Bergmann, he states

"I think my first design credit was designing my own life. Understanding that I would never accept what it was, I would have to create a new one. My window to the world was, in fact, a little black and white television. And I remember seeing Expo '67 and it just blew my mind. (Expo '67 was a World's Fair which was held in Quebec, Canada, in 1967 and is generally considered to be one of the most successful World's Fairs of the 20th Century.) 'Man and his World' was the theme. And I didn't know the word 'design'. I'd never heard it really. It wasn't part of our imagination. I saw a new life. I saw this extraordinary world outside of my world and I wanted to be part of it."

And that is exactly what he has done! Mau's career as a designer has spanned 40 plus years. He's also been an innovator, educator, author and artist on a vast spectrum of projects in collaboration with the world's leading brands, organizations, universities, governments, entrepreneurs, renowned artists and fellow optimists.

To say that books have been central to Bruce's purpose would be an understatement. In 1995, Bruce collaborated with Rem Koolhaas to conceive the landmark architecture book, "S,M,L,XL," on the remarkable visionary work produced by the Dutch firm OMA and its acclaimed founder. It presented a new kind of narrative in design and architecture – Bruce wanted people to experience the reality of architectural life, *"what it means to dig a hole in the ground and change the world."* The book changed everything for Mau and set a new standard for how such narratives were conceived and communicated.

At the age of 39, Mau self-published "The Incomplete Manifesto for Growth", his offering – incomplete – of a way of thinking about how to sustain a creative life. His 43-point statement, which he describes as having a "gentle spirit", delivered a universal calling that spread throughout the world. When it was subsequently translated into dozens of languages it served as a beacon for creatives globally. Even today, he encounters designers who tell him that the Manifesto hangs on their office walls. Over the course of his life, he has designed over 250 books and authored or co-authored 12 of those.

Together, Williams and Mau, truly became a unified force of nature and have subsequently collaborated on a stunningly diverse array of projects, working at almost inconceivable scales, including the redesign of Mecca, a rebranding of the country of Guatemala, and bringing a sustainability campaign to Coca-Cola.

Williams and Mau have been profoundly close collaborators throughout their lives together. Williams describes herself as an epiphany engineer.

"I used to be called the minister without portfolio," she jokes, *"I mean, I'm a researcher but I also work as a strategist for our company and our clients. And so the question became, can strategy and research be as sexy as applied design? And we agreed that, yes, it can be. And in fact, it's an integral part of how we work."*

A massive ambition

Williams and Mau's most realized collaboration to date took place in 2004 when they led a team of intrepid designers to mount an ambitious 2,000m² exhibition called MASSIVE CHANGE commissioned by the Vancouver Art Gallery (VAG).

The exhibition was about *"the power and promise of design."* It sought to reveal the presence of design in every sphere of human endeavor, from transportation to urbanization to housing to energy, health, manufacturing, communications

and all the technologies that animate these various disciplines.

The idea for mounting the first MASSIVE CHANGE exhibition came from Bruce Grenville, who at the time was Senior Curator at the VAG. Grenville and the museum's Chief Curator Kathleen Bartels attended a talk given by Mau at a Vancouver design store that was promoting his latest book, Lifestyle. Grenville and Bartels were so energized by the talk that the next day they decided to challenge Williams and Mau to create an exhibition for the VAG that would help people understand the important role design plays in every realm of human activity today.

Initially, the studio turned it down. It didn't feel it had the capacity to pull off something on that scale without bursting at the seams. They were already at capacity and furthermore had been approached by Phaidon to create a new book and by a media company wanting to create a video series.

In the midst of pondering this confluence of opportunity, Mau was approached by a friend, Marlene Hore, who served on the board of George Brown College in Toronto. He had always admired the campus for its diversity and forward thinking vision. They met for a drink near campus and Marlene made a proposal,

"We want to collaborate with you. Would you think about conducting an experiment in design education? We already have a traditional design school, so we don't need to repeat that. What do you think about creating some kind of innovative engagement?"

Williams and Mau thought about it and suddenly had the realization that they could manage all four projects if they combined them into one – the exhibition.

They had a lofty ambition for the video project. They wanted to create interactive learning modules drawn from the work in the exhibition which could be placed online but these were the early days of the internet. Tablets and smartphones were a few years from launch, and it would have cost millions of dollars to host them and without the bandwidth, they would be almost impossible to engage with. As per usual, Williams and Mau were thinking way ahead of the times. However, although the video project fell away, the word 'Massive' was used ubiquitously in the design phase leading them to apply it to the exhibition's name – MASSIVE CHANGE.

Williams and Mau focused their attention on the design school. They suggested that the initiative could be named the 'Institute Without Boundaries'. Mau explains,

"We wanted the Institute to be a purpose-driven, experience-based, entrepreneurial learning model where we wouldn't start out with curriculum, we would start out with a problem. And we let the problem drive the learning. And in the process, the students become entrepreneurial learners. They become entrepreneurs, they become designers. I can't teach anyone how to be an entrepreneur. They have to experience it. But once they experience it, they will never un-experience it."

Williams, Mau and their associate Greg van Alstyne (who became the Institute's director), understood that the first "problem" for the Institute to tackle could be the exhibition. It could in fact become the focus of the first two years of the Institute's curriculum, providing an extraordinary opportunity for everyone involved.

They quickly realized it would make most sense to bring the students directly into the design studio. The students would then have support from some of the world's finest designers all working under Bruce's direction. ▸▸

"The studio's team provided endless streams of research and creativity, churning ideas constantly. It was intensely productive. But the challenges were also endless," explains Grenville. *"First, we had a daunting 2,000m2 to fill – two full floors of gallery space. We had to deal with materials the staff had never worked with before. We were bringing in objects from all over the world."*

"We were constantly pushing into new territory, doing things that are considered easy now but had never been done before at the time. The beauty of the studio was that if something didn't work, they'd come up with a better way to do it. There were more than a few times when we spent full 24-hour days trying to solve a particular problem."

It turned out to be well worth the effort. Says Susan Rome, Program Coordinator, Schools and Youth at the VAG,

"It created such a buzz in the community. People came back again and again. People who had never been to the VAG or had little prior interest in art came to see MASSIVE CHANGE. Twenty years later, there are people who can't remember other shows, but can't forget this one!"

In conjunction with the exhibition, Phaidon published the book, MASSIVE CHANGE, which received critical acclaim and flew off the shelves of book stores.

Furthermore, the students from the Institute without Boundaries, two cohorts of twelve, were all listed by name at the front of the book. Mau reflects, "When they graduated, they could take the MASSIVE CHANGE book to an interview and

put it on the table and say, *"This is what I did during my education."* He adds, *"I'll never forget when we did a tour of the opening night with the president of George Brown. At the end of the tour, she turned to me and said "Wow, last year our students did MASSIVE CHANGE. I wonder what other students did?"*

MASSIVE CHANGE was the most successful exhibition the VAG had ever mounted, beating all previous attendance records. "We beat the Warhol show. We beat Picasso", says Williams. "People were lined up around the block for hours, waiting to get in." It later repeated that feat in Toronto and Chicago.

When it arrived at Chicago's Museum of Contemporary Art (MCA) in 2006, Time magazine called it "a cabinet of wonders" and Wired called it "a World's Fair hopped up on human growth hormone." Chicago Magazine described it as *"a blueprint for the future. . . including the work of engineers, scientists, economists, and dreamers on such diverse subjects as sustainable agriculture, virtual war, biotech body parts, and rural electrification."* Once the exhibition was launched it also became an educational program, a blog, and a radio program.

What made the exhibition such a big hit? As Paula Antonelli, Senior Curator of Architecture & Design and Director of R&D at New York's Museum of Modern Art, said of the show,

"MASSIVE CHANGE had tremendous influence. It was one of the first exhibitions to really tackle the problems facing humanity right now, in a way that was so well-packaged."

In other words, in its ability to synthesize and visualize the forces shaping the world today, the show successfully engaged the attention of its audience with the urgency of issues that were of practical and critical relevance to their lives.

Traditionally, big art exhibitions are imbued with a sense of eucharistic reverence. Works of art are considered sacred. There is always an invisible barrier between the art and the viewer. Explanatory texts that accompany work tend to be academic and subdued. MASSIVE CHANGE turned that whole experience on its head, monumentalizing and objectifying its messages, turning them into provocations as compelling as the artifacts on display. As exhibition design goes, it was a case of maximalist, in-your-face innovation.

"It was accessible, but not populist." Williams observes, *"It was deeply global, but sensitive. It was designed for multiple intelligences. It was also designed to be welcoming. It was a very deep, strategic design without declaring it, but subtly saying it's a really important thing. We knew what rules were keeping people away from traditional exhibitions and so we broke every single one of those rules which made it a fresh experience for habitual museum goers and super welcoming for everyone else. It was meant to communicate. We really wanted to communicate, and we designed it to communicate."*

Mau adds,

"So much language in the world of art, design and architecture is alienating. It self-marginalizes by making itself inaccessible to most people. But if you read MASSIVE CHANGE, you don't need to be a designer to understand it. I believe that if you want to be taken seriously, you should use clear language and make it accessible to everyone. That's one of the reasons that we broke attendance records. People actually understood what we were saying. Most museums push the message at you. They are designed to push messages. They say, 'here, you'll see this, and here we're going to tell you this, and here we're going to tell you that.' We took the opposite approach, which is to say we created a "pull" economy. You walk into the room and have a moment of awe and ask 'What is this? How is this assembled?' It created a very different energy from classical exhibit strategies. The whole idea was to inspire the audience with questions and then serve them answers because they were looking for them."

"It was a design show." states Williams. *"Bruce's hypothesis was that everything is designed. So let's test that hypothesis. And we did. Healthcare, the military, infrastructure and housing, markets, material science, technology information. We realized that we could bring the whole world together into a microcosm and use it to look at your world through a new lens. It was like an analog version of the Metaverse. It was completely immersive, huge scale, and super saturated with images. And it realized the opportunity that museums present as a place of learning. In a way, Bruce created his own version of Expo '67. He saw it on television when he was a little boy but he couldn't attend so he made it live."*

A new opportunity

As successful as it was, the MASSIVE CHANGE exhibition revealed an opportunity for future exploration.

"Once the exhibition had finished traveling," explains Williams, *"Bruce was expecting that people would go out and start solving problems. When that didn't happen, therealization I had for him was that we didn't give them the tools with which to do it."*

One of Mau's favorite observations is, *"If you're a designer, your principal responsibility is to inspire people."* In the case of MASSIVE CHANGE, Williams, Mau and the team had managed to inspire, but realized that there was a next step still to be taken. They had to now design a bridge between inspiration and action.

Fortunately, they had laid a strong and deep foundation for building that bridge in the form of an idea which became central to their practice known as 'life-centered design.'

And we return now to the beginning of our story and our 13 year-old high school student. It was 2004, shortly following the opening of MASSIVE CHANGE at VAG. The student was Tamara Mihic. While listening to Mau talk about design as a human-centric project in which he quoted Historian Arnold J. Toynbee who famously said

"The twentieth century will be chiefly remembered by future generations not as an era of political conflicts or technical inventions, but as an age in which human society dared to think of the welfare of the whole human race as a practical objective." Mihic raised her hand and told Mau that she didn't think he wasn't thinking 'big enough.' He jokingly responded that he had never been accused of that before. Undaunted, she continued "Historian Arnold J. Toynbee was right, the 'welfare of all mankind' was the project of the last century. But this is the 21st century. Our project is the welfare of all of life."

Mau was stunned. Mihic was absolutely right and this new line of thinking was to influence Williams and Mau's thinking from that day forward. In a 2022 article entitled Putting Life-Centered Design into the Heart of Organizational Development, Mau points out that the term 'human-centered,' which has dominated the innovation discourse over the last 25 years, is based on a narrative that humans are at the center ▶▶

of the universe and that we have dominion over the natural world. *"This thinking is not only unsustainable,"* says Mau, *"It's false. Humans are part of an ecosystem that sustains all life on the planet."*

How best to describe life-centered design? Mau often refers to the following experience. In 2013, his hometown of Sudbury became home to the McEwen School of Architecture where Mau serves as a member of the adjunct faculty. Mau shares that once a year, under the direction of Indigenous elders from the five First Nations in the area, students go into the woods and harvest the materials needed to build a traditional birchbark canoe. The elder helps them identify a birch tree

that *"is ready to give up its bark."* They remove the bark in one piece and use it to build their canoe. When the canoe is complete, they launch it into the lake to experience the beauty of what they have crafted together. When the canoe is no longer fit for use, it is returned to the forest floor, where it will take its place in the ecosystem to naturally decompose, providing fuel for future growth. This is the traditional life cycle of a birchbark canoe as it has been practiced by Indigenous peoples for centuries. That circularity lies at the core of life-centered design.

Indeed, life-centered design could be said to lie at the core of Indigenous practices which have been in existence for at least 60,000 years. As Tyson Yunkaporta points out in his book on Australian Indigenous thinking, because Indigenous cultures have not left behind archeological edifices such as colosseums and aqueducts we are tempted to dismiss their cultures as primitive and long-forgotten. And yet, in the sphere of life-centered design, it is precisely that lack of a cultural footprint which can articulate a sustainable future and Indigenous

thinking is very much alive and well and still evolving. We would do well to pay attention.

Following the wildly enthusiastic reception of the MASSIVE CHANGE exhibition at the MCA, Williams and Mau moved their family to Chicago and established their new design practice, Massive Change Network, or MCN for short. It took the better part of ten years to codify how life-centered design would manifest within Williams and Mau's work, but by 2020 they had laid it all out in a book: MC24, Bruce Mau's 24 Principles for Designing Massive Change in Your Life and Work. As inspirational as that book is, however, they knew it would still not be enough to spur people into action. They surmised that they would need yet another initiative, but one that would expand to include an infrastructure for action. They would call it MASSIVE ACTION.

The path to MASSIVE ACTION

In the late 2010s, Song Xiewei, Dean of Design at the China Academy of Fine Art (CAFA), reached out to MCN and asked if Williams and Mau could bring the MASSIVE CHANGE exhibition to China exactly as it was in Vancouver. Their response was that they would rather think of creating a sequel. Says Mau, "Thinking about what worked and what didn't in MASSIVE CHANGE led the conversation to MASSIVE ACTION."

In a late 2017 presentation to CAFA, Mau announced that MASSIVE ACTION would premiere in Beijing and tour the world. It was envisioned as a 6,000m² exhibition – 3x the size of MASSIVE CHANGE! As such, it would be the biggest design exhibition ever produced. Its ultimate purpose would be to put the power of design into the hands of as many people as possible.

But as it often does, fate intervened. In 2019, amid rising diplomatic tensions, plans to launch the exhibition in Beijing were scuttled. That did not deter MCN from its mission. It just meant that the exhibition would need to find another launch venue and perhaps a different form.

As wildly ambitious as the plans for the exhibition itself may be, the vision for MASSIVE ACTION is much greater than an exhibition. If MCN is going to engage the world in adopting a life-centered design mindset, it is going to need a great number of people working together to achieve those ends.

MASSIVE ACTION is therefore envisioned as a multidisciplinary global movement empowering 100 million designers with the tools of life-centered design. These tools will then be used to

collectively tackle the world's most vexing problems and design a better future for all of life.

Williams and Mau frame our current situation as the crisis stack: a confluence of interconnected problems that are taking place simultaneously. They divide into seven wicked problems; climate, empowerment, health, cities, demographics, energy and learning. (Although the exact origin of the phrase 'wicked problem' is unknown, it was brought into the mainstream in the 1970s by designer Horst W. J. Rittel and Melvin M. Webber, a professor of city planning, as a *"complex social or cultural problems, with an unknown number of potential solutions."*)

This level of ambition naturally raises lots of questions. First and foremost, how to inspire 100 million designers? How to scale the solutions to meet the scale of the challenges? What is the MVP (minimum viable product) for a life-centered design mindset? What will it take to give someone an optimistic, entrepreneurial perspective – the ability to see opportunity where others see barriers? What does the team look like to make this happen? What is the minimum amount of

design knowledge they'll need to participate effectively? How to ensure global inclusivity in the process of developing 100 million designers? How does it map onto existing structures? Perhaps most importantly, who is already working on the wicked problems?

In order to answer these questions, Williams and Mau have envisioned an interconnected ecosystem of communications, media, educational institutions, partner organizations, community organizations, museums, galleries, businesses, NGOs and governments all acting collectively to solve the seven wicked problems.

Courage and collaboration

Williams and Mau eschew the idea that MCN or MASSIVE ACTION will itself solve the world's problems. They see this as an outdated colonialistic or even patriarchal way of thinking. Instead the initiative is a fundamentally collaborative project. It also functions primarily as a catalyst. Its ambition is to inspire institutions, artists, community, and government, serving as ignition to a process that will highlight and shine ▸▸
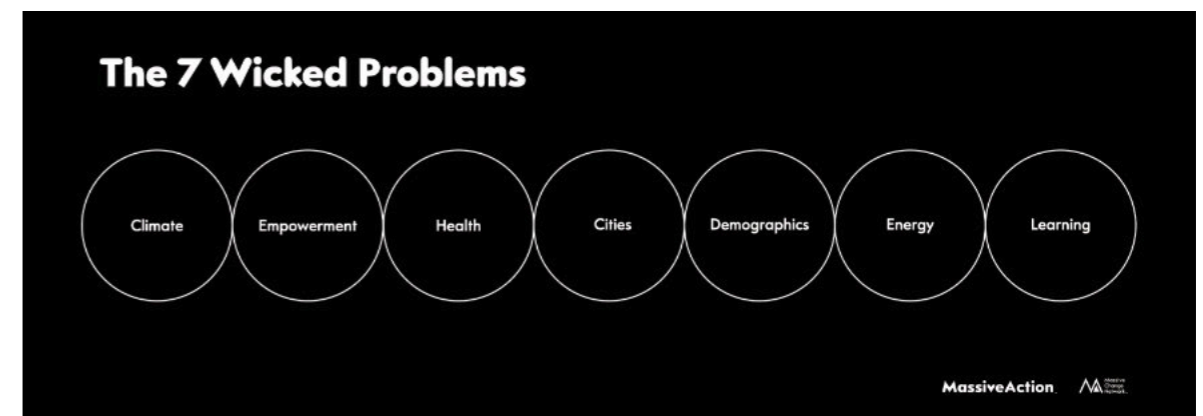
a light on already existing solutions to local, national and global concerns.

"There are so many amazing projects currently underway and being led by so many remarkable visionaries and yet most people, gathering their information from purely traditional sources, are unaware of them." says Michael Halberstam, whom Williams and Mau recently brought onto the team to serve as the Executive Director of MASSIVE ACTION. "Bisi and Bruce speak often about making the invisible visible and about the relational nature of the project. Bisi often speaks of Bruce as one of the world's great framers. We see our work therefore as creating a framework within which people can engage in the many initiatives of MASSIVE ACTION. To accomplish that, we must create portals for personal engagement."

"Because of the urgency of the challenges the world is currently facing, MASSIVE ACTION is in a constant state of flux, experimentation and growth." says Halberstam, "We don't have time to sit around waiting for the end of the world because we have basically six years to inspire these significant changes before climate change becomes irreversible. This means that we must work even as we are creating."

However, he hastens to point out that Williams is adamant that the initiative should begin with fact-based optimism – another of the MC24 principles.

"Bisi recognizes that people are turning away from doom scrolling headlines of disaster and reports of end times. Bruce regularly points out that people are now viscerally and personally experiencing climate change. They intuitively understand that it is real – it's happening right now and all around us, and so we need instead to shine a light on solutions, connect them to ways forward and provide opportunities for individuals to engage in change in their own lives and work. We have a collective responsibility to embrace the future and ensure that generations to come have a functional world into which they can grow and live and love and create. When Bisi first called me to invite me onto the team, I was a pessimist. In the space of a two-hour phone call, she turned me into a zealous optimist. Bisi and Bruce have an extraordinary gift for igniting the flame of hope and it breathes all the way through the initiative."

To a large extent, the success of MASSIVE ACTION depends on relationship building. Williams often talks about the fact that MASSIVE ACTION is a relational project. She discusses creating a network of like-minded individuals, framing the conversation, shining a light on the work that other people, organizations and institutions are engaged in, and catalyzing strategies that will manifest in world-changing ideologies, structures and projects.

Meanwhile, with the Beijing project on hold, in 2020, the world was plunged into a global lockdown with the arrival of COVID-19 as it spread widely and quickly across the face of the planet.

In true MCN fashion, a crisis became an opportunity. Emma Mills, a lecturer in Design at the University of New South Wales in Sydney, Australia was looking for a way to inspire and teach under the unprecedented conditions of the pandemic. She had reached out to a number of high profile designers to see if they would be willing to contribute virtual talks to her students and Mau responded enthusiastically. The talk was a huge success. Students and faculty alike were profoundly inspired and Mau's presentation came to the attention of Professor Claire Annesley, the visionary Dean of Arts, Design and Architecture (ADA). Having just launched her 30-year vision for ADA – "through creativity, collaboration and inclusion, we seek and solve problems to improve life on earth" – she sensed an enormous opportunity to begin an engagement with MCN in order to chart a path forward for the Faculty. Dean Annesley invited Williams and Mau to discuss how they might contribute to accelerating progress towards ADA 2051's strategic goals. An initial conversation around an in-person campus visit quickly evolved into the idea of a partnership between MCN and ADA's Innovation Hub, a campus initiative directed by Dr. Carly Vickers that enables cross-disciplinary problem solving.

Williams and Mau agreed to work with ADA to lead a cohort of UNSW faculty, staff and students in applying their MC24 Design Principles to reimagine, explore and redesign collaborative approaches to critical challenges in the areas of climate, power and health. Williams and Mau also recognized this as a chance to launch MASSIVE ACTION in the education space and the collaboration became known as MASSIVE ACTION Sydney.

Thus began a months-long discovery and planning phase, during which MCN researched

the cohort's thematic areas of exploration to customize the engagement.

The UNSW ADA team led an Expression of Interest (EOI) process to cast the net wide and invite a diverse cohort of faculty, staff and students from all disciplines across ADA to participate in MASSIVE ACTION Sydney. In their EOI submissions, participants were asked to identify their interest in one of three specific thematic areas of focus, so that the project teams could begin to take shape.

MCN conducted a series of virtual interviews with key UNSW stakeholders for their take on the most critical local and global challenges and engaged in group calls with participants to introduce them to the MASSIVE ACTION program and to one another.

In September of 2022 with the lock-down finally ended, Williams, Mau and MCN Managing Director Gretchen Gscheidle traveled to Australia to engage in a month-long design sprint. The partnership brought together innovators, thought leaders, visionary artists and change makers from both the ADA staff and student community to collectively work on wicked problems through their work. It was an exhilarating process involving over 1,000 attendees, numerous lectures, seminars and workshops.

A highlight of the process was a UNSW-MCN co-produced performance of Williams and Mau's theatrical creation DESIGN FOR ALL THE SENSES. Design for All the Senses is one of the MC24 Design Principles that underpin the work of MCN.

It was a dazzling manifestation of "First Inspire"

By the end of the collaboration, the partnership had identified 400 innovative prototype examples from across the globe, and resulted in twelve participant projects which eventually led to the creations of five project teams who continue to work today to manifest their visions. They include initiatives to inspire ways to address climate change through "Making Good Media"; a process for allowing faculty to engage respectfully with Indigenous knowledge in "Caring for Country"; ecoculture jams – playful public unsettlings that promote and experientially manifest creative and restorative ways of being while disrupting the destructive status quo in "(Daily) Delight~Disrupt"; a plan to radically transform the approach to mental health in "Big Trauma, Big Change" and "re-situ" – a digital platform that connects and

informs designers and change makers to First Nations perspectives.

Dean Annesley was incredibly pleased with the collaboration.

"Our goal at ADA is to work creatively, collaboratively and inclusively to solve problems that improve life on earth. MASSIVE ACTION Sydney gave staff and students a unique opportunity to work intensively and at speed. The process was challenging, but so rewarding to see how much they developed individually and achieved collectively across the MASSIVE ACTION Sydney design sprint month. It has been empowering and transformational. It has built community and a shared sense that Massive Change is possible."

Once the Sydney partnership got underway, MCN continued to prototype MASSIVE ACTION in collaboration with the Dahdaleh Institute for Global Health Research at York University in Toronto to work on solutions for tackling water safety, protecting public health and developing communities of practice for humanitarian emergencies. The outcome was The Safe Water Optimization Tool (SWOT), which applied data analytics to ensure timely and safe implementation in emergency situations.

As the academic engagement strategy has grown, the process has refined. However, recognizing that Williams and Mau do not have the capacity to be on the ground for weeks at a time in thousands of academic institutions globally, MASSIVE ACTION has started creating catalytic engagements. They aim to spark the ▶▶

internal creativity and vision of each school while nurturing and encouraging them to start operating at scale. If they are successful, they can then spread the concept of life-centered design across the campus and beyond.

It is a hope and ambition of MASSIVE ACTION that life-centered design will become ubiquitously applied and will very quickly become the gold standard for all design departments everywhere.

It is a key aspect of the engagement that students are taught to engage in projects which tackle real world problems and that these projects are stress-tested in public settings, bringing local, national and international experts into the conversation.

Currently MASSIVE ACTION is in conversations with multiple educational institutions with the hope of expanding the reach into thousands of design schools across the globe.

In the Spring of 2023 Mau mentored two high school students as part of a design competition intended to create an international network of youth-led climate projects. As a result of the collaboration, the two young women were invited into the MCN studio for a summer mentorship. Sophia and Lulu spoke passionately about what they called actionism. They coined the term in response to what they saw as the passive engagement of online social media activists.

Actionism is a key descriptor for MASSIVE ACTION and has been heartily adopted into the narrative. As Williams likes to observe, "Demo, not memo!"
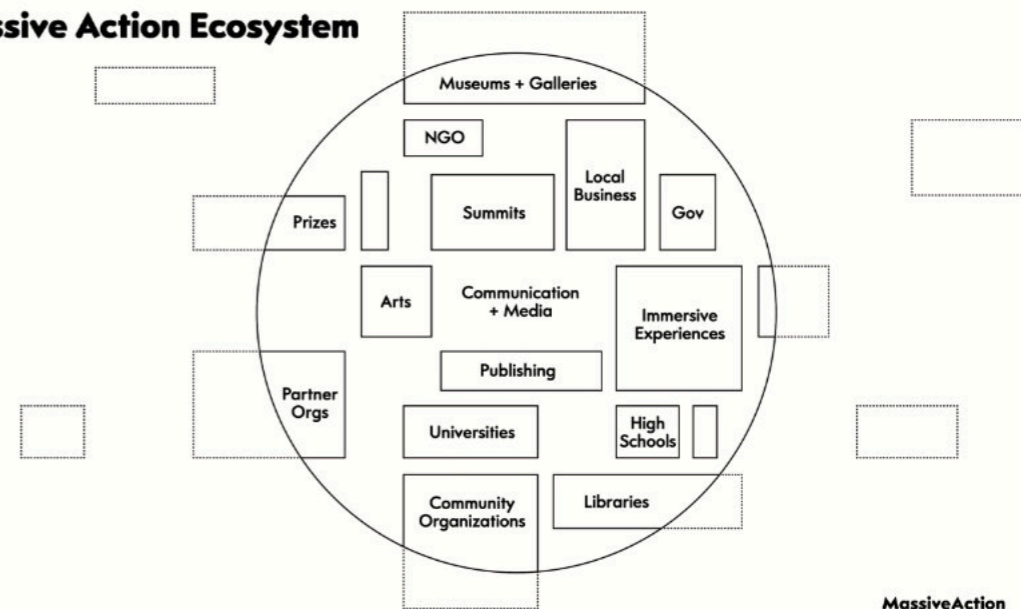
"When I think about the role of our 100 million designers," she says, "I feel that we need a culture of originators. And that's the role of a university – they are originators. They are designers and designers are originators. They dream about what could be, what might be, how might we look at it? The ability to think like that could be existential. But if you can't think, you've got an issue. If you can think, then you'll be a productive person with purpose in this world. The role of the public university is to inspire thinking and thus to generate ideas and then create the world that we're all going to live in."

The MASSIVE ACTION ecosystem has many evolving components and it is in a constant state of creative growth. Williams and Mau are both organic, iterative thinkers. As opportunities arise, they invite collaborators in and begin to imagine and envision new worlds, possibilities and frontiers.

"We are in the process of creating a global network of actionists," says Halberstam, "Bisi and Bruce have inspired a generation of designers and innovators, many of whom cite MASSIVE CHANGE as a breakthrough moment in their understanding of the field. We are building relationships with a remarkably diverse array of organizations including the Buckminster Fuller Institute; Skidmore Owings & Merrill; the University of Wisconsin – Madison; Arizona State University; NASA; Saskatchewan Polytechnic; York University; Not Impossible Labs, the Australian Indigenous

Mentoring Experience; not to mention a significant network of potential museum partners."

Some of these actionists have been featured in virtual salons which MASSIVE ACTION hosts several times a year. Excitingly, there has been an exponential increase in attendance and follow up for each salon.

One of the most exciting components currently being imagined is a MASSIVE ACTION exhibition, with a vision of stagings in a myriad of museums around the world. The great innovation of the exhibition and the great leap of growth between MASSIVE CHANGE and MASSIVE ACTION will be that rather than engaging passively with static display models, the public will be invited to engage directly with projects, inspiring actionism by hundreds of thousands of participants.

Of course, with MASSIVE ACTION it is entirely possible that by the time this article is published, the ecosystem will contain new components, shapes and forms. It is very much in start-up mode and yet it is happening even as you read this

article. Williams and Mau are still building the airplane even as they are flying it.

Back in 2004, MASSIVE CHANGE posed the questions, *"Now that we can do anything, what will we do?"* Although Williams and Mau did not know this at the time, they do now, and their answer is MASSIVE ACTION.

Will Novosedlik

If you want to be kept informed about MASSIVE ACTION please visit our website and sign up to become one of the 100 Million Designers. ∎

https://www.massivechangenetwork.com/massive-action

Typography ?

What is **typography?** Or, on **definitions** of a field that won't be squeezed into a **rigid framework**

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Anna Sieroń

Introduction. Historical definitions of typography

Although it was already the Arts and Crafts movement that took up the discussion of main problems and the future of typography [1], its most turbulent period was in the 20th century. Two main trends in defining typography and its role can be noticed in this century – the first one, usually defined as functionalistic, emphasises the agreement between form and content and the clarity of communication. The other one permits or even assumes the breaking of rules and sacrificing clarity in favour of expression. The first one, apparent from the end of the 19th century, constitutes the elaboration on tendencies that were already visible in other fields, especially in architecture, where gradual departure from decorativeness, rejection of rich ornamentation and search for the pure, functional form could be noticed.

Retrospectively, modernistic tendencies and the perception of typography mainly as a communication tool have proved to be the most long-lasting. As László Moholy-Nagy wrote, "typography is a tool of communication. It must be communication in its most intense form.. The emphasis must be on absolute clarity since this distinguishes the cha-

racter of our own writing from that of ancient pictographic forms".

Typography is therefore just a means to an end that is to convey meaning. This is served by the economy of means, abandonment of unnecessary elements, and focusing on the most functional composition – the rules which should be followed while designing the communication include "unequivocal clarity in all typographical compositions" and "legibility" – communication must never be impaired by an a priori aesthetics", e.g. typesetting a text in a preconceived framework. This vision of typography also does not allow any space for the composition to express author's emotions, individuality, or subjective feelings. Moholy-Nagy, one of the most important typographers and theorists of this field, Bauhaus lecturer, through his teaching activity and contacts he maintained with the most important European milieus, significantly influenced this field's history.

Jan Tschichold first systematised the functionalistic tendencies in an article entitled "Elementare typographie" [2], and then in "New Typography", a book published in 1928 [3]. In the latter publication, when summarising the most important trends of the early 20th century, he

pointed out features which, in his opinion, characterised the titular new typography, and which should be continued in modern printing: asymmetrical typesetting, matching the contents, departure from historical typefaces and using exclusively sans-serif fonts, applying modern techniques for typesetting, printing and reproduction of illustrations. All this was to attain the clearest composition possible – "it is essential to give pure and direct expression to the contents of whatever is printed; […] "form" must be created out of function. […] The function of printed text is communication, emphasis (word value) and logical sequence of the contents" [4]. The strive for purity of typesetting was juxtaposed by Tschichold with traditional typography – "The essence of the New Typography is clarity. This puts it into deliberate opposition to the old typography whose aim was »beauty« and whose clarity did not attain the high level we require today" [5]. The design – both of the text and of the typeface used for the typesetting – should not be expressive or striking, he believed that the best typefaces were those that were "useful and free from personal idiosyncrasies – in the best sense of the word, uninteresting" [6], i.e. not taking the attention away from the communication itself because "typography tinged with personal style constitutes bad typography". Tschichold also placed a great emphasis on the role of empty space – "New Typography […] considers the blank white spaces on paper as formal elements just as much as the areas of black type" [7].

The alternative to tendencies dominating the theory of typography in the interwar period was among other things futurism. Even just the name of the movement referred to the future and modernity, and its assumption was the transformation – futurization – of practically all areas of life, including, of course, typography. As the main theoretician of the movement, Filippo Tommaso Marinetti, wrote, revolution in this field had been started as an opposition to traditional typesetting the objective of which was to obtain a typographic harmony of the page and was "aimed against the

idiotic insipid passéisme form of a poetry tome" [8]. Similarly as pioneers of the New Typography, he criticised it for its archaic, unattractive appearance, however unlike them, he proposed the use of the wealth of diverse forms of expression – several different colours on a page, numerous typefaces and varieties of prints that were to visualise not just the given word or sequence of sounds, but also the way they were pronounced. Violent onomatopoeias were reproduced through the use of bold fonts, italics meant a series of similar and rapid sensations, etc. Thus, the printed text ceased to be just the carrier of contents – it was to be a record of multidimensional experience, affecting different senses and also taking place over time, and typography was treated as a medium of artistic expression, going far beyond the recording of text [9]. Parole in liberta reproduced colours, scents, street noises, animal sounds, "linguistic archaisms, barbarisms, exoticisms, and neologisms!" [10]. Looking to the future also involved the rejection of old techniques and promotion of modern methods of typesetting and printing. Just like a speeding train is more beautiful than Venus de Milo, so high-yield, fast, noisy monotype prevails over the traditional, intricate manual typesetting [11]. Paradoxically, the unique, expressive typesetting of the futurists' poems could not be achieved using mechanical typesetting devices so admired by them.

Seemingly, the futurists' demands were close to those made by representatives of functional currents – this is because they placed an emphasis on the agreement between form and content, highlighting it through an appropriate selection of typographic devices. However, whereas the latter were aiming to give a text a form that made it easier to understand the content, in futuristic projects the primacy of content was completely rejected. The accumulation of diverse elements, however, is not tantamount to decorativeness – quite the opposite. All elements, also abstract ones, at the first glance only adding variety to a page, were carriers of content and emotions. ▶▶

1. J. Tschichold, *Nowa typografia*, Recto verso, Łódź 2011. *More about the new typography*, conf. e.g. P. Stirton, Jan *Tschichold and the New Typography. Graphic Design Between the World War*s, Yale University Press, New Haven – London 2019.
2. W. Morris, *The Ideal Book*, [in:] G. Lees-Maffei, R. Houze (ed.), *The Design History Reader*, Berg, Oxford – New York 2010, pp. 65-69; Id., Note by William Morris on his *"Aims in founding the Kelmscott Press"*, [in:] T. Triggs, L. Atzmon (ed.), *The Graphic Design Reader*, Bloomsbury, London - New York 2019, pp. 32-34; W. Crane, *O zdobnictwie książek dawnych i nowych*, Universitas, Cracow 2018.
3. Ibidem, p. 66.
4. E. Boyé, „*Dom pod pijanymi gwiazdami*". Futuryzm i F.T. Marinetti, „*Wiadomości Literackie*" 1926, No. 41 (145), p. 1.
5. E. Lupton, *Projektowanie graficzne a dekonstrukcja*, [in:] P. Dębowski, J. Mrowczyk (ed.), *Widzieć, wiedzieć...,* . cit.; pp. 89-107; J. Keedy, *Modernizm żywych trupów*, [in:] P. Dębowski, J. Mrowczyk (ed.), *Widzieć, wiedzieć...* , op. cit., pp. 143-159; R. Poynor, *No More Rules. Graphic Design and Postmodernism*, Laurence King Publishing, London 2003.
6. Ibid., p. 77.
7. D. Cundy, *Marinetti and Italian Futurist Typography*, "Art Journal" 1981, vol. 41, pp. 349-352.
8. C. Wilde, *Introduction: Alberti and the Formation of Modern Art Theory*, [in:] P. Smith, C. Wild (ed.), *A Companion to Art Theory*, Blackwell Publishing, Oxford 2016, p. 15; C. van Eck, *Rhetorical Categories in the Academy*, [in:] P. Smith, C. Wild (ed.), A Companion..., op. cit., pp. 109-110.
9. *Podaj dalej. Dizajn, nauczanie, życie. Ewa Satalecka w rozmowie z Krzysztofem Lenkiem*, publ. Karakter, Kraków 2018, p. 216.
10. D. Cundy, Marinetti..., op. cit., pp. 349-352.
11. F.T. Marinetti, *Revolution typographique et Ortographe libre expressive*, [in:] Id., *Les mots en liberté futuristes, Ed. futuriste de "Poesia"*, Milano 1919, pp. 49-51; translation as in: J. Tschichold, *Nowa typografia* (New Typography), op. cit., p. 53.

Fig. 1 Jan Tschichold, "Typographische Mitteilungen", special edition: "Elementare Typographie", 1925. Source: https://www.moma.org/collection/works/168064

Fig. 2 Filippo Tommaso Marinetti, Parole in libertà, 1915. Source: https://www.arte.it/notizie/mondo/il-futurismo-e-l-europa-parla-fabio-benzi-curatore-della-grande-mostra-olandese-20363
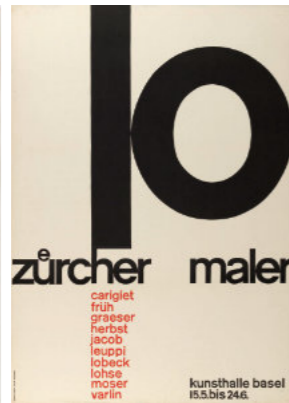

Fig. 3 Max Bill, USA Baut's poster, 1945. Source: https://www.moma.org/collection/works/6625

Fig. 4 Emil Ruder, plakat wystawy 10 Zürcher Maler, 1957. Source: źródło: https://www.eguide.ch/en/objekt/moderne-franzoesische-knuepfteppiche/

In 1930s, when Tschichold, as a result of his arrest by Nazi German authorities, decided that the rules he had been promoting were too radical, arbitrary and restrictive, his vision of typography was continued by other designers. Max Bill, later the Vice-Chancellor of the school in Ulm (Hochschule für Gestaltung Ulm) deemed the *"asymmetrical or organically formed typographic system"* to be a model one – functional and logical, unlike the traditional decorative symmetric typeset. He particularly accentuated the rationality of typography, objectivity of its rules and the need to observe them: *"no other applied art includes such a scale of accurate requirements as exists in typography. This precise initial material determines the nature of typography"*. Although the author also turns his attention to the aesthetics, he believes it to be secondary to functionality: "This is before you allow for purely aesthetic reflections, the conditions of clarity and linguistic requirements must first and foremost be met". A perfectly typeset text should be first of all clear, *"without decorative embel-lishments and without toil"*.

This rational, functionalistic tendency was continued among others by Emil Ruder, one of the more important representatives of the Swiss style. He believed typography first of all to be the *"methods of organisation of various compositional elements of the publication's graphic layout. We are not interested in rigorous artistic demands or creative activity; we simply strive to find a solution to everyday problems that is formally and functionally satisfactory"*. Similarly to Bill, he believed aesthetics to be secondary to form. *"The overarching rule that cannot be departed from is for a text to be clear [...] only after these elementary conditions have been met can we start talking about the issue of form"*. The post-war modernism represented by the typographers mentioned, described as the Swiss or international style, continued this way the most important tendencies of the new typography – it promoted the primacy of legibility and clarity, it assumed adherence in typography to strict rules that are deemed universal, objective and timeless, and he also assumed maximum rationalisation of the design process and "concealment" of the author's individualism and personality.

The functionalistic trend, both before and after the Second World War, accentuated the role of modern technology and the need for its inclusion in the development of typography, however it was far from its glorification, so characteristic of futurism. Tschichold emphasised rational thinking about the production process, including standardisation of formats and fonts. Ruder, on the other hand, wrote that *"typography, possibly even more than graphic design, constitutes a reflection of our era of technological order and precision"*.

Clear changes in the thinking on typography may be observed from 1970s. Modernism that emerged as an opposition to archaic, fossilised rules of typography, partly formulated during the early days of printing, after several decades itself became a conservative movement, rejecting any departures from rigid rules, and at the same time limiting expression – as it permitted a rather narrow range of means of expression (sans serif typefaces, asymmetric typesetting). On the other hand, changes observed in typography were inspired by poststructuralism, mainly the research conducted by French philosophers and linguists. Under their influence, a challenge was made against dualism – the juxtaposition of dynamic speech and abstract writing, image viewed and text read. The breaking of barriers between the image and the text meant creating compositions which combined them in a dynamic, not obvious way. Text could function as an image, and an image could be read as text. Postmodernism in typography, however, meant first and foremost the rejection of the most important

rules of Modernism – the primacy of legibility and clarity of typographic communication. There was no more striving towards harmony, obtained through the appropriate selection of parameters of the text – a line could be of any length, line spacing could be reduced to a minimum, and a block of text could take various shapes. All typefaces, consistent rejected by modernistic typography, were used – both traditional, modern antiques, and typefaces inspired by Medieval writing and fonts, freely mixed with angular fonts designed for personal computers of the day. Once again, typography became a medium of expression and not just communication. Communication itself, regardless of the medium, ceased to be treated as a predictable information transmission process – the meaning of a communication is built in the interaction with the public, in the context of the public's experiences, previous knowledge, expectations and associations. A specific reception of a message cannot be assumed, and therefore designed [12].

However, how Catherine McCoy, one of the most influential representatives of this trend, noted in 1990: *"as the cycles of change continue, Modernism may be reemerging somewhat, a renewed minimalism that is calming down the visual outburst of activity of the past fifteen years"* [13]. According to some, Modernism is returning, and according to others – it remains one of the most important currents in typography. Awarding primacy to clarity and functionality, it forms part of the universal design trend, so important today, and the grid, so characteristic of the Swiss style, constitutes an obvious tool for designing i.e. websites. One of the topics that we have intended to analyse in our research has been what definition, or more widely – vision of typography is the closest to contemporary lecturers, and how it possibly translates to their teaching activity.

Krzysztof Lenk's typography

An atypical, and most of all – extremely important approach to typography from the point of view of the growing awareness among designers of the need to design effective solutions in the increasingly complex world – was represented by the eminent Polish graphic designer, theoretician and lecturer, professionally active mainly in the US, Professor Krzysztof Lenk. In 2018, asked about the goals of education in typography, he said that the *"ability to efficiently use typography devices should be embedded in the graphic designer's consciousness. It is a set of*
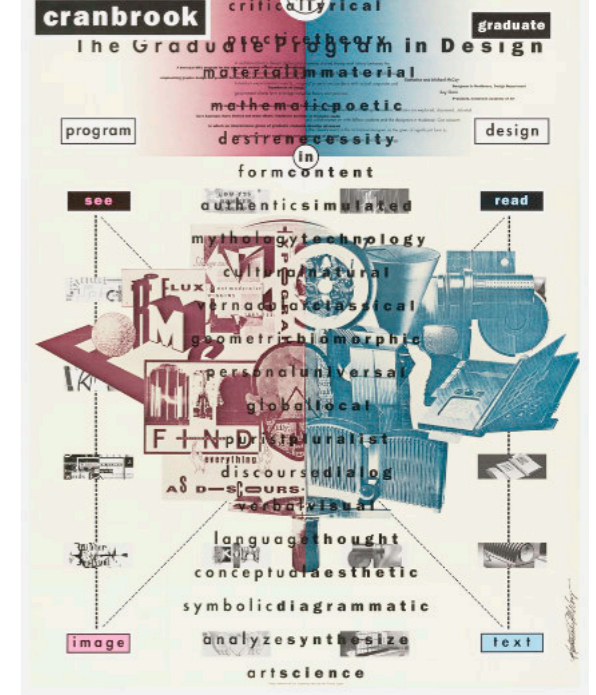

Fig. 5 Katherine McCoy, Cranbrook Institute of Art's master degree promotional poster, 1989. Source: https://cranbrookart.edu/2023/02/03/katherine-and-michael-mccoy-talk-cranbrook-design-on-scratching-the-surface-podcast/

knowledge and skills that allows them to set communication goals on the one hand, and on the other hand – select appropriate means of their accomplishment" [14]. It is impossible to accept this statement as a definition, nevertheless it encompasses the most important issues concerning the designing of visual communication, and not just within the discipline of typography. Firstly, in the context of achieving the assumed goal, Professor Lenk points out the use of knowledge and effective application of skills in the construction of the visual communication. Therefore, he does not leave any space in typography for purely formal experiments, digressions, or a search towards the achievement of aesthetic attractiveness of the communication without any connection with its purpose, content, user characteristics, or functional context. Secondly, the author emphatically formulates the fundamental task for the designers: setting communication goals, i.e. the need to define: what is to be the result of the communication process? What is to be its outcome? Contrary to appearances, for many people who are designers, or the more so, who are learning design, this is not an obvious or even recognised issue even today. Professor Lenk stresses, therefore, that it is not the means that are important, but the result achieved through those means. In the statement quoted, the main focus is moved from ▶▶

12. D. K. McCoy, *Przemyśleć modernizm, uaktualnić funkcjonalizm*, [in:] P. Dębowski, J. Mrowczyk (ed.), *Widzieć, wiedzieć...*, op. cit., p. 165.
13. D. Maison, *Jakościowe metody badań społecznych. Podejście aplikacyjne*, PWN, Warsaw, pp. 59-62.
14. Two pages of a book or newspaper, left and right, popularly referred to as verso and recto.

the form (types of typographic messages) to objective. Besides few exceptions among some typographers (which have been discussed in the earlier part of this paper), it is not the view of the main narrative about typography. It does not mean, however, that it is untrue. On the other hand, the selection of appropriate means of implementation, which Krzysztof Lenk writes about towards the end, is nothing else than the demand for – rational, logical, and adequate to the design problem – creation of grammar of the visual language which guarantees the achievement of the expected result. On this basis, Professor Lenk called for the inclusion of knowledge from the area of social sciences and humanities into the education of future designers of visual communication. It is not without reason that he claimed that the previous curricula which separated design disciplines from the humanities required a reform. In turn, only thanks to the knowledge about language and communication processes high quality designers may be educated [15]. Krzysztof Lenk's position is close to communicologists, which may be treated as a proof of correctness of his perception of typography from a perspective that has been much wider than the traditional one. One of the proofs is for example the definition of design proposed by communicologist Mariusz Wszołek. He claims that "*design means solving problems through their analysis and provision of solutions that are appropriate for a user in a specific social role*" [16]. Despite different perspectives of authors, their knowledge and education, you can see significant concurrence of their approaches to design, regardless of specialisation. Of course, someone might say that Krzysztof Lenk's statement is of a general nature and may be referred not just to typography but to any other visual communication design discipline. It is worth noting that Professor Lenk does not differentiate typographic communications from other visual communications in a conventional and unjustified manner but relies on facts. Reception and cognitive processes taking place in the minds of the audiences as a result of their interactions with visual communications, regardless of whether they contain text or whether they are not very similar. In turn, regardless of whether the communication is based on text to a larger or lesser degree, setting

communication goals is one of the most important elements of the designing process. It is in the realisation of these facts and in inducing deeper reflection on the effectiveness of visual communication that the strength, topicality and universality of Professor Lenk's cited statement lies.

Methodological assumptions of the study and selection of the research sample

Facing a multitude of definitions and understanding of the field that is typography, as a research team we decided to examine the methods of teaching and defining typography at Polish universities and design courses. The conclusions presented in the following article, concerning contemporary understanding and definition of typography, come from qualitative research conducted using the techniques of individual in-depth interviews and dyad interviews, the nature of which was exploratory [17] and which preceded a quantitative, representative study. The purpose of this preliminary research stage was to prepare a quantitative tool – an online survey – which will be sent to all universities in Poland that offer studies including issues from the field of typography [18] and to selected European academic centres that are leading institutions teaching typography.

The research problem of the whole study that we want to address refers to the determination of a method which can be used to teach typography, so that the process responds to the contemporary social, ecological and technological challenges, allowing for the need for inclusivity, and that it is compliant with the modern teaching standards. The aim of this study is to diagnose the condition of typography teaching at universities and at design and non-design courses, as well as to analyse how much the concept of typography and the rules of its teaching developed by Krzysztof Lenk are used in the didactic work. It should be emphasised that so far this is the only such an extensive study of both the teaching of typographic subjects and – more broadly – teaching at design courses in Poland. In accordance with the triangulation rule [19], it combines the qualitative and the quantitative perspective through the application of desk research, in-depth interviews, and a questionnaire survey. In accordance with Norman Denzin's concept,

triangulation also refers to the interdisciplinary nature of research achieved in this case through the involvement of not just designers, but also sociologists, anthropologists, or representatives of other social disciplines and the humanities in the research process [20].

Through the analysis of interviews with and statements of our respondents, we want to check how the approach to the function and importance of typography that they represent affects the choice of tasks carried out during classes, teaching content and tools used in the course of the didactic work with students. This leads us to another hypothesis – that tools used in the teaching of typography at universities have not been standardised, there is also no canon of content imparted to students during courses. This hypothesis has already been confirmed in the curricula, subject sheets and syllabi provided by Polish universities that we have analysed, and it will be verified at the quantitative research level.

We conducted 16 interviews – 14 individual in-depth interviews and two dyads [21] – with 18 respondents in total. These were expert interviews by nature, and information obtained this way was used to prepare questions for the online survey questionnaire.

The first version of the interview guide was supplemented with additional questions after the first two interviews had been completed, which is fully compliant with the standards of preparation of qualitative research tools [22]. The use of the individual in-depth interview technique allowed us a more relaxed approach to the interview guide – as Dominika Maison writes: "*such interview is of rather free nature, (...) the wording of specific questions or the order in which they are asked is less important, and it is more important to obtain specific information*" [23]. Researchers asked in-depth questions, and interviews were recorded.

The interview guide referred to the following issues:

▸ respondent's characteristics: education, professional and didactic activity, motivation to undertaking teaching work,
▸ experience in teaching typography: fields of study in which the respondent is teaching, university type,
▸ assumptions of the typography classes taught: how typography is taught; whether the respondent refers to a specific school, approach or theory of typography teaching; what tasks,

exercises, materials are used during the classes with students; in their opinion, what is important in the process of teaching typography and what skills in this respect the students should acquire,
▸ broader context of typography teaching: historical, social and cultural,
▸ universality and changeability of Krzysztof Lenk's concept of typography teaching.

Respondents were selected for the interviews on the basis of several criteria, in accordance with the principles of purposive sampling in qualitative research [24]. The key criterion in the selection was allowing for the type of university, so that experts teaching at art and design universities (e.g. Academies of fine arts) and also universities and courses not related to design took part in the research. The respondents included 9 persons representing art universities, others taught at universities and tertiary education facilities offering courses also in fields other than art. It was also important during the selection of respondents whether the university where they were teaching was a public or a private one – the latter category of schools was represented by three experts. The diversity of the research sample in terms of university type enabled us to build the context, the institutional framework, within which our respondents are moving around during the typography teaching process. The experts taking part in the survey work at universities located in the largest cities in Poland, and thanks to such distribution of the research sample we could refer to the geographical aspect and potential differences between academic centres in the context of typography teaching in the process of interpretation of the respondents' statements. The research sample was also diversified in terms of experience in typography teaching: experts included persons with longer and shorter periods of teaching experience, both with a master's degree, with a doctor's degree, and with a professorship. The last criterion that we were trying to control when selecting our experts was gender, taking into account differences in the professional, academic and didactic career in the context of this variable.

Characteristics of experts surveyed

The great majority of respondents have design-related education, they have a university degree in graphic design, design graphics, graphic techniques, or visual communication at one of the art uni- ▸▸

15. P. Pawiński, *Badania eksploracyjne*, [in:] M. J. Lutostański, A. Łebkowska, M. Protasiuk (ed.), *Badania rynku. Jak zrozumieć konsumenta*, PWN, Warsawa 2021, pp. 182-191.
16. Quote from Dr. M. Wszołek's lecture for participants of extramural doctoral studies at the SWPS University, Warsawa 14.12.2024.
17. Among other things, subjects on typography, graphic design, lettering and typography, publishing graphics, lettering design, editing, publication and multimedia publication design, book graphics, typeface design, publishing illustration and graphics, introduction to graphic design, as well as studios preparing for the diploma work, i.e. typography studio, editing studio, visual communication design studio.
18. N. Denzin, *Sociological Methods: A Sourcebook*, Routledge, New York 2017, pp 472-473.
19. D. Silverman, *Prowadzenie badań jakościowych*, PWN, Warsaw, 2009, pp. 171-173.

20. More frequently conducted during typesetting or editing classes which often contain elements of typography.
21. Ibid., p. 472-473.
22. The most popular one is Adobe InDesign.
23. Ibid., p. 67.
24. D. Maison, *Jakościowe metody...*, op. cit., p 54.

versities in Poland. Two respondents graduated from studies in the area of the humanities or social sciences.

When analysing their career paths, you can notice two strategies: some of the experts stayed at the university immediately after graduation and conducted classes for students, usually initially in the assistant position, and some undertook didactic activity only after several years of work as a designer. The following statement illustrates this very well:

"And after some time working for someone else, I decided it would be cool to work for myself, and this was when I set up a publishing house. And many designs that I am currently the happiest with, these were the book designs that I did for myself, so it was after around 10 years. Maybe less, but yes, around 5, 7 years. And at some point I felt as if it was no longer enough for me, and then I received an offer to share what I can do, what I had achieved. I also had this offer immediately after I graduated, to stay at the university, but then I had this thought that there was nothing I could teach, that I did not have the experience, I did not have the skills". [Expert 10]

Almost all of the respondents have market-based professional experience, and simultaneously with their teaching job they carry out commercial orders including publication and book design, designing of graphic materials (e.g. posters, leaflets), visual communication and visual identity design, they have experience from working in a printing house. Usually, their designs are prepared for cultural institutions, they work as freelancers, or they have work experience from design studios.

Most of the experts we have interviewed have experience in teaching classes as part of design courses, although some teach typography at liberal arts studies, where these courses are conducted only for a limited number of hours and/or mostly in the form of lectures. In most cases, typography in courses taught by the experts included in our survey is a compulsory subject, usually for the first and second year of bachelor's degree studies or uniform master's degree studies. Some of the experts also organise dissertation workshops on typography, which may be selected by students from final years of university. Respondents also included those who provide typography content and exercises only as part of the dissertation workshops mentioned above – this is reflected in the following quote:

"This workshop includes lectures, and as if there is nothing additional, I do not teach any other subjects, just this workshop. The workshop in which students sometimes get a degree, and sometimes come in for a year, or two semesters". [Expert 9]

How is typography defined?

As has been mentioned, one of the topics we had been planning to investigate during the interviews was how the experts defined typography, whether they referred to definitions and approaches established in the literature, and whether, and possibly how, this translated into their teaching activity.

The experts taking part in the research emphasise that building a definition of typography is difficult due to its extent and changing interpretation of typography as a design field. The common denominator for all of the interviews is understanding typography as a communication tool, however experts differ in determining the boundaries of this communication. There are different approaches, from very practical ones to metaphorical definitions, depending on the respondent's interests. Typography, having evolved together with technology and the media, constitutes a dynamic field, as a result of which some experts avoid defining it rigidly. In the context of a com-munication, typography allows you to express ideas that a picture cannot capture. In the process of creation of communication, questions about the context, addressee, medium and goal are important, which shows the versatility and importance of typography.

When summarising the diverse visions and definitions of typography that appear in the statements made by the respondents, you can distinguish several recurrent themes.

Typography is a basic communication tool

Typography is the key tool for efficient communication of information through the layout, shape and organisation of text. In the context of communication, it plays the fundamental role in generating clear, attractive and understandable written messages. It encompasses such elements as types of script, letter sizes, spacing and compositional structures which affect the reception and understanding of the communication. As a communication tool, typography not only provides the contents but also participates in the shaping of the reception through conscious creation of information hierarchy, emphasising key points and imparting tone and style.

"Well, typography is a carrier of communication, an absolute base and, from my point of view, a core for all of the design-related activities, also first and foremost a communication medium, it informs and not visualises, first of all, first and foremost". [Expert 16]

Typography means designing communication interfaces

Thus defined typography means reference to the comprehensive process of creation of systems which make it possible to understand information. It is not just a tool for the presentation of the text but an integral component of interactive communication environments. The design of typographic interfaces constitutes a conscious manipulation of relationships between a letter, an image and space. These elements generate tensions impacting the perception of the message. Designers analyse and shape these relationships, aiming to create cohesive, attractive, and effective communication systems. Typography may organise space, influencing the functioning of the communication, language and the audience.

Typography means finding the correct form for the given content

Typography is not an art of creating beautiful communications, but an ability to find an appropriate visual form for them; it should visually, clearly present the structure of the text. This is why its objective cannot be just beauty, aesthetics, but the efficiency of communication, agreement between form and content and specific nature of the audiences, and appropriate hierarchy of information.

"...search for an appropriate form of a written message, such visual form which will be the most appropriate, which will provide the best communication [...] What Tomaszewski said that ... that typography ... that the aim... Oh, I like this sentence, that the aim of typography is to find the appropriate form to convey specific content contained in a book, newspaper, item of jobwork, or any other [...] it is not playing art but looking for a good form for a communication". [Expert 15]

Typography means designing the reading experience

Typography is not just arranging letters on a surface but designing the complex experience of reading. It plays the key role in leading the reader through the content, making the reading activity more efficient. This is the art of supporting people in the process of receiving content and interacting with the communication and the entire cognitive process.

Designing of the reading experience means creating an environment that is conducive to fluency and comprehensibility of text. It encompasses composition structures, information hierarchy, and balance between aesthetics and functionality. Typography aims to find the most appropriate form, overcoming the barriers of words and ensuring the reader's full immersion in the content. In this context, experts also cited Leona Urbański's definition:

"...just like once Leon Urbański, who I value very much and I generally love his work, said that he did not create art but helped to read. And I, and I also have this motto, to help to read". [Expert 11]

Typography means designing audience's emotions

Typography also means designing emotions in the audience to which the communication is addressed. It shapes the visual environment, subtly, subjectively and individually affecting the emotional experience of reading. This is why the use of typography must be purposeful, creating intended mood and atmosphere. The designing of emotions starts with conscious selection of the script style, text layout, letter sizes, spacing and colours. Each element conveys moods, tone, and character. The hierarchy of information influences what the reader notices first, guiding their attention and interpretation of text. Typography becomes a tool which not only conveys content but controls perception and feelings of the audience. The designing of emotions requires understanding the context, group of addressees, and objective of the communication, in order to engage senses, shape the atmosphere and create the complex reading experience. Gaining psychological competences is of key importance, as it allows conscious use of typographic elements in order to evoke specific emotions, influence moods, or direct the reader's attention.

Typography means a relationship between the person conveying the message and the person receiving it

Typography is the key relationship between the person conveying the message and the person receiving it, affecting the conveyance and reception of information. From the functional point of view, it is a tool for precise arrangement of letters, forming clear text. In the psychological context, it affects the processing and interpretation of content, emphasising key fragments and stimulating interest in the communication. In cultural terms, differences between groups of readers are taken into account, and typographic elements are adjusted to different cultural, regional or social contexts.

Typography means designing texts

Typography is a comprehensive process of designing texts in publications, both printed and electronic ones. The designer must select fronts and script styles precisely, allowing for the aesthetics, character of the text, and purpose of the publication. This also encompasses the precise layout of words, paragraphs and elements on the page, attention to balance, clarity and attractiveness of the composition. ▶▶

Designing of the typesetting additionally includes conscious management of spacing between elements, affecting the appearance and organisation of the page. The elaboration of texts also requires taking into consideration the technical specifications, particularly in the case of printed publications, such as picture resolution, file format and colour scheme.

Typography means play between black and white

In the context of typographic design, precise positioning of letters and characters, which creates balance between intense black and white spaces, is of key importance. The strength and beauty of typography are concealed in this harmony. Experts emphasise that it is not just the contrasting of colours that is important, but also the skilful manipulation of space around letters. Black does not only represent letters but also the depth and width of the text designed. Text, the information carrier, is rooted in that blackness. White, the space between letters, gives the composition breathing space and clarity, making it possible to focus on the communication. In this context, a typographic design strives to harmony, attracting attention without overwhelming the reader. Typography becomes an art of manipulation of space and shape, creating aesthetic and functional compositions.

Typography means pondering the letter

For the respondents, this means immersing themselves in the subtlety of letter shaping, they can see a form of design expression in this. A typographer's work does not just mean manipulation of the letter but also understanding how it affects the reception of the text. Designers' responsibility encompasses the knowledge of various styles and forms, as well as the ability to adapt them to the context. One cannot also forget the historical context – the evolution which has happened over centuries, from pictograms to letters on a regular grid adapted to the specific typeface.

Thus, typography also becomes art in which the letter is a medium for conveying contents and expressing creativity. Abstract characters create communication received directly or deeply metaphorical. Letters shape the reality, giving it an overtone, making that something is formal or invites you to play with the language. Despite moving around in the world of letters on an everyday basis as users, we usually do not notice the power of letters. Letters are a communication which shapes our perception giving the reality a positive or a negative overtone.

"Diverse collection of knowledge, rules connected with working with the letter, in a very broad meaning of this word". [Expert 14]

Typography means conscious visual organisation of the language structure

Typography is not just the ability to compose text, but deep reflection over the communication, combining speech and the graphic form. Within this meaning, typography goes beyond the conventional boundaries of craft, becoming a comprehensive process in which the letter constitutes an accent that is equivalent to content.

In typography understood as organisation of structure, it is necessary to apply design thinking which forces conscious decisions concerning each element of the text. Formal choices are based on the analysis of context, addressees, communication goal and aesthetics. The designer takes clarity into account, creating space where each and every element has a precise location and meaning.

Thus understood typography becomes a powerful communication tool, transcending the graphic plane. This is art of expressing tone, rhythm and intention through layout, letter size, interactions and contrasts, where individual elements harmonise with one another.

"You asked me about the definition of typography, whether it is the organisation of this visual structure of language, that we have an element, a set and this structure. We organise it like this or like this, depending on what the purpose of this organisation is supposed to be". [Expert 12]

Typography is a process with a planned aspect of utility and attractiveness

Typography is the key element of utility and it also affects attractiveness and commercial value of content. Designing it consciously streamlines clarity and navigation, combining practical and artistic aspects. In the artistic context, decisions concerning the shape of letters or colours improve the aesthetics and the artistic expression. In the commercial area, the attractiveness of typography is connected with its ability to attract attention, to make the brand stand out, and to create a lasting impression that is suitably connected with the price of the finished design.

"Typographer is such communicator who, who holds the function of a commentator of information, that information is not decoration, this is I think repeated after someone, so it is very important to simply interpret content using visual devices, assisting, assisting in reading". [Expert 15]

Typography is a set of rules that every designer should know and use

Designers connected with typography make a habit of paying attention to errors in composition and incorrect use of typefaces or other typographical syntax rules, deeming the knowledge of standards of correct design to be the crucial duty of a good and professional designer. Nevertheless, they are aware that rules change, and adjusting the design to the expectations of diverse audiences becomes very important. In the context of this aspect of the definition, one cannot forget also that typography is an area subject to trends and it requires that context is taken into consideration, such as age, level of education and expectations of the addressee.

Typography is the science of culture of the written word

Within such meaning, typography becomes a space that allows the designing of the visual form of the language. Thus, it goes beyond the non-technical aspects of letter arrangement, focusing on the shape, aesthetics and cultural context of the written word.

"Typography is also the science of culture of the written word, the letter". [Expert 10]

Designing the language through typography means conscious manipulation of the shape of letters, typeface, sizes and composition layouts. Typography makes it possible to design the language form, allowing for the diversity of styles, history of script and contemporary trends. In this context, it is a science pervading the area of the written language, combining art, technology and cultural studies.

Typography may last in time

Dynamic typography on the screen, different from its static form, expands the boundaries of expression and interaction with the audience. Screen designers experiment with motion, shape and composition, creating involving experiences which often are stretched in time and space. This is not just aesthetics, but a powerful tool capable of evoking emotions and focusing attention in real time. The challenge is in combining traditional rules with interactivity, allowing for the fluidity of motion, rhythm and dynamics in the communication of contents on a dynamic screen.

Typography often means lonely designing

Typography is a design process that is often deprived of immediate feedback from the audience. Unlike the designing of interactions, the evaluation of effectiveness of the typographic message requires time, and sometimes it does not reach the designer

at all. Designers must predict and analyse users' responses, adjusting the design based on the future reception.

Summary

Summarising the definition of typography obtained from the expert interviews, we can distinguish several key aspects of thinking about typography. Firstly, typography is a design area with an unlimited scope, that is not subject to a clear-cut framework, which makes it flexible and comprehensive. Secondly, the changing trends and the technological progress influence the evolution of approach to typography that is adapted to new needs and capabilities of the design circles. Thirdly, a typographer should acquire extensive knowledge and sensitivity, encompassing such areas as psychology, anthropology and sociology, in order to efficiently communicate content and shape the reader's experience.

In a nutshell, typography is not just the art of shaping letters, but subtle navigation allowing deeper understanding of content. It is comprehensive designing of experience, transcending the letter form, affecting the way in which information is assimilated in various forms of publications. Typographic decisions are not limited to the form of letters, but encompass deeper aspects, such as emotions, psychology or culture, finally shaping the reading experience.

- ▸ In the context of dynamic typography, we explore new dimensions of expression of the text, going beyond the framework of static rules. This is not just aesthetic revolution, but also a powerful tool for designers who wish to create interactive and involving visual experiences, capable of interesting and intriguing the audience.
- ▸ Performance of exercises
- ▸ Contents of tasks

The experts taking part in the survey emphasise that they do not believe themselves to be typographers. This, according to them, is due to the lack of appropriate education. As they explain, during their studies there was no such subject, or the typographical problems were not included in the curriculum at all. Despite this, they run typography classes at different studies based on their own experience. The majority of them teach typography or similar topics at courses connected with typography in all types of schools, universities, academies of fine arts or technical universities. Several key issues may be distinguished from their statements:

- ▸ After completing the course, students should be able to use the correct typology and ▸▸

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terminology, define the typeface and select it correctly. It is also important for them to learn the rules of clarity and basic content organisation skills. The ability to create a cohesive graphic-and-letter form and achieving certain sensitivity to typographic detail are also essential.

- ► Students should understand the relevance of a character and a letter as communication and be able to build a message taking its function, aesthetics and visuality into account.
- ► The following issue which recurred in the interviews was the emphasis on the knowledge of the design process and accustoming students to modern design thinking necessary in the professional life of a designer.
- ► Tradition and new media. They place an emphasis on the knowledge of tradition as an element necessary during the designing of a contemporary typographic communication.

Forms of classes

According to experts, the necessary form of classes are lectures, often connected with exercises. A lecture provides the opportunity for delivering base knowledge on historical content, build of the letter, and basic micro- and macro-typography problems. This method of imparting knowledge is supplemented with educational games or other forms of active learning, making it possible for students to consolidate the knowledge acquired.

"I give lectures, I conduct exercises, I organise such educational games. I also do tests, these tests, like school tests [laughter] have to be selected, identified … so I definitely ask everyone ten times what an antique is". [Expert 3]

Exercises as a rule are based on traditional forms: revisions and discussions. Group discussions and groupwork also take place,

"…we have also introduced group exercises, because after all designers work in groups, so students have to learn soft competences – thus teamwork – and this is a benefit for students, but also for their designs, as they become better and more mature". [Expert 1]

and even student revisions.

"…it is as if they finally generate individual designs, however this is preceded with such teamwork, however they consult with one another about their designs". [Expert 16]

Exercises
Tools

If the course is a foundation one, which is part of the first year or even first semester curriculum, the exercises start from learning the basic digital and analogue tools. This includes learning Adobe Illustrator or Adobe InDesign, ink drawing, using paintbrushes, stick, or chisel-tip marker pens. Depending on their place in the curriculum, classes may also include elements of lettering and calligraphy.

"We do these classes, I ask them to bring such chisel-tip marker pens, these may be felt tip pens, and if anyone is brave enough, this can be ink etc. But as a rule, these are marker pens, and they are trying to copy typefaces, I usually select Renaissance typefaces, several, a dozen or so letters, and as accurately as possible. First, see of course what their proportion is. I talk about these proportions. And they start to see that there are single-element letters, two-element letters. What the reason for this is. The tool". [Expert 11]

Basic terms

Another challenge that a lecturer is faced with is to teach students how to use fonts – how to obtain them, how to instal them, how to use them, and how to find whether the given font is complete and is sufficient to be used freely – contrary to appearances, this is not common knowledge that is gained at secondary school. Then they acquaint students with fundamental definitions, ones that are almost metaphysical for a typographer, such as the difference between the typeface, print font and digital font [25]. The next step is introducing students to the arcana of letter build and all elements that are connected with it, as well as basic rules of typesetting (so-called orphans, widows and runts).

Lettering and typography

Classic lettering and similar exercises still enjoyed popularity. Tasks carried out include a letter drawn using various tools to different scales or creating a manually drawn signet or an abstract character built from letters. Classic, analogue methods are often combined with digital ones – e.g. manually drawn drawings are scanned and used in further digital work. Collage and arranging compositions from elements previously prepared by the lecturer are also popular methods.

Ideal copy does not exist?

One of the experts, referring to the traditional practising form in the master painter's studio, suggests an exercise which consists in copying

a press article and preparing a version that is identical with the basic model. During the preparation of the design, students must analyse the typefaces used, the typographic layout and means necessary to obtain an image that is identical to the original.

"So these exercises. At the beginning I start with this somewhat old method [laughter]. Just like, say, paintings painted in the old days, and if someone young wanted to be a painter, he got into such studio and had to make a copy to learn some topics, so often during those classes, if we have a topic, we make a copy of something, if we have its packaging, or if we have for example digital solutions, websites, applications, then I select some designs which, in my opinion, are done well, that they are clear. And such design is copied, reproduced". [Expert 4]

Analysis of the environment

The recurring motif is the verification of potential sensitivity of students to typography through their involvement in the analysis of typographic solutions from their own surroundings. In this case, students, using their own phone, have to take a sequence of photographs from their immediate environment – city, street or architectural details, and subject them to an independent evaluation. The selection of elements and the aptness of their evaluation enables the lecturer to assess the student's competences.

"The first task I give them consists in taking out their smartphones and take two photos within one week. Only two photos. A photograph of a beautiful, in their opinion beautiful, lettering arrangement, it may be packaging in a shop, it may be a shop sign, anything else. And a hideous lettering solution. What is this task supposed to achieve? I would like to know what their natural, pardon the expression, innate sense of lettering aesthetics is". [Expert 2]

Text as character

Numerous and very ingenious are exercises consisting in building graphic characters using letters, sometimes in such a way so that the meaning of the given word is emphasised, or abstract ones. The thing that may be mentioned here is building compositions from antonyms, creating illustrations from letters to drawn words or phrases, signet or initial constructions. The preparation of a lettering-typographic poster that is more a work of art than functional graphics is a separate issue.

"It is close from here to lettering experiments, for example Lech Majewski's. […] What else is there in this exercise? The form of the letter alone is im-

portant, the letter structure on its own is one, but building a composition, letters and the relationship of the letter, the character to the space, to the whiteness surrounding that letter. As lettering characters, mutually more and more densely arranged, may build a form when they are suspended in an empty space, because students also present such works. They are very diverse. They often come close to a completely abstract form. And now, when we have the opportunity to work with students from Ukraine, and there are many of them, and they simply close some proportions, some accents derived from the Cyrillic, in the Latin alphabet letters during those manual exercises. This is becoming even more interesting and even more unusual". [Expert 2]

"The first task is the task that I call typofaces. This is a lightweight task. Someone might say that it is of low relevance, but I see huge potential in it. In the task, students are supposed to design a face using typographic characters, but this face is to be built of as few characters as possible, and suddenly they find out that the typeface does not just include A to Z and from one to zero, that there are different scripts, there is Latin script, another script. Suddenly they find out where you can find these characters in programs, and actually the aim of this task is firstly for them to find out, but secondly – get to know these characters, that outside the alphabet there are dozens of characters that they have never seen, and these characters are used for something. And they are important". [Expert 12]

Musical posters are particularly popular as they allow a reference to be made to the rhythm and melodiousness of the topic to which the task refers. Last exercises in this area that have been mentioned by the experts refer to the most advanced typography classes and concern the creation of non-alphabetic systems, alphabetic systems, elements of script typefaces, and even full script typefaces.

Composition

An important matter raised by the experts is the students mastering the composition rules and preparing diverse lettering compositions. The exercises which can be used to elicit similar skills include building lettering compositions from prepared materials (so-called cut-outs),

"…I give them materials in the form of a cut-out, which means that everyone is given for example the same texts, with the same grade of script, the same typeface, the format is set, and you only have to arrange these things, and everyone does it completely differently. And these things truly differ. I mean, of course, no, it is not that they are very different, but ► ►

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25. Typeface – graphic image of script, print font– physical script medium, digital font – electronic script medium.

they are so different that this effect is completely different". [Expert 3]

Abstract tasks introducing students to the creation of a centrefold layout also appear [26] (arranging rectangles that depict elements on a page: margins, text columns, titles and headers, page number, possibly illustrations) or building a layout from imposed elements. The last, most advanced, exercise from this series is building realistic typographic grids in an appropriate program [27], i.e. arranging elements of a centrefold of a book or a newspaper in the form of a reproducible template.

Information structure

The ability to use typography as a tool to build the text information structure is, according to experts, particularly important. The task that was indicated most frequently as an appropriate one to achieve these types of effects are various types of poster designs – specific content, precisely defined format, relatively narrow assumptions force precise information structure with relatively extensive artistic freedom.

"This design appears because for me it is an exercise which, on the one hand, enables students to show some creativity, because they must come up with a creative motif, but I also show them already that it is not just creativity that is relevant in this whole design, but also the efficient conveying of information. They use repeatable content because the poster has a specific structure, so it is there always. We impose this structure, because this is this very situation, beginning of the 2nd year, so they don't have so much here, this exercise is very limited in the sense that only a certain scope of skills is practised, because they cannot cope with a more complicated one yet, so this exercise has structure. There is a time, date of the event, day of the event, participating artists and some brief and some brief description, and now they have to manage this". [Expert 6]

Exercises may be carried out in two forms, either as posters with the content set by the lecturer – in this case students cannot interfere with the content – or as a system of information built by them from scratch. In this case students prepare the content of the poster themselves on the basis of the event indicated to them. This way they are not just the organisers of the content but also the authors and they themselves make decisions about the materials prepared.

All typesetting design tasks with defined parameters, containing elements such as varied headers, footers, tables, indexes, etc. may be included in other exercises from this area [28].

- ▸ Smuggling in additional content
- ▸ Designing content with specific meaning constitutes an interesting type of exercise reinforcing the knowledge acquired during a lecture. Tasks of this type place a particular emphasis on the adaptation of the graphic form of a design to its content. This is where tasks such as the typeface template design appear: students not only design a template which corresponds to the character of the given typeface, but they also assimilate the contents contained in it, talking about the history of the given country, parameters and application possibilities. Another such task is the graphic design of a short text about a given designer, design or design trend. It may also be the designer's statement or a type of typographic or graphic manifest.

"In the first year, they design an exercise in our university which we have called a typeface template, and this exercise is an opportunity to at least come into contact with, not to say to learn the specification, I apologise, classification of typefaces in detail, and using subject matter of a specific design, i.e. on the one hand theories that are of relevance, but through practice, so they have to divide this publication, obviously, into 8 sections, just like we have 8 basic script classes. And here, as if based on the design method, through design, they at the same time learn to design, but they also gain concrete knowledge". [Expert 14]

To sum up, during the preparation of their original exercises, our experts place an emphasis on four aspects that, in their opinion, are crucial. After completing the course(s), students should:

- ▸ use basic elements of the design process
- ▸ demonstrate sensitivity to the form of the letter
- ▸ efficiently build the structure of information in the text
- ▸ understand and use the letter within the meaning of the message

Historic knowledge and expertise in contemporary tools used in typographer's work are also essential. The experts want their students to be able to function as designers having the appropriate knowledge and skills in the operation of tools suited to the medium completed. In this context, certain lack of modern tools for working with hypertext or scaled text sounds interesting in the experts' responses. Only one expert raises this topic in more detail:

"It is interesting that a lot of tools have popped up now that automate this work a little, and at the same time these automatic tools are very good. They enable you to understand quicker when typography starts to become clear, and when it does not. So such digital tools or measurement of the size of building proportion and scale are often referred to. These are websites with grids or building of hierarchies and scaling of typography. Mainly German tools". [Expert 4]

Summary

References to modernistic, functionalistic definition, placing emphasis on the agreement between form and contents, are the most frequent ones to appear in the statements of experts taking part in the research. These are opposed with "formalistic" tendencies, triumph of form over contents, blurring of clarity or aiming to search for visually interesting solutions in separation from the function that the given text is to fulfil.

This coincides with tendencies observed in the theory and history of graphic design. Most publications on history of typography and methods used to define it place an emphasis on functionalistic trends and phenomena which had the greatest impact on contemporary design. Sometimes you can have an impression that they present more of a process of reaching today's understanding of this field, and not necessarily its overall picture. Functionality is understood as agreement between form and content, but sometimes much more narrowly – as typesetting that is modernistic or referring to this tradition. Which is interesting, this definition of a good design – i.e. agreement between form and content – refers to an even older, ancient, notion of decorum, i.e. appropriateness, suitability, adequacy, introduced by Aristotle, developed by Sokrates and popularised in the modern theory of art [29].

The conviction that a set of rules exists in typography, that should be observed and that should be taught to students during the preliminary stages of education, common among experts interviewed, also constitutes a reference to the modernistic definition. Any possible experiments, search for non-standard solutions, going beyond the patterns is possible only after the rules have been learned and after the skills of correct, i.e. "transparent" type-setting, one that is not necessarily striking but is functional, have been mastered. Such typesetting is sometimes described as more difficult, more demanding, than more experimental solutions – because it requires accuracy, attention to detail, and at the same time – hiding your individually, giving up your own style. To achieve this effect, the essential things are focus, concentration, and first and foremost correctly conducted design process. This is a vision that refers among other things to Beatrice Warde's classic text of 1932 [30], which was as a matter of fact cited by one of the respondents.

Form usually appears in the respondents' statements in the context of function – as a visual shape taken by the communication, and not as an element that is juxtaposed with content or appearing in separation from it. Our respondents rarely refer to aesthetic categories, maybe even consciously avoid them. A thought appears in the statements of several respondents that typography is not about things "being nice" but about functionality, solving a design problem, making it easier to receive the text. Expectation of a visually striking effect is sometimes juxtaposed with the designer's correct attitude, i.e. striving to solve the problem. Experts less frequently mentioned expression – usually in the context of typography enticing emotions, influencing the audience, and more readily as individual expression, associated more with art and not design. Exercises geared towards expression most frequently appeared therefore in the context of lettering (drawing letters, free gesture, experimentation, breaking patterns).

The strive towards objectivization of aesthetic evaluation, which should be based on clear criteria (correctness of typesetting, agreement between form and content) and not subjective feelings (whether something is "nice"), and which refers to the modernistic vision of typography, can also be seen in the statements of our respondents. At the same time, experts emphasise the role of "familiarization" – several respondents provide exercises consisting in seeking out well and badly designed typographic communications in the public space, and they also mention the role that the contact with good typography played in their career.

■

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26. S. Gudkova, *Wywiad w badaniach jakościowych*, [in:] D. Jemielniak (ed.) *Badania jakościowe. Metody i narzędzia*, PWN, Warszawa, pp. 120-123.
27. *Podaj dalej...*, op. cit., p. 264.
28. Ibid., p. 71.

29. The original notation of the title using minuscule was retained in the text.
30. B. Warde, *Kryształowy kielich*, [in:] P. Dębowski, J. Mrowczyk (ed.), *Widzieć, wiedzieć...*, op. cit., pp. 39-45.

DESIGNER AND ACCESSIBILITY
by **Ewa Gołębiowska**

"dsignn" is a combination of "design" and "sign". Process and meaning – appropriate words for a magazine that wants to be a space for exchange of experiences and presentation of new design concepts. Accessibility is not a new idea, but it is worthwhile to learn about diverse and changing approaches, methods, and design practices, so that at the end you can see that this approach is needed for us ourselves and not, as one could think – for "them", i.e. people with disabilities and limitations.

A little bit of history

We have to be clear about it: it was wars and the situation of veterans (particularly after the Second World War and the Vietnam War) that brought a change of attitudes, and with it, although not so quickly, legal changes. Many years had passed before rules for the design itself were formulated – the design of products, services, communication – addressed to people with disabilities.

Polish Accessibility for Persons with Special Needs Act was adopted as late as in 2019. It introduces universal design, on which the UN Convention on the Rights of Persons with Disabilities is based, as the current standard. Created by an American architect Ronald Mace in the 1980s, universal design is design of products, environments, programmes and services to be useable by all people, to the greatest extent possible, without the need for adaptation or specialised design. Thus, universal design is to be characterised by: equal access, flexibility of use, simplicity and intuitiveness in use, clear information, tolerance for error, minimisation of physical effort, space parameters and dimensions that permit access and use [1].

Simultaneously, in the United Kingdom, inclusive design has been developing, formulated in 1994 in Helen Hamlyn Centre for Design [2]. It accentuates the need for inclusion of needs of the broadest user group possible. Inclusive design focuses on identifying groups which have previously been excluded, not only based on age and disability. The design thinking method is being used as the leading principle of the design process which is conducted from the very beginning together with the user.

Slightly later, but also longer, the idea of Design for All has matured. The Institute for Design and Disability established in 1992 in Dublin supported rights and needs of persons with disabilities. The Stockholm Declaration (2004), the most important document of the organisation, accentuates the growing diversity of people in Europe in terms of age, culture, social position, or abilities. Currently, EIDD "Design for All Europe" constitutes a platform for associations, design centres, design universities as well as cities and regions whose task (and maybe even mission) is to ensure equal opportunities in every aspect of life [3].

Design includes!

Obvious? Not at all... It is worth remembering that even quite recently exclusivity had no negative connotation and design was believed to be a discipline used to make products and services stand out among many similar ones on the market. "Value added" that was equated to design allowed profits, i.e. the product price, to grow, thus creating an aura of desire around "designer" goods. In early 21st century Poland, design was a symbol of aspiration, ambition, success in life. Victor Papanek's "Design for the Real World", with its famous first sentence ("There are professions more harmful than ▶▶

1. Kamil Kowalski, *O co tyle szumu? Projektowanie uniwersalne.*
    https://formy.xyz/artykul/o-co-tyle-szumu-projektowanie-uniwersalne/
2. https://www.rca.ac.uk/research-innovation/research-centres/helen-hamlyn-centre/
3. Polish members of EIDD Design for All Europe are: Academy of Fine Arts (ASP) in Katowice, Design Centre in Gdynia, University of Life Sciences in Poznań, Cieszyn Castle.

industrial design, but only a very few of them"), came out in print in Poland in 2012, i.e. 40 years after it had been first published. Maybe earlier there was no climate suitable for design critique? The awareness of how much it contributes to the disease of consumerism and destruction of our planet's resources is growing fast, and exclusivity of design is being supplemented with a left wing, social inclusion.

For whom?

The disability symbol known to everyone – the silhouette in a wheelchair – dominated the notion of and the way of thinking about persons with special needs for a very long time. It was designed by Susanne Koefoed in 1968, when the number of people with disabilities in comparison with contemporary times seemed much lower (around 5%), and the architectural and systemic barriers were incomparably higher. In 2022, in Europe itself, there were 101 million – 27% of the population – of them (us?) [4]. Does this mean that, despite the progress in medicine, the health of Europeans has deteriorated dramatically? Not quite, although longer life expectancy, widespread lifestyle diseases and cognitive disorders do have an impact on the surprisingly high results. When designing, one must remember about the invisible and hidden disabilities, also these relatively new ones. It is estimated that neuroatypical persons may constitute even 20% of today's society.

What does this mean for a designer?

You could write contrarily: nothing new, small changes... First the pronouns: "they" has to be replaced with "WE". Because even if we are not suffering with any serious conditions that restrict our independence, this can refer to our loved ones. If we are lucky and live to a ripe old age, the limitations will appear gradually but inevitably. Fashionable optical frames, invisible lenses and hearing aids are the imperceptible element of everyday life. Just like wheely suitcases and baby

prams. Only it is getting worse, we live in a turbulent world of climate catastrophes, armed conflicts, migrations – and this is also our everyday life. Pete Kercher (EIDD Design for All Europe) repeats that design constitutes an intelligent response to the changing needs of people. Also those we do not know.

Another change must be made in the design practice, this time in prepositions, because "for" is being replaced by "with", i.e. co-design. In terms of methodology, not grammar, this means using the principles of the design process. Empathy, cooperation, but also iteration. Shared problem formulation, including a check – who we unintentionally exclude, looking for solutions together, prototyping, honest testing, and validation. Guidelines and limitations concerning graphic accessibility: contrast, alternative text, letter size and typeface, and finally simplicity of language and the design itself may seem a restriction. In reality, as any difficulties, they just stimulate creativity and have a positive impact on the final effect.

Thus, in exchange, we receive much more than just compliance with statutory requirements. The available design means customer satisfaction and loyalty, and for the designer – satisfaction with solutions that are unique and addressed to the majority. ∎

Ewa Gołębiowska

Initiator and in the years 2005-2021 Director of Cieszyn Castle. Co-founded among other things the Silesian Design Network (Śląska Sieć na Rzecz Wzornictwa), Silesian Thing (Śląska Rzecz) competition, Graduation Projects review, or Design in Public Space (Dizajn w Przestrzeni Publicznej). Active participant of many European cooperation networks, including SEE Platform, DME Award, Human Cities and EIDD Design for All Europe – she chaired the latter organisation in the years 2013-2017. From 2022, Vice-President of the SPFP Design Association.

4. Data based on Eurostat data for 2022, https://www.consilium.europa.eu/pl/infographics/disability-eu-facts-figures/

Design

Maciej Błaszak, PhD

as an element of expanded human mind

"Remember first to possess his books,
for without them He's but a sot, as I am."

William Shakespeare, *The Tempest*

Design is a type of heuristic activity which forces you to experiment with possibilities and devise innovative solutions, unlike algorithmic activity which solves problems based on a set of predetermined instructions. Heuristic activity means making decisions on the basis of limited information, and understanding the problem in an imperfect way, tainted with certainty that is not there and knowledge that is a product of group confabulation. The most frequent obstacle in the process of discovering new solutions is not the designers' ignorance but the illusion of knowledge they have.

We have a love-hate relationship with the uncertainty arising from ignorance. We hate it because uncertainty generates losses and deprives us of control. We love it because uncertainty introduces the "maybe" element into our life. Maybe next time I will have more luck and maybe it is not as bad as everyone thinks. This type of uncertainty put – in the remote evolutionary past – a strong adaptive pressure on learning mechanisms, first and foremost through Bayesian inference, from empirical evidence about its most probable causes [1]. When inferring, the brain reduces uncertainty arising from ignorance – i.e. so called "known unknowns" – by updating contents of mental hypotheses. For example, 83% of highly qualified radiologists who are supposed to identify cancer lesions on lung scans fail to notice a gorilla silhouette placed in the picture, a silhouette that is 48 times larger than an average-sized lesion. Even then, however, the variability of results from one diagnosis to another still exists. We receive a sequence of diagnoses in which the percentage of radiologists who have failed to notice the gorilla silhouette is lower or higher than 83%. This variability constitutes the non-reducible uncertainty, i.e. "unknown unknowns" [2].

Thus, a designer encounters significant doses of uncertainty which require two types of mental effort from them. Firstly, they should eliminate – while still learning – this type of uncertainty which creates "known unknowns". Secondly, they should know when to stop learning! Without a clear signal *"you have learnt everything that was possible – now stop"*, the designer's brain will continue to attack the problem in which mostly "unknown unknowns" remain, which leads to colossal losses of energy and breaking of rules of efficient information processing in the nervous system [3]. These rules are free and imprecise processing of neuronal prediction errors so that the brain can stay within its energy budget of a 20-watt lightbulb.

The limitations of "unknown unknowns" in design may be alleviated by the design itself. In order to understand how, you must say goodbye to a certain myth shared by people and most of social sciences (including neoclassical economy), stating that complex forms of behaviour require the existence of a complex brain mechanism. Studies of embodied [4] and situated [5] forms of cognition show that cognitive processes are exported en masse outside the boundaries of the brain in order to reduce its demand for energy. From this perspective, the complexity of human behaviour reflects first and foremost the complexity of the ecological niche we inhabit. The difference between Prospero and Caliban from Shakespeare's "The Tempest" is that the former has access to achievements of civilisation, and the latter does not.

What is the ecological niche for the human being residing in it? The niche may be perceived as the total of opportunities for action, i.e. offers or affordances [6] which enable us to avoid the overloading the decision maker's mind with excess information. Science records an increase in the intelligence quotient in subsequent generations [7] not because brains are subject to quick phylogenetic changes, but because previous generations – by constructing the ecological niche in the form of carriers of knowledge (e.g. books), emotions (e.g. theatre plays) and experiences (e.g. designed culinary art) – carried out hard epistemic work, helping their offspring understand the surrounding world better. Such behavioural path to create valuable information packs – through designing of impressions, experiences, or views – is cheaper from the point of view of energy consumption than the neuronal path – personal testing using the trial and error method of the world of experiences or convictions – and explains why the basic form of learning for our species is imitation. Cognitive artefacts, embodying other people's minds, change our points of view, and not necessarily the construction and functions of our brains. The evolutionary process of the niche construction explains the exceptional civilisational progress made by human beings, from the moment of supporting our biology with cultural learning processes [8].

Thus, the human being is capable of constructing their own surroundings and, in consequence, evolutionary pressures it is subject to as a species. Being homo faber – man the maker – it ceases to be a passive witness to environmental forces, coping with environmental challenges, and becomes the designer of niches, determining which aspects of the external world are important for the activity, development, genesis and adaptation of the human organism. Paraphrasing French philosopher Emil Chartier ("it is the sea herself who fashions the boats [9]"), we can say: it is the environment, and not only genes, that gives shape to the human mind that is expanded and encompasses the brain, the body, and the designed surroundings of the human beings. In this approach, the designer is a researcher studying cognitive processes on par with a neuroscientist, doctor or psychologist.

Instead of using very expensive "grey matter", the human being supports itself with processes that are cheaper in terms of energy consumption. It is easier to write down than to remember, calculate using a calculator than count in your head, compare two samples of colourful material rather than imagine them. Of course, in order for the body to be part of a healthy expanded mind, it must be able. For the human environment to be this part, it must be well-designed. What features should a design have to be friendly to the homo sapiens brain?

Today's methods of studying functional states of the brain allow the identification of global neuronal networks located in the cortex. To simplify it slightly, there are three cortical networks in a human brain, fulfilling three basic adaptive functions: social security, analytical problem solving, and creative reflection. All three networks remain in a mutual relationship reflecting adaptative priorities of the homo sapiens: the social security network is the basic one in relation to the other two networks of analytical and creative thinking. Human brain evolved first and foremost due to the social environment [10] and its purpose is not to think [11] but for its owner to succeed in life where the success is measured by social criteria. Both networks responsible for thinking are functionally mutually exclusive, nevertheless it is the creative reflection network, active in free time, that constitutes the "default" one. Our brain not only resembles a politician more than a scientist by building its worldview and not looking for the truth due to the social security network, it also prefers freedom from task-based work and likes to spend time daydreaming [12].

It is the salience network [13], which integrates external and internal information crucial to maintaining homeostasis, that is responsible for the social security. This network is connected to the interoception sense which monitors the body ▶▶

1. Hipólito, I., Kirchoff, M., *Breaking boundaries: The Bayesian Brain Hypothesis for perception and prediction. Consciousness and Cognition,* Vol. 111, 2023.
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11. Feldman Barrett, L. *Mózg nie służy do myślenia.* Łódź: Feeria Science, 2021.
12. Bar, M. *Mindwandering.* London: Bloomsbury Publishing 2022.
13. Uddin, L. Salience *Network of the Human Brain.* London: Academic Press.

physiology and sends a report to the insular cortex, and we – subjectively – receive this report as feelings. Positive feelings constitute a signal of an equilibrium, negative feelings signal a disruption to the equilibrium under the influence of various stressors. If the physiological homeostasis is maintained, the insular cortex signals to the motivation centre – and this is the anterior cingulate cortex – the readiness for the human being to undertake an action. This demonstrates, based on the functional organisation of the salience network, that motivation for task-based work – at school, or design work – depends on social support. Maslow's hierarchy of needs must – at first three levels – be redeveloped, with clear bolstering of social needs of the third level. Social deprivation may take a form that is just as acute as the failure to satisfy physiological needs or needs for security.

Networks responsible for analytical problem solving and creative reflection are – respectively – the central executive network and the default mode network [14]. The former, located in the dorsolateral prefrontal cortex, is responsible for task-based work, answering questions, and fulfilment of well-defined goals. The latter, present first and foremost in the medial prefrontal cortex, fulfils five key cognitive functions of the human brain: creativity, categorisation, mentalisation, building of subjectivity and axiological assessment.

And thus, during free time, the brain poses creative questions, organises material inside the head, guesses what other think about us, builds our identity on the basis of values of the group to which we belong, and evaluates reality in the light of the value of care, equity, loyalty, authority, sanctity and freedom which build modules of the moral sense, i.e. conscience, in our brain.

Cortical networks build three dimensions of the subjectivity of a human being. The salience network creates the sensory dimension of our identity ("I feel, therefore I am"), controlling the optimum level of metabolic energy consumption and controlling our activities that are motivated by affective states. The monitoring of health requires for the brain to create a sensory representation of the body in the form of sequence of feelings based on the inter-oceptive integration of information in the insular cortex of the salience network ("I feel good, therefore I am healthy").

The central executive network, in turn, tests mental hypotheses, checking their credibility ("With the assumption that a hypothesis is true, how well does it explain the sensory data collected by the senses?") and building the epistemic dimension of identity ("I think, therefore I am"). And, finally, the default mode network generates mental hypotheses during free time and builds the reflexive dimension of identity ("I imagine, therefore I am"). This network is turned on automatically when we suspend the task-based work and our thoughts start to wander. The Oracle of Delphi's maxim ("Know thyself") and the dictum from Plato's "The Apology of Socrates" (38a, 5–6) ("the life which is unexamined is not worth living") refer unintentionally to the activity of the default mode network.

We know already that we do not think with a "naked" brain, similarly as we do not hammer in nails using a bare hand. A hand needs a hammer, and a brain, besides a working body, needs a well-designed environment. Just like there are different types of tools fashioned to perform different tasks, there must be appropriate features of design that are fashioned to meet the expectations and the method of operation of the three cortical networks in the brain. Therefore, what design parameters are encoded by the social security network, the analytical problem solution network, and the creative reflection network?

Design – from the perspective of its user's brain – has three dimensions: perceptibility, functionality and rationality. Perceptibility, registered using the salience network, has two basic parameters: security and naturality. These two parameters may be reduced to three design indicators: biodegradability, functional minimalism and multi-sensory nature.

Functionality, in turn, for which the central executive network is responsible, is represented by offers (affordances) of the design: grabability of a container, or detachability of packaging. And finally, rationality, analysed by the default mode network, is reflected in project parameters connected with conscience values in the brain. For example, the care value may be realised in the design as conscious care for the environment, and the fairness value – as equal opportunities. ∎

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14. Bressler, S., V. Menon *Large-scale brain networks in cognition: emerging methods and principles.* Trends in cognitive sciences. 14 (6), 2010.

Designing universal information

Małgorzata Sobocińska-Kiss, PhD

"Universal design is design of products and environments to be useable by all people, to the greatest extent possible, without the need for adaptation or specialised design" – this definition of universal design created by the author of the concept, Ron Mace, reflects in fact the entire idea of the methodology.

Ronald L. Mace [1] was in a wheelchair for most of his life after he contracted polio in his childhood. He started his work on accessible designs by designing illustrated visual information for one of the state buildings in North Carolina. Paying attention to the world in which both healthy and disabled people live side by side, he developed tools which enabled him to create more accessible projects. In 1989, at the North Carolina State University (USA), thanks to the funds from the National Institute on Disability and Rehabilitation Research (NIDRR), The Center for Universal Design was established. In 1994, the Center adopted its leading goal: Developing the innovative approach to design, financing and management of projects which make everyday life easier.

Universal design is not a new field of design, but a different, broader approach to it, allowing for a larger quantity of data. It is also worth noting that the term 'disabled person', significantly restricting the recipient group (also in the sphere of psychological and social impact), is more and more often replaced by the term "functionally impaired person". This term refers to the entire society and not, as customarily believed, just to disabled persons. Each designer's goal should be to design products and services in such a way so that as large a number of users can use them, without the need for adaptation ▶▶

1. Ronald Mace, The center for Universal Design, [online] https://projects.ncsu.edu/design/cud/about_ud/about_ud.htm
2. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *"European Disability Strategy 2010-2020: A Renewed Commitment To A Barrier-Free Europe"*, Communication from the Commission to the European Parliament, the Council, the European and Social Committee and the Committee of the Regions European Disability *Strategy 2010-2020: A Renewed Commitment To A Barrier-Free Europe*, Brussels, 15.11.2010. COM(2010) 636 final version, [online] https://www.rpo.gov.pl/pl/content/ europejska-stategia-w-sprawie-niepe%C5%82nosprawno%C5%9Bci-0

or specialised design. In accordance with the universal design principles, solutions aimed at compensating shortcomings of functionally impaired persons (e.g. stairlifts) should be abandoned. It should not be indicated either that a product has been designed especially for disabled persons. Of course, work on specific designs usually starts with individual target groups' problems with disfunctions, but products and services designed in accordance with the universal design principles are used successfully by the majority of society.

Accessibility – legal deliberations

If we look at people as a set of completely different and individual entities, we immediately come up with a conclusion that accessibility is the basic condition of functionally impaired people being able to take part in the social and economic life.

On 15.11.2010, in Brussels, the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "European Disability Strategy 2010–2020: A Renewed Commitment To A Barrier-Free Europe" [2].

"... The EU and its Member States have a strong mandate to improve the social and economic situation of people with disabilities".

▸ Article 1 of the EU Charter of Fundamental Rights (hereinafter referred to as the "Charter") stipulates that: "Human dignity is inviolable. It must be respected and protected".

▸ Article 26 states: "The Union recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational

integration and participation in the life of the community". Moreover, Article 21 prohibits any discrimination based on disability.

▸ The Treaty on the Functioning of the European Union contains the requirement for the Union to aim to combat discrimination based on disability (Article 10) in defining and implementing its policies and activities, and the possibility of adapting the EU legislation for this purpose (Article 19).

The UN Convention on the Rights of Persons with Disabilities [3] (hereinafter referred to as the "UN Convention"), which was the first legally binding instruments with regard to human rights the parties to which are the EU and its Member States, will soon be in force in the entire EU. The UN Convention obliges its States Parties to "protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities ...".

The purpose of the Strategy is to enable the largest possible number of disabled persons to fully participate in professional and social life. The European Commission defined eight areas for action:
1. Accessibility,
2. Participation,
3. Equality,
4. Employment,
5. Education and training,
6. Social protection,
7. Health,
8. External action.

In Europe, the universal design idea is dealt with by EIDD [4] (European Institute for Design and Disability), an organisation established in 1993 in

Dublin. It was appointed in order to promote design for functionally impaired persons in Europe. After some time, this activity was expanded to include activities in support of design for all. In 2006, the name was changed to EIDD – Design for All Europe. EIDD is a federation of 44 organisations from 23 European countries, promoting the idea of improving the quality of life through the implementation of the principles of Design for All. From 2009, Cieszyn Castle (Zamek Cieszyn) is a member of EIDD – Design for All Europe. The Management Board of EIDD Design for All Europe decided to place the only EIDD archive in Europe in Cieszyn Castle. On 4 December 2010, Cieszyn Castle opened Michał Oźmin's Institute of Design for All [5]. The Institute plays the role of a hub for members of EIDD and constitutes a centre of research and popularisation of the idea of design for all.

One of the most important areas without which it may be difficult to implement the other ones is accessibility and elimination of barriers. The accessibility of services, facilities, transport, technology and ICT systems constitutes the basic condition for inclusion of functionally impaired persons, and particularly disabled persons, into the community life.

"In order to ensure positive living conditions in Poland, a comprehensive programme is needed, ensuring multi-aspect, systemic and coordinated actions. Their aim is to improve the quality of life and ensure its independence for persons with special needs, including the elderly and persons with permanent and temporary impairments of mobility or perception. This will be achieved through improved accessibility of public space, including architecture, transport, products and services on a wide scale" [6].

In accordance with the European guidelines, in March 2018, the "Accessibility Plus" Government Programme for the years 2018–2025 was announced in Poland. This Programme stipulates action in many areas. The first one is inclusion of accessibility problems into public policy, with regard to both

planning and implementation of investments. The Programme assumes among other things the introduction of legal regulations which will guarantee accessibility in infrastructure, means of transport, signage in public space, or means of electronic communication. Each new investment connected with the public area must meet the requirements of accessibility. In consequence, consumers are more willing to use products and services, which in turn provides their suppliers with a competitive advantage. In order to achieve the assumed goals, it is necessary to introduce accessibility issues to a greater degree than has been the case so far into the curriculum of design and architecture studies. The actions under the "Accessibility Plus" Programme are to be implemented in 39 activities in the areas of architecture, transport, education, healthcare, digitalisation, services, competitiveness and coordination.

One of the areas included in the "Accessibility Plus" Programme is the improvement of accessibility of healthcare facilities, implemented under Activity 15. "The Activity will aim at improving architectural, digital, communication and organisational accessibility in healthcare entities selected through competition". Accessibility refers here not just to architectural aspects but also to the appropriate signage in public healthcare facilities, which usually has not been taken into consideration.

The publication of the "European Disability Strategy 2010–2020: A Renewed Commitment To A Barrier-Free Europe" and of the "Accessibility Plus" Programme comes eight years apart, but there is a big difference between the assumptions of both documents. The change of thinking about accessibility is apparent here. The authors of the European strategy focus mainly on physical and social needs of disabled persons as those that are most in need of help.

It obliges the European Union countries to ensure full participation in professional and social life for disabled persons through the removal of barriers.

In turn, as the introduction to the "Accessibility Plus" Programme indicates, its authors took into ▸▸

Fig. 1 Symbol of the medical model of disability. Source: own study.
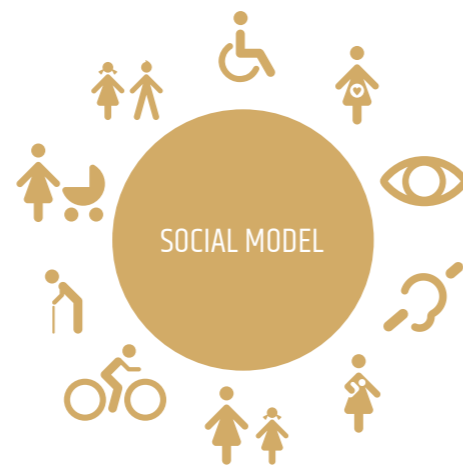
Fig. 2 Symbol of the social model of disability. Source: own study.

3. *United Nations Convention on the Rights of Persons with Disabilities*, New York, 13 December 2006, [online] http://niepelnosprawni.gov.pl/container/dokumenty-miedzynarodowe/onz/Konwencja%20ONZ%20o%20prawach%20osob%20niepelnosprawnych.
4. EIDD – European Institute for Design and Disability, [online] http://dfaeurope.eu/
5. Michał Oźmin – architect, designer, author of research work, lecturer, graduate from the Interior Design Faculty of the Warsaw Academy of Fine Arts and the University of Manchester Institute of Science and Technology. He was the first Head of the Department of Design of the National College of Art and Design in Dublin, responsible for introduction of the modern model of education about design in Ireland and at Southampton Polytechnic. He held the function of President of the Association of Designers in Ireland (currently the Institute of Designers in Ireland, IDI), and later President of the Institute of Design and Disability. In 2003, Michał Oźmin joined the Executive Committee of EIDD. He was elected the honorary treasurer, and then Vice-President for Finance. He held this function until his death in January 2011. [online] http://www.zamekcieszyn.pl/pl/artykul/instytut-projektowania-dla- wszystkich-im--michala-ozmina-210
6. Ministry of Investments and Development. *Accessibility Plus Government Programme 2018-2025*. Warsaw, 2018. [online]. Access: https://www.miir.gov.pl/media/60878/Program_Dostepnosc_Plus.pdf.

account not just disabled or elderly persons, but also other people with special needs. Disabled persons are only some among many addressees of this Programme, which this way becomes more accessible itself. One of the methods of improving accessibility that are mentioned in the document is universal design which helps create accessible goods and services.

According to the "Convention on the Rights of Persons with Disabilities":

"Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others".

The greatest problem of such categorisation is the subconscious creation of a division into Us (healthy) and Them (ill, different). Whereas the term functionally impaired person concerns temporarily and in specific circumstances the entire society.

Such persons include [7]:
- parents with children in prams/buggies,
- small children up to the age of 7 – due to their height and difficulties with reading and concentration,
- very short and very tall people,
- left-handed people,
- people with dyslexia, etc.,
- people with allergies,
- foreigners who do not speak the local language,
- people with vision defects (even minor ones),
- people who have been involved in accidents, who have temporary problems with mobility,
- elderly people,
- people in wheelchairs.

Universal design

The universal design principles have been created on the basis of personal experiences of functionally impaired persons. Despite the fact that several decades have passed since their creation, they resist the passage of time because they do not refer to technology but to universal truths the following of which should be obvious. The seven principles may be referred to each area of design, both concerning products, information, and services, provided we want to retain the usefulness of designs. Unfortu-

nately, their careful application requires the designer to analyse a larger amount of data and to take into consideration a larger number of circumstances, due to which the design period is extended. In exchange, we receive an intuitive "product", devoid of most faults, because it is the designer who assumes all of the effort. "Ordinary" creation of designs takes less time, however we transfer some of the thinking to the consumer who often must use more effort when operating such a object or using a service.

Seven universal design principles [8]

▶ **PRINCEPLE 1 – EQUITABLE USE**
The design is useful and marketable to people with diverse abilities.

▶ **PRINCIPLE 2 – FLEXIBILITY IN USE**
The design accommodates a wide range of individual preferences and abilities.

▶ **PRINCIPLE 3 – SIMPLE AND INTUITIVE USE**
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

▶ **PRINCIPLE 4 – PERCEPTIBLE INFORMATION**
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

▶ **PRINCIPLE 5 – TOLERANCE FOR ERROR**
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

▶ **PRINCIPLE 6 – LOW PHYSICAL EFFORT**
The design can be used efficiently, comfortably, and with a minimum of fatigue.

▶ **PRINCIPLE 7 – APPROPRIATE SIZE AND SPACE FOR APPROACH AND USE**
Appropriate size and space is allotted for approach, reach and manipulation regardless of physical characteristics such as size or mobility.

At first glance, universal design is tantamount to barrier-free design. We think that it is enough to remove a barrier in order for a disabled person (because we are usually thinking about them) to move freely in their surroundings.

Medical model of disability

Such thinking is consistent with the medical model of disability that has applied so far; such model approaches disability as a problem of the specific entity that is treated as a patient who requires help and because of this constitutes a social "problem". Such person becomes "socially impaired"

because it is condemned to lack of independence and help from others. The approach of the majority of "healthy people" is based on the medical model and the tragedy/charity/pity model in which the disabled person deserves sympathy and pity of the general public.

A good example may be the designation of special disabled parking spaces. From the point of view of the medical model, it is a good rule. A disabled person has a designated spot which no one else will occupy and may reach it in a wheelchair. Unfortunately, the relevant signage at the same time stigmatises the disabled person. On the other hand, the example of frequent blocking of parking spaces for disabled persons by persons without disabilities shows that sometimes you have to choose lesser evil to ensure maximum comfort for a person in need. For this reason, the Ministry of Infrastructure and Transport, in its regulation of 3 July 2015 [9], changed the signage designating disabled parking spaces by additionally painting them blue. On top of this, fines for parking on the so-called "envelope" were increased.

Social model of disability

The social model approaches disability as a problem of the entire society which should aim to ensure that each of its members is independent. A disabled person is not a patient here but a client who has the right to decide about their own, independent life, but also, which is equally important, about the purchase of goods and services that fully suit them. In this model, the term disabled person is replaced by the term functionally impaired person. They are treated in the same way as other members of the society, and through the removal of all architectural, informational, legal and mental barriers, they can function normally. This model assumes that disability actually lies in the surroundings that are not adapted to full diversity of people functioning there and this is why we should change the environment and not adapt the human to it. The universal design methodology is based on the social model of disability.

Impact of demographic changes on design

At the moment, in the minds of young people from the so-called Generation Y [10], from the point of view of work, after 30 we are starting to slowly move towards old age. Although people aged 30 on average have only worked for just 6–7 years, forty-year-olds are believed to be "elderly" in terms of

their career, despite the fact that as many as 25 years remain until they retire. Such thinking shunts the majority of working people to the sidelines. Paradoxically, the age at which young people become independent and start their own families is changing. The so-called Millennial Generation lives with their parents for a very long time because the quality of life becomes more important for them than possessions, as a result of which they don't want to "tie themselves down" with larger liabilities, such as e.g. a bank loan. They want work to be just one element of their lives and they don't want it to take up all of their time which they would like to devote also to other areas. Becoming independent later also means starting your family later, and which follows – having children later. According to statistical data, demographic changes which started in Poland in 1990s caused that currently the highest fertility in women is in the 25–29 age group and not 20–24 as in previous period. Additionally, with each year the number of women aged 35–39 who decide to become a mother is growing. Women, just like men, want to achieve high positions and social status. In 2012, the percentage of young mothers with higher education increased nearly sevenfold (from 6% to over 45%) in relation to 1990s. In 2013, negative birth rate was recorded, mainly due to the number of births that was lower than in 2012 with the simultaneous increase in the number of deaths.

Based on the data published in Demographic Yearbook 2023 prepared by Statistics Poland [11], in 2023 in Poland, there were 65 people of non-working age per each 100 people of working age. There are 7,644,000 people of pre-working age and 7,353,000 people of post-working age per 22,770,000 people of working age (Fig. 3). Forecasts for 2050 look much less optimistic. It is predicted that the total population in Poland will decrease from 38,036,000 to 33,950,000 people. The number of people of pre-working and working age will also go down.

However, the number of people of post-working age will go up by as much as 69% as a result of which the burden on working age people will increase drastically (by 60%). For now, these forecasts do not allow for any possible migrations which could increase the birth rate and rejuvenate the society, but at the same time could cause the appearance of language or cultural barriers, which has been apparent for several years in Western European countries. ▶▶

7. Own study based on: The Norwegian Ministry of Environment, *Thematic report Universal design Clarification of the concept*, November 2007, [online] http:// niepelnosprawni.gov.pl/container/publikacje/projektowanie-uniwersalne/projektowanie-uniwersalne.%20Objasnienie%20koncepcji.pdf
8. The Center for Universal Design, *The Principles of Universal Design ©*, [online] https://projects.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm

9. Regulation of the Minister of Infrastructure and Transport of 3 July 2015, Poz. 1314. *Journal of Laws of the Republic of Poland*, Warsaw, 7 September 2015.
10. Generation Y, or so-called Millennials – persons born, according to different sources, in the years 1984 - 2000, [online] https://pl.wikipedia.org/wiki/Pokolenie_Y

	2022	2050	change
pre-working age 0 – 19	7 644 tys.	4 963 tys.	− 36% ↓
working age 20 – 65	22 770 tys.	16 583 tys.	− 28% ↓
post-working age 65+	7 353 tys.	12 404 tys.	+ 69% ↑
Population aged non-workin age per 100 people of working age	65	104	+ 60% ↑

Fig. 3 Age distribution of Polish society in 2023 and forecast for 2050. Own study based on: Statistics Poland, Statistical Publications Unit, Demographic Yearbook 2023, ISSN 1505-6716.

The data from the Office of the Government Plenipotentiary for Disabled Persons, Ministry of Family, Labour and Social Policy, developed on the basis of the 2011 National Census [12], indicate that there were 4.69 million disabled persons in the Polish society, of which 2.28 million were persons of working age. Only 19% of this group (920,000 persons) were professionally active. The rest, due to their health and numerous barriers, both architectural and mental, could not earn a living.

These data are definitely not optimistic, however they provide information that will help to prepare for the future in the longer term and adapt our surroundings and mentality to the future needs.

Designing effective visual information systems

Before we become aware of the information and are willing to take action, first the information is processed in our subconscious. The process of transition from the subconscious to conscious phase takes around 10 seconds. In a situation when quick response is required, our body acts in the state of subconsciousness in which we process the largest quantity of information, but we also feel unity with what we are doing. In 2005, Mihaly Csikszentmihaly referred to this state as flow [13]. It is also a state in which we do not have to control the tools and we are simply performing our work, which may be pleasurable for the user and at the same time take much less time.

Designing both visual information systems and information overall constitutes a huge challenge during which many factors and diversity of addressees of each communication must be taken into account.

We must remember that some users [14]:
▸ cannot see,
▸ cannot hear,
▸ cannot understand,
▸ receive information in a way that is different from that assumed.

Users with limited access to visual information include:
▸ blind persons,
▸ small children,
▸ visually impaired persons,
▸ persons with impaired colour vision (e.g. colour-blind persons),
▸ foreigners not speaking the local language.

Users with limited access to sound information include:
▸ deaf persons,
▸ hard of hearing persons,
▸ persons using information in difficult conditions (e.g. in noisy surroundings),
▸ persons who have equipment without amplification or who turn the sound down.

Users who have problems understanding the content include:
▸ small children,
▸ persons with reduced intellectual norm,

11. Statistical Publications Unit, *Statistics Poland, Demographic Yearbook 2023*, ISSN 1505-6716.
12. Office of the Government Plenipotentiary for Disabled Persons, Ministry of Family, Labour and Social Policy, *Demographic data based on the National Census 2011*, Warsaw, 2015.
13. Mihály Csíkszentmihályi, *Przepływ*, publ. Moderator, Wrocław 2008.

▸ persons with low level of education,
▸ persons not knowing the specialist and hermetic language,
▸ foreigners and people with poor command of the given language.

It should be pointed out that well-designed useful information makes it possible to reduce physical exertion and stress of functionally impaired persons to a minimum. Badly conveyed information generates many unpleasant consequences, both in the physical and in the emotional, mental or economic sphere.

Consequences of badly designed signage:
1. Physical – generating tiredness (client/patient must cover additional distance),
2. Emotional and mental – fear of being late, anxiety which can be manifested somatically, reduced self-esteem ("I misunderstood something again"),
3. Economic – being late may result in needing to buy another ticket or losing a business client.

It can be noticed that, in the case of airports or train stations, people who make decisions usually attach a lot of importance to the appropriate design and implementation of visual information. Managers of shopping centres, treating signage as an aesthetic addition, disregard the stage of implementation in the specific surroundings. The author's analysis indicates that it is the implementation stage that generates most of the errors connected with logic and consistency of information provided.

Analysis of the visual information system – work with students

Designing functional public space constitutes a challenge for the designer. Allowing for diverse needs requires a multilayered analysis of a large quantity of data. During studies, young design trainees are often given simple design tasks. They are only able to encounter advanced projects conducted in teams when they have undertaken work in their profession in which there is little time for training and the client expects results, this is why during classes at the Visual Information Systems studio in the years 2016-2023 the author implemented an educational programme for students of the first year of undergraduate studies which enabled them to become acquainted with work in a design team and with solving complicated design problems.

The "Golden Terraces" ("Złote Tarasy") Shopping Centre, located in the very centre of Warsaw, right next to the Central Railway Station (Dworzec Centralny), was selected for the semestral project. The Centre houses shops, restaurants, cinemas and service outlets. Since its opening in 2007, it has been visited by over 330 million people. This is where paths of many clients, Warsaw residents and travellers (both Poles and foreigners who have a varying command of Polish) cross. Those who are visiting Warsaw for the first time, and regular visitors. In each of these groups we can find people of any age, build, physical and intellectual capabilities, battling allergies and phobias. The building has a complicated layout.

Outlets open to customers are located on five levels, from -1 to 3. Customers additionally have an extensive underground car park at their disposal (levels -1 to -4).

Unfortunately, the existing visual information system has been designed perfunctorily and inconsistently, probably by several different creators, as a result of which many customers feel lost here, and some give the "Golden Terraces" a wide berth. The Centre is therefore a great testing ground for students.

The semestral design task is conducted in a 7 to 10 strong team which includes both people who know the Centre very well and move around it "by memory", and ones that do not know it well and feel lost there.

During the first class, both the design process and the universal design methodology are discussed, as they have to be taken into account during the creation of the design.

Work on the design is broken down into stages:
1. participant observation in which students as customers are to check whether by using the existing information they will be able to find toilets, the cinema, the exit or a shop,
2. preparing the photographic documentation of the existing status,
3. analysis of the existing visual information in key areas of the shopping centre, allowing for the needs of individual groups of customers,
4. presentation of the proposed design changes for individual areas.

In most of simple tasks created during studies, the focus is mainly on aesthetics and style of the design. Students think in the "pretty-ugly" categories. Therefore, before work on the design starts, students believe that the design will not require a lot of commitment and thinking from them because the signage in "Golden Terraces" is "aesthetic and elegant". At the same time, they are defending ▸▸

14. Jacek Zadrożny, *Universal website design*, Regional Development Institute Foundation, 27 October 2010.

themselves against the need to face up to the actual problem.

As the work progresses, students notice more and more errors in the existing system and design problems that need resolving. They keep returning to the Centre to verify the premises for the design and problem solutions. As a result of the multi-layered analysis of data, they manage to identify reasons for which the Centre is not very customer-friendly, e.g. lack of logic in visual information, visual chaos, no information about important services, or bad signage for car parks and access routes to them.

The analysis is always conducted allowing for seven principles of universal design. Its effect is each time the creation of a design in which the information system logically leads the customer to the expected destination, thanks to the graphic unification of all models of communication, as well as logic and consistency of information.

The visual information system design for the "Golden Terraces" Centre enabled the students to face up to a complicated and multifaceted design thanks to which, as the work progresses, they start noticing design issues that are overlooked during the studies. After the in-depth reading of the universal design principles, they can very quickly identify all errors of the existing design and propose innovative solutions which can make it easier for customers to move around the Centre, and thanks to the careful application of these principles, they manage largely to create satisfactory solutions.

Designing visual information in health care establishments

The overriding goal during the development of the hospital information system concept should be to create an environment that is friendly for patients, staff and visitors. The most important task is to show the person remaining within the hospital premises the shortest route to the location they want to visit or to the person who is going to directed them to it. Just like many other public utility buildings, hospitals are usually impersonal. The patient or their family, when arriving at the hospital, are in a difficult situation. Their focus is on their own or their loved ones' health. As a result, they are disoriented and find it difficult to move around in the new space.

During her work on the design of the Visual Information System for the district hospital in Pruszków, the author conducted many interviews with patients, personnel and management of several hospitals, also as a patient and a patient's carer. The observations and interviews indicate that information and directions for patients constitute a link in the chain that is often disregarded or

treated very perfunctorily during the organisation of a medical establishment.

A frequent phenomenon in old hospitals is that the signage is created by the medical personnel. You often encounter sheets of paper with information printed out or written on them with a felt-tip pen, or notes added with a pen in the lifts. Because signage has often not been thought through, the entire information has to be delivered orally by the staff who are constantly being asked by patients and their families where various medical services are located. For some time now, the situation has been slowly changing, although the problem of visual information that constitutes a component of accessibility is still an afterthought when the construction or extension of the hospital has been completed. When information systems are being designed, the issues traditionally considered are functionality and aesthetics of the design. Human experiences and feelings are rarely taken into account during the design phase in order to create space that is accessible to the broadest group of people possible.

Design from the user's point of view

Designs connected with healthcare are particularly difficult because they must allow for factors connected both with medical procedures and the entire patient treatment process.

Point of view from the visual communication perspective
- communicator (perspective of intention),
- messenger (proximity) visual and verbal communication, information for patients, staff, visitors,
- recipient (reception) – mainly patients, but also staff, visitors, persons from outside the hospital, patients of the laboratory, specialist clinics, etc.

According to the hierarchy formulated in 1943 by Abraham Maslow, each message/process/service fulfils its recipients' needs in a strictly predetermined order, in the first place satisfying physiological and safety needs, and self-actualisation needs last (fig. 4). In the case of services in the healthcare system, both the needs of patients and of the staff and third parties are being fulfilled.

Fulfilment of patients' needs:
1. physiological needs – treatment, intimacy in the examination area, as well as in rooms, corridors and bathrooms,
2. personal safety and safety of personal belongings,
3. belonging to a group – making friends through shared health experiences,
4. esteem and respect from medical personnel, general personnel, as well as other patients and visitors.

5 Self-actualisation
4 Esteem
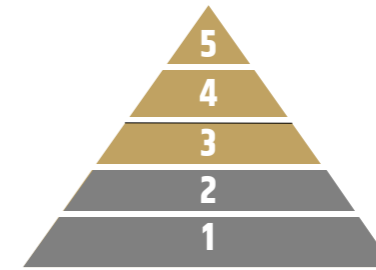**3** Belonging and love
2 Safety
1 Physiological

Fig. 4 Maslow's hierarchy of needs. Source: Own study based on https://pl.wikipedia.org/wiki/Hierarchia_potrzeb[15]

Fulfilment of personnel's needs:
1. physiological – bathrooms,
2. personal safety and safety of personal belongings,
3. belonging to the medical personnel group,
4. esteem and respect from medical personnel, patients and visitors,
5. professional self-actualisation.

From the patients' point of view, it seems that the most important thing is the fulfilment of the lower level needs, i.e. physiological and safety. For the medical personnel, in turn, the fulfilment of the higher level needs is essential. A hospital, which at the same time is a medical establishment and a workplace, should fulfil all of the patients' and personnel's needs.

The following are components of a well-designed establishment:
- well thought out architecture, accessible for functionally impaired persons, at the same time comfortable as a workplace,
- appropriately developed medical procedures,
- appropriately developed patient care procedures,
- appropriately developed information system.

Information in the healthcare system should be provided based on the FEEL – THINK – ACT formula. A good design should ensure that the reception of information commences already at the stage of feeling, i.e. during the flow phase.

The research conducted by the creators of the "ADA White Paper" [15] indicates that information that can be received by functionally impaired persons should be placed on matt backgrounds. Forms which reflect light, such as mirrors, shiny glass or plastics, in the case of persons whose perception of space is impaired, as well as persons with mental limitations or phobias, can cause disorientation or even panic attacks.

Selection of typography

Polish Association for People with Intellectual Disability (PSONI), together with similar organisations from Scotland, Finland, France,

Ireland, Germany, Portugal, Austria and Lithuania, prepared "European standards for making information easy to read and understand" [17], compliant with the universal design principles, helping designers to prepare texts for people with intellectual disability. People with intellectual disability generally find it easier to read and understand texts which have been written using a sans-serif typeface and a combination of capital and small letters (e.g. Waiting Room). The Americans with Disabilities Act [18] states that any discrimination against disabled persons with regard to access to goods, services and employment is unlawful. ADA constitutes the expansion of the Civil Rights Act of 1964 which prohibited the discrimination of any person on the basis of race, religion, sex, nationality, etc. On 26 January 1992, Americans with Disabilities Act Accessibility Guidelines (ADAAG) came into effect. In March 2011, these standards were updated, and in 2012, SEGD (Society for Environmental Graphic Design) created the "ADA White Paper" which is to help designers and decision-makers to adapt the public utility structures for functionally impaired persons. According to the recommendations included in the "ADA White Paper", in any signage for visually impaired persons, any titles and names should be written in upper case which is easier to read.

It is assumed that there are around 25% of people with vision impairments in the entire society. In the age group of 60+ this percentage increases to 75%. Patients in the hospital in Pruszków are mostly elderly persons, often with problems with their eyesight. Persons with intellectual disability constitute a small percentage of patients.

The guidelines analysed indicate that the lettering used to create visual information systems in healthcare establishments should be:
- sans-serif (the easiest to read by persons with vision impairments),
- proportional in structure, in order to make it legible, but narrow enough to include as much information as possible in the formats required,
- legible both in positive and in negative.

▶▶

Besides the selection of typefaces as described in the previous section, a lot of attention should be paid to the determination of the appropriate size of letters, depending on the distance to the viewer. Letter sizes have been determined on the basis of ADA research presented in figure 5.

Icon design and colour scheme

Verbal communications are complemented with a system of icons which support the reading of information by persons who do not speak Polish or have problems understanding it. Information provided with icons must be as simple as possible, precise and clear for persons with impaired vision. The first issue is to define the visual concept of the entire system of icons. When creating such a system, you should take account of requirements of visually impaired persons. Currently, it is popular to create symbols using outlines, which makes them light and looks very modern. In accordance with principles 1 and 4 of universal design, maximum clarity of communication should be ensured for audiences. Figure 6 shows the comparison of female and male icons (in two versions: with just an outline and filled with colour) seen as a sharp and a blurry image. While the version with the solid fill even when blurred remains legible, in the icon with just an outline individual elements seem to merge and the whole sign becomes unidentifiable.

Additionally, all signs should be designed on the basis of a dedicated construction grid. Thanks to such grid being used, changes in scale of individual icons that are frequent in such cases may be avoided and proportions of individual signs may be retained [19].

The development of the colour code for the system involves allowing for both the appropriate contrast and needs of persons with colour vision impairments (e.g. colour blindness or protanopia), who, based on various studies, may account for up to 0.5% of women and 8% of men. In order to verify the clarity of the project and the colours used for persons with impaired colour vision, each time the readability test should be conducted. Functions of graphic programs (e.g. Adobe Photoshop, Adobe Illustrator) and functions in online applications may be used for this purpose. Figure 7 presents an example of a colour scheme for a hospital layout plan which does not provide an appropriate contrast, making it hard for a person with colour blindness to tell

apart some of the departments (surgery and gynaecology), which is incompliant with principles 1, 2 and 4 of universal design. Figure 8 presents the visualisation of the plan using a modified colour scheme, seen by a person without colour vision impairment and by a person with colour blindness. Although colours are similar to those in the previous plan, thanks to their greater saturation, greater contrast and better clarity of the design has been achieved.

Logic and consistency of information

Persons moving around in a new place often find it difficult to identify the location in which they currently are. Closed spaces make it difficult to orientate yourself in relation to characteristic points, in particular when we are dealing with multi-level spaces in which we have to orientate ourselves both vertically and horizontally.

The signage and wayfinding system design must be clear and comprehensibly provide persons remaining in the facility with information about their exact location within the premises and the route to the place they want to visit. A lot of attention should be paid to the clarity of wayfinding signage elements and signs denoting places, allowing i.a. for the rules of tactile graphics [20] and universal design. The signage is designed based on the following rule: from the most general to the detailed information. The signage diagram has been shown in figure 9.

Wayfinding signage includes hanging and standing signs which indicate the direction. These may be either small signs fixed to the wall or large information pillars outside the building.

In order to retain the logic of an information sequence it should be ensured that none of its components have been omitted. The last stage of an information sequence are signs marking places. These include: signage marking traffic routes, lifts and staircases, doors, zones and wards.

Implementation and final analysis

An important element of implementation of a visual information system is examining its effectiveness for its addressees. After the analysis of questionnaire surveys conducted after the implementation of the Visual Information System in the District Hospital in Pruszków, answers to the question about the preferred way of moving around the

15. *ADA White Paper (2012 ADA White Paper Update)* – document formulated by The Americans with Disabilities Act (ADA), containing guidelines on accessibility of products and services, [online] https://segd.org/2012-ada-white-paper-update https://segd.org/2012-ada-white-paper-update
16. Craig M. Berger, *Wayfinding and Implementying Graphic Navigational Systems*, publ. RotoVision, 2005,pp. 45-66
17. [online] https://psoni.org.pl/wp-content/uploads/2015/09/Informacja-dla-wszystkich-internet_0.pdf
18. Americans with Disabilities Act, [online] https://adata.org/learn-about-ada

DEPENDENCE OF TEXT SIZE ON THE DISTANCE FROM THE VIEWER

MIN. HIGHT OF THE PLATE	APPROPRIATE SIZE OF LETTER	DISTANCE TO THE VIEWER
10 mm	4,4 mm	2 m
15 mm	6,6 mm	3 m
20 mm	8,8 mm	4 m
25 mm	11 mm	5 m
30 mm	13,2 mm	6 m
35 mm	15,4 mm	7 m
40 mm	17.6 mm	8 m
45 mm	19,8 mm	9 m
50 mm	22 mm	10 m
55 mm	24,2 mm	11 m
60 mm	26,4 mm	12 m
65 mm	28,6 mm	13 m
70 mm	30,8 mm	14 m
75 mm	33 mm	15 m
80 mm	35,2 mm	16 m
85 mm	37,4 mm	17 m
90 mm	39,6 mm	18 m
95 mm	41,8 mm	19 m
100 mm	44 mm	20 m

Fig. 5 Dependence of text size on the distance from the viewer. Source: Own study based on ADA and richardwolfstrome.com

building proved to be the most interesting ones. The surveys indicate that 60% of people prefer to move around the premises independently, using the signage, around 10% have no opinion about it, and nearly 30% of respondents prefer to turn to the personnel to ask the way rather than use the signage. Preferences of such a large percentage of the last group seemed important enough to the author to justify the repeated analysis of the results

from the point of view of the way people moved around this type of facilities.

Responses of persons who preferred to ask the way (first group) were compared with responses of those for whom it was more convenient to use the signage (second group). To the question *"Have you noticed the new signage?"*, 75% of persons from the first group and over 85% from the second group answered yes. The answer to the following question: ▶▶

Fig. 6 Comparison of male and female icons (in the version with just the outline and colour filled) seen sharply and blurred. Source: Own study.

"Is the new signage clear and understandable?" showed a significant divergence of opinions. Only 46.42% of persons from the first group answered affirmatively, for 39.28% the signage was partly or wholly incomprehensible, and 14.28% had no opinion. In the second group, as many as 83.58% of persons answered that they had understood the new signage, 11.94% – that they had not understood them or had understood them incompletely, and 4.47% had no opinion about this. Even more disparities may be noticed when answers to the next questions are analysed: *"Does the new signage help you find your way around the hospital?"*. Among persons preferring to talk to the personnel, only 28.57% decided that the new signage helped them find the way round the facility, according to 42.84% it became worse, 14.28% did not notice any difference, and the same percentage had no opinion about this.

A completely different picture emerged from the analysis of answers given by the second group, who preferred to move around the hospital independently. As many as 71.64% of respondents decided that the new signage was helpful in finding the correct location within the facility, 13.43% decided it was worse, 11.94% did not notice any difference, and 2.98% had no opinion about it. In this group, the percentage of people who had no opinion about this topic was five times lower than in the first group, which may constitute evidence of the greater awareness of people from the group preferring to use signage. After the patients' surveys have been analysed, it is indicated that the group of people who, for various reasons, prefer to ask the personnel to show them the way has problems understanding messages placed on the signs. This may be due to the fact that they notice the information but they do not want to use it because personnel constitutes a more reliable source of knowledge or they need to have direct contact with another human being. We do not have data on what the understanding of messages would look like if personnel was not available at all, however on the basis of the research one might draw a conclusion that these persons could feel uncomfortable not having the possibility of asking the way. For this group of respondents, visual information systems fulfil an exclusively supporting function. At the same time, the majority of persons asked, regardless of their preferred method of moving around the facility, were happy with the appearance of the new signage. This may constitute evidence that persons unwilling to use the signage are open to new solutions useful for others and feel the need to introduce changes which improve the infrastructure. The analysis of data from ques-6tionnaire surveys and comparison of two groups of recipients has showed that persons preferring contact with personnel are much worse at receiving visual communications as they don't always understand them.

Conclusions

The creation of useful and comprehensible information systems constitutes a multistage action the first stage of which is the analysis of the spatial functional system and of information needs of persons remaining within the given space (customers and employees). This stage is crucial in the context of understanding needs and goals which the design is supposed to meet, and it allows the formulation of basic assumptions for the design.

The implementation stage is a long-term process which in each of it points requires many experiments

Fig. 8 Hospital plan in an improved colour scheme ensuring its correct perception by a colour-blind person. Simulation of how the place is seen by a person without colour vision impairment on the left, and by a colour-blind person on the right. Source: Own study.

Fig.7 Hospital plan using the colour scheme which does not ensure it is perceived correctly by a colour-blind person. Simulation of how the plan is seen by a person without colour vision impairment on the left, and by a colour-blind person on the right. Source: Own study.

to be conducted and verification of the compliance of the work with universal design principles. Often it turns out that relying solely on intuition may lead to erroneous design decisions being made, and in consequence, a useless design being created. You should also take into account the occurrence of problems the nature of which is not connected with the design itself, however which have a significant impact on the creative process.

The last stage – implementation – is crucial for the usefulness of the entire system. Conducting this process wrongly generates the largest number of errors in the logic of information, and which follows – the correct reception and understanding of the system. It also causes negative reception of the space for which the design has been prepared.

The author's long-term experience indicates that the design of information should be based on needs of persons who find it the most difficult to adapt to new spaces or technologies, because solving the most difficult design problems, according to universal design principles, gives satisfaction to the widest group of recipients. ∎

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For the design of the Waycludi Visual Information System, the author received the 2021 A'Design Award in the Graphics, Illustration and Visual Communication category.

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[error

and Its acceptance in multimedia creation]

Marcin Noga, PhD

Introduction

The role of error in multimedia may be described using three types of signal processing. The first one is connected with the processing of analogue signals and error of analogue and digital signal conversion. The second type of error is the inaccuracy of calculations resulting from the processing of digital signals related to computational precision. The third type is connected with digital processing of signals for the purpose of, i.a. filtration, transformation, coding, or compression. The final outcome of the processing, besides the proper signal, contains the sum of errors arising at each stage of digital and analogue processing.

Role of error in multimedia

The humanities, due to their specific nature, enable the public to interpret and describe the work with words. At the same time, they offer the possibility of using vivid language that is abounding in stylistic devices. This way facts recorded using words are presented. Similarly to old photographs showing freeze frames from history in the world of multimedia. Selected dates or facts from among which individual representative events have been selected, allowing the depiction of the given period, or constituting an illustration of processes taking place in the given era. The first aspect conditioning the potential problem is the interpretation of the knowledge gained, based on the simple causation principle which does not take the entire issue into account.

Mathematics is in opposition to the humanities and natural science. This is an extremely logical branch of science in which one thing arises from another, and the knowledge acquired is used in everyday life. Thanks to the knowledge of geometry and the ways in which it works, it is easier to understand the principles of artistic composition. Physics, in turn, and in particular the phenomenon of colour mixing on the screen, or knowledge of optics, make it easier to understand the problems of aerial perspective that occupied Italian Renaissance masters. Trigonometrical functions may be used in practice in order to understand polar coordinates during the sending of digital data in telecommunications. It is mathematics – referred to as the queen of the sciences for a reason – that introduces the notion of abstraction at the early stage of primary education, e.g. point, plane [1] or straight line that has no beginning and no end. At a later stage of education, the probability calculus which, among other things, demonstrates the fact that the seeming free will of an entity – from the statistical point of view – is just an isolated error that ceases to be noticeable in a larger set (Fig. 1).

Source: own study.

Multimedia constitutes a combination of several different forms of information communication. They include, i.a. text, sound, graphics, animation, video. Multimedia have an application in the recording and playing of multimedia content. They are also used in many branches of science and arts, and they take advantage of the latest technological and scientific achievements, relying on the contemporary application of algebra – one of the main branches of mathematics. Historically, algebra was a science of equations, their systems, and their general identities. In the classical approach to sciences there is no room for error. The result of calculations is always the same and it does not depend on the computing method selected.

The invention of mathematician Richard Hamming, an employee at Bell Labs in a research and implementation department [2], introduced an algorithm which automatically detected errors and corrected any false readings. In 1950s, the computer data input was carried out using punched cards (which often caused reading errors) in which holes were punched during the data transfer onto the cards (Fig. 2).

▶▶
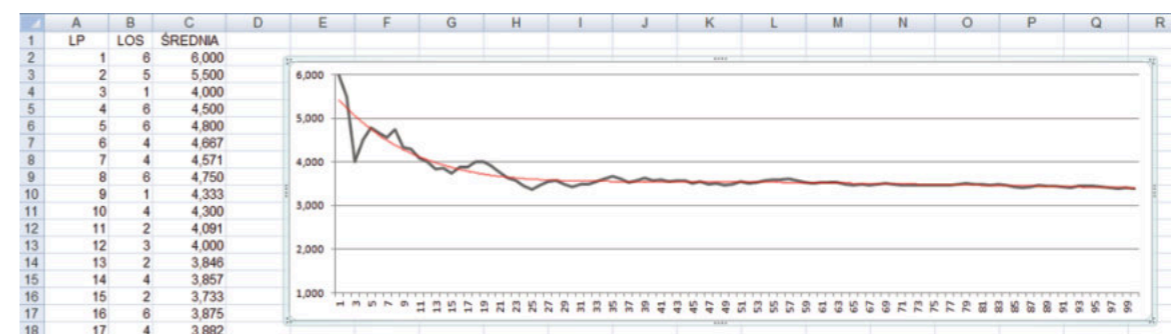
Fig. 1 Average value of random numbers. Source: Own study.

Richard Hamming worked for several years on an algorithm which automatically repaired errors without the need for the operator's manual correction. He constructed an algorithm which recorded four bits of input information as a seven-bit word containing additionally three extra even parity bits. Such Hamming Code detects and corrects errors consisting in the falseness of one bit and indicates a two-bit error. In each seven-bit sequence, one field may be read incorrectly, and
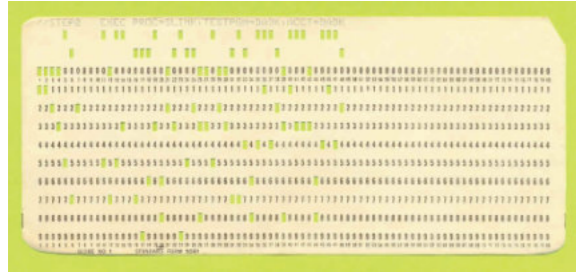

Fig. 2 Punched card and woman operating a keypunch.
Source: Wikipedia, Punched card, https://en.wikipedia.org/wiki/Punched_card, access [07.12.2023].

the algorithm will remove the error automatically. In the case of two errors, the algorithm will indicate the two-bit error. Hamming Code (7,4) [3] has in our times become a reference point to determine the level of efficiency of new algorithms, quality of error detection and automatic repair of data, among other things in contemporary wireless systems where statistics and level of error constitute the basis for the design of systems that use radio waves.

An important moment in the history of multimedia development – and not just due to the technological innovation brought to this field of technology – was first and foremost the change of approach to the representation of recording from analogue to digital. For the first time, individual users could check the correctness of the advertising slogan digital recording is better than analogue

media when the Philips and Sony digital compact disc project was launched [4]. In our day and age, the process of migration to the digital recording has included all multimedia branches. These changes refer to just one stage of data processing because the world surrounding us is an analogue world with just a single transformation phase when sound, image or other mechanical actions are recorded in the digital form.

At the first stage of playing back digital sound, the digital signal is converted in the digital to analogue converter to electric current. Then, the strength of the analogue signal is increased in an audio amplifier and the alternate current powers the speaker coil which in turn moves the membrane, thus creating an acoustic wave. This analogue acoustic wave is received by the hearing organ as an analogue electrical impulse which is sent to the brain via the neuronal network. Digital sound, or picture, is recorded simply as a string of numbers, and at any other stage from the recording to playing or displaying it constitutes an analogue action (Fig. 3). At each stage, the analogue signal is distorted, some of the signals are lost, and, as a result of intermodulation, new artefacts are created due to the interaction of input signals.
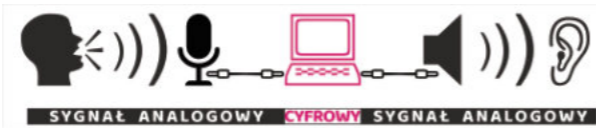
Fig. 3 Sound recording and playback process diagram.
Source: Own study (ANALOGUE SIGNAL DIGITAL ANALOGUE SIGNAL).

The idea of a digital copy on Compact Discs became quickly devalued. Before digital sound discs became popular, a German science and research association Fraunhofer IIS introduced MP3, a lossy format of sound recording [5], which quickly became a worldwide standard and not only revolutionised the method of music recording but completely changed the approach to the function of multimedia and data storage form [6]. The new digital era that was introduced by Philips and Sony in 1982 allows contactless reading of a piece of plastic that is 12 cm in diameter, and, with the use of laser, decoding digital sound with recording parameters better than those achieved in recording studios of the time. CDs have been supplanted by the MP3 lossy compression format. The process of migration from physical media to digital files has been driven by the expansion of the Internet

and pirate websites offering many musical albums free of charge.

Based on an IT definition, compression is divided into lossless and lossy. Since 1990s, the expression how many times the file size has been reduced has become the synonym of the word compression. Highly compressed files, with low information quality and fidelity, have been used. The dynamically increasing computing power of computers and the media size have also allowed the transition from analogue moving image media to digital image representation where advanced lossy compression algorithms have been used. Three types of frames are used in film compression: I – the least compressed, P – more compressed, B – subject to the greatest data compression and only information about references to preceding and following frames is recorded (Fig. 4)

In the example in illustration 5 (in the eleven-minute film), only around 1% (187 out of 15691) frames are recorded as JPG files – I-Frame, the rest of the frames constitute an attempt at describing only the changes in the frame – P-Frame, and a recording of a film frame in the form of the parametric description of the movement of objects around the film frame – B-Frame.

In the automotive industry, compression means forcing larger amount of air into the combustion chamber, whereas compression in ICT refers to an exactly opposite action, based on purposeful reduction, removal of those elements that are not essential to convey. Lossy compression does not just mean accepting error, but it means generating error in a recording on purpose in order to achieve the intended goal of recording just the most important

elements, thus making the digital recording much shorter and ensure that the audience does not notice the loss of part of the information conveyed. Even thus simplified, the signal is better to receive and its requirements as to the audiovisual equipment are lower. A video image subject to compression looks more dynamic and colourful. In general, such picture may be even better to receive than the original film.

Despite the expansion and growing capacity of media and data transmission, new lossy compression algorithms, which are more efficient in masking errors in the image generated, continue to be developed. They are also planned on the basis of artificial intelligence which is used to eliminate interruptions in the reception of the stream, or even draw the probable high-quality picture on the basis of transmitted data that have been distorted through compression. Even source material to be edited in a professional TV studio is subjected to minor lossy compression.

The latest new generation video compressor H.266/VVC (Versatile Video Coding) was finalised on 6 July 2020 by the Joint Video Experts Team (JVET). It is the successor of the H.265/HEVC compression standard. The first development versions made available indicate complexity of coding. The compression of 720p film material using the H.266/VVC compressor, the duration of which was 10 minutes and 34 seconds, took 17 hours with the application of a high-efficiency processor (Fig. 6). The compressor utilises the variable organisation of a macroblock and, depending on the number of details to be recorded, a macroblock that is 128x128 pixels may be divided into block ▶▶
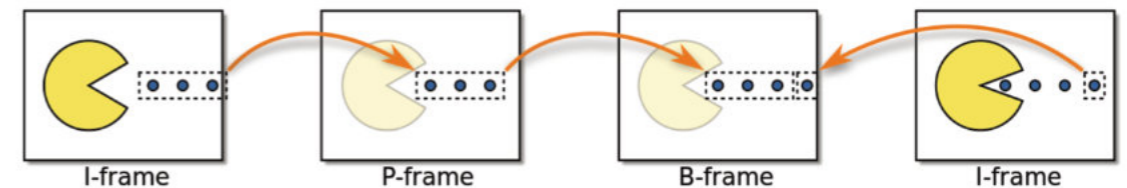

Fig. 4 Three main types of frames used in various video algorithms are I, P and B.
Source: Wikipedia, Video compression picture types, https://en.wikipedia.org/wiki/Video_compression_picture_types, access [07.12.2023].

Fig. 5 Report on the result of video compression using ffmpeg.exe codec H.264. Source: Own study.
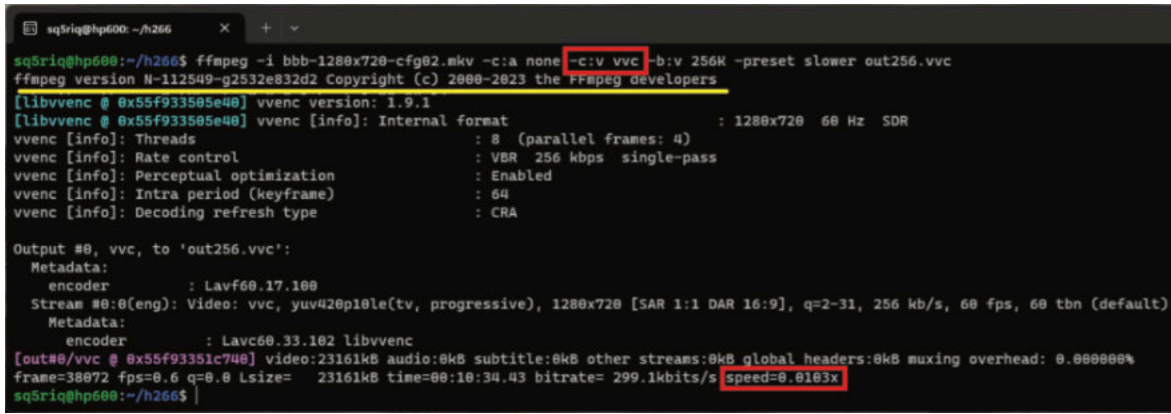
Fig. 6 Film coding using H.266/VVC compressor. Source: Own study.

Fig. 8 OpenSCAD generation of a circle using trigonometrical functions. Source: Own study.

Fig. 9 OpenSCAD – moving objects translate and editing shape using envelope offset. Source: Own study.

structures of varying sizes of 4 x 4 to 64 x 64 pixels. Thanks to this, a dynamic and detailed HD picture has been achieved, with the 200 kb/s transfer, without visible block boundaries due to compression errors which are apparent in the previous version of the HEVC compressor in the following example (Fig. 7). A film recorded in the VVC format seems less sharp in comparison with HEVC, but actually reproduces the original image more realistically.

Rose (rhodonea) curve

The author's intermedia works include elements from interdisciplinary fields because the creation process also contains a scientific approach to the topic of utilisation of mathematics, physics, and information technology in collecting and processing digital data necessary to generate an image that allows 3D printing. The majority of works constitute an illustration of the original creative process constituting the conversion of the electromagnetic wave energy into forms of organic structures. The latest art project is the artwork presented at the exhibition entitled 30 YEARS OF THE ARTS DEPARTMENT. It is an artistic, visual attempt at answering the question about the role of error and its acceptance in the artistic creation. For the purposes of this project, the program used was a free design support application OpenSCAD [8], based on just scripts, that uses its own language,

and the syntax of the script reflects the philosophy of functional programming. The following example presents a concept of generation of solids. Ready-made solid modelling was not used, and the solids were drawn using trigonometrical functions in the Cartesian coordinate system. Thus, created points are connected into two-dimensional solids using the polygon function (Fig. 8), and then subjected to subsequent stages of spatial editing and recorded in the form of a vector grid.

Besides the basic trigonometrical functions [9], the program offers full functionality of the programming language and edition of solids, including advanced combinations of the envelope and the Minkowski sum which is available only in professional CAD-type software. Semantics of the program is like this: after the graphic command is entered, a solid is drawn, which is then placed at the beginning of the coordinate system and, using the move (Fig. 9) or rotate function, is positioned in the intended location.

The rose curve 4P1 is one of two works which have been created in the cycle of the author's latest work and which constitute a spatial expansion of the two-dimensional rose (rhodonea) curve mathematical formula. It was named by the Italian mathematician Guido Grandi who studied it between the years 1723 and 1728 [7]. The rose is a set of points
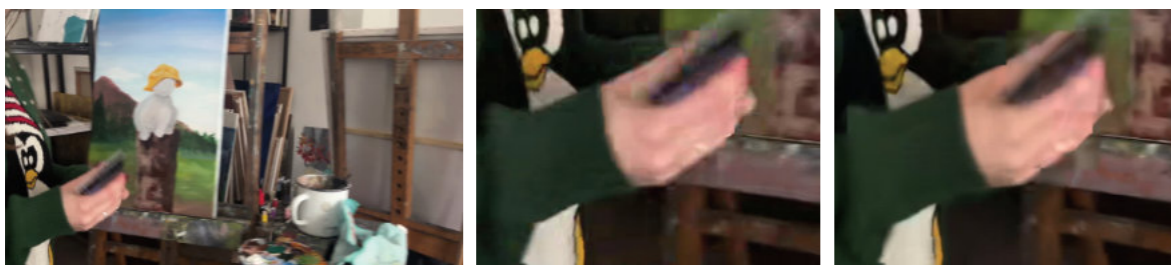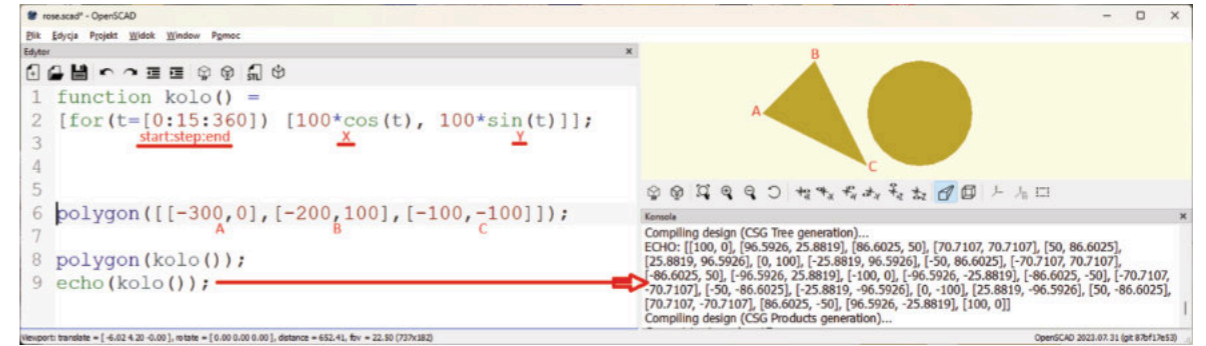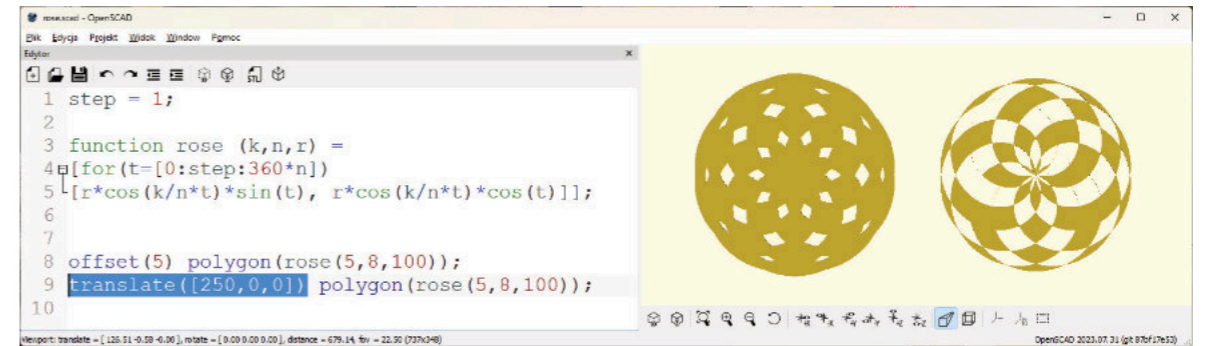
calculated using trigonometrical functions on a plane, expressed as polar coordinate graphs.

Several dozen other solutions not included in Fig. 10 were analysed, and, additionally, shapes resulting from calculations for non-integer numbers were selected in order to achieve a unique shape. An adequate method of reducing the parametrical shape of the solid generated from the mathematical formula were also sought.

The solid obtained constitutes a geometric combination of spatial figures (Fig. 11) with the shape changing together with coordinate Z. The technology of construction of the parametrical solid was obscured by the aesthetic values of the project. When the oval shape and one sharp edge were generated, the nature of the solid of revolution was intentionally disturbed. This project could not be completed; despite the fact that a 128 GB RAM was installed in the graphics station, the programme interrupted calculations after around three days. Another attempt was made, and the solid was broken down into two separate graphic files, as a result of which STL files of 66 MB and 81 MB were obtained. They contained errors of the internal node grid and around 10% of doubled nodes, as well as spatial crossing planes which did not contribute anything to the external shape of the solid. None of the

available advanced programs for 3D solid modelling was able to automatically repair and combine such extensive individual 3D elements. This task was carried out using a browser and a simple Microsoft 3D object editor called 3D builder (Fig. 12).

Taking into account the ecological approach during the design phase, the work created is a three-dimensional solid with the external wall thickness of 10 mm. The final work consists of two parts. Seven attempts at 3D printing were made over the period of four months. After one month and two failed full-format attempts, the work was printed correctly at half its scale (15 x 15 x 30 cm). As a result of this, further attempts were made to complete the original project by significantly reducing the printing speed. The whole printing process took nearly two months before two correct and cohesive parts were obtained, which were then glued together permanently. The additional aesthetic value of this spatial artwork is that it has been made of ecological semi-transparent PLA filament, exposing the internal structure of the wall disappearing inside the solid. The reflexes created on the intersections of plans are interesting to observe and the diverse texture of the surface changes depending on the angle at which the plane is positioned. During the designing of the form, the limitations of the 3D ▶▶
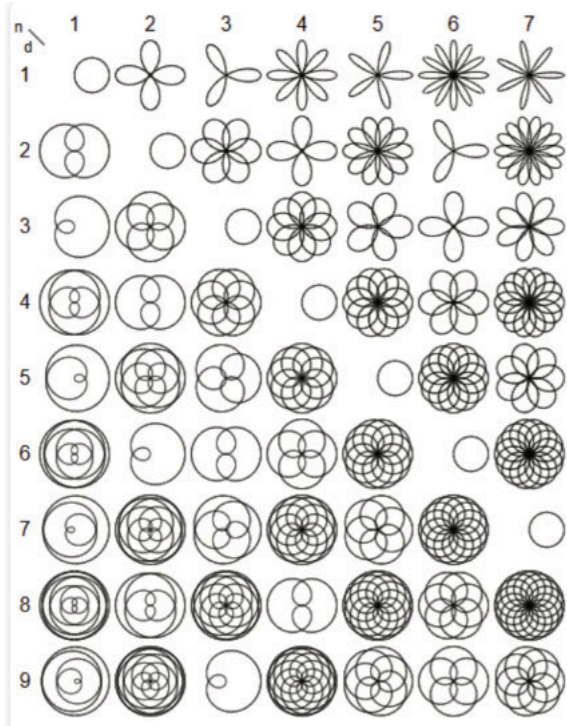

Fig. 7 Compression comparison: original, H.265/HEVC, H.266/VVC. Source: Own study.

Fig. 10 Rose (rhodonea) curve [7] – rosette table (left) Marcin Noga, Rose curve 4P1, 3D printing, 30x30x(30+30), 2023 (right). Source: Own study.

Fig. 12 Repair of the 3D grid and adding solids in the 3D Builder program. Source: Own study.

printer were also taken into account, and due to the large weight (1100 g), the printing speed was restricted to 20 cm/s during the passing of the table, as a result of which a correctly printed element was obtained.

Conclusions

After completing his work, the artist takes the role of the first member of the audience with his concerns about the correct selection of media and method of communication, because he is the only one to see the goal that has been achieved, and he knows his artistic endeavours. At a certain moment during such creation, the artist notices that he cannot simply rely on the trust in the visual impression, and this has given rise to an idea of explaining the problem through science. A question appears here: is this technological approach to the grasping of a fleeting moment an attempt at escaping from the subjective evaluation of capturing just the important details of the entire observation from the point of view of implementation of an art project in favour of the evaluation of the artist's work through an algorithm? Currently, the author has access to research tools (radio wave recorded and spectrometer) at a level that was available to a research institute a decade ago. The recorded signal may be reproduced repeatedly to test unique research methods in order to find a perfect solution to reproduce selected features of the signal as a digital graphic image. It is a popular saying that computers don't make mistakes, but algorithms written by humans are executed in a program, and an error arising from the search for a solution makes it possible to deviate from set patterns, and this is an inherent part of the development of humanity. The consequence of this is that error in multimedia may be causative and acceptable, also in the sound and image recording. Searching also means making mistakes, and paraphrasing Albert Einstein's words: you can't invent anything new by repeating the same experiment in the same way and expecting. ∎

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Fig. 11 Code generating the rose curve in the OpenSCAD program. Source: Own study.

Condensation

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Many looks, many areas.
Author's interpretation of movement

Fig. 1 Edgar Degas, Prima Ballerina, 1877.
Fig. 2 Edgar Degas, After The Bath, 1882–1885.
Fig. 3 Edgar Degas, At The Races, 1880.
Source: https://pl.wikipedia.org
Source: https://en.wikipedia.org

Introduction

Motion is one of the fundamental elements of life, brining both subtle changes and significant transformations. From simple actions, such as opening eyes or lifting an arm, to dynamic events such as jumps or flowing rivers, motion is ubiquitous in our surroundings. I would include it among the strongest stimuli affecting or body in visual terms. The innate sensitivity to the position of elements in our surroundings enables us to see both positive and negative situations. Sometimes it elicits an immediate, uncontrolled response. As the Ionian natural philosopher, Heraclitus of Ephesus, believed – everything "flowed", was subject to constant change. He promoted the concept of change as the main element of the world. Plato additionally claimed that no motion in space was created spontaneously and each change had its cause that initiated it. Currently it is assumed that the appearance of motion is inextricably linked with the existence of its opposite, static. Without elements remaining in balance, displacements or changes of form of other objects would not be possible to observe. This type of symbiosis causes the world to be dynamic and interesting. An interesting example of theoretical deliberations on this subject are "Zeno's paradoxes" devised by a Greek philosopher, Zeno of Elea. Based on the division of time into infinitely short moments, he claimed among other things that motion did not exist because in each ultrashort moment the seemingly moving object remained at rest in relation to its surroundings or did not even have the possibility of commencing the motion due to the inability to cover the infinite number of sections in finite time. In turn, Aristotle divided motion into quantitative (e.g. increasing or decreasing in size), qualitative (e.g. transformation of a ripe fruit into an unripe one) and local (physical change of location). He also believed that, besides the so-called natural motions towards the Earth as the centre of the Universe, there were also sudden movements, caused by external forces. As the years went by, further theories appeared, concerning e.g. the law of inertia discovered by Galileo, or Isaak Newton's subsequent three laws of motion which created the foundations for the contemporary mechanics. The multitude of this type of theories through the ages constitutes evidence that, despite many attempts at defining it, the topic of motion still has not been fully understood. Depending on the point of reference, a moving object may be perceived as dynamic or static, and in our times it is defined through its displacement, trajectory, path and time. One of its most interesting features, from my point of view, is the relativity. Due to the complexity of this process, depending on the size of objects considered, their speed and whether gravity is taken into account or not, currently it is described both by the classic mechanics, theory of relativity, and quantum mechanics.

Relying on the knowledge I had gained during the process of academic education and that gained during more than ten years of my professional career as an animator, I decided to analyse in my own way the displacement in space and changes in the form of objects under the influence of external forces. My premise was not so much the revolutionising of the approach to the issues that interest me, but rather, on the basis of my own and other artists' previous achievements, to obtain a new, fresher resolution of questions that had been troubling me for years.

– Can changes of form occurring in mobile objects in a selected period be recorded?

– Can information about motion be contained in a static work?

The task I set myself was to cast a different look at the issues that had already existed in art and that were connected with the perception and interpretation of movement. I decided to reverse the stan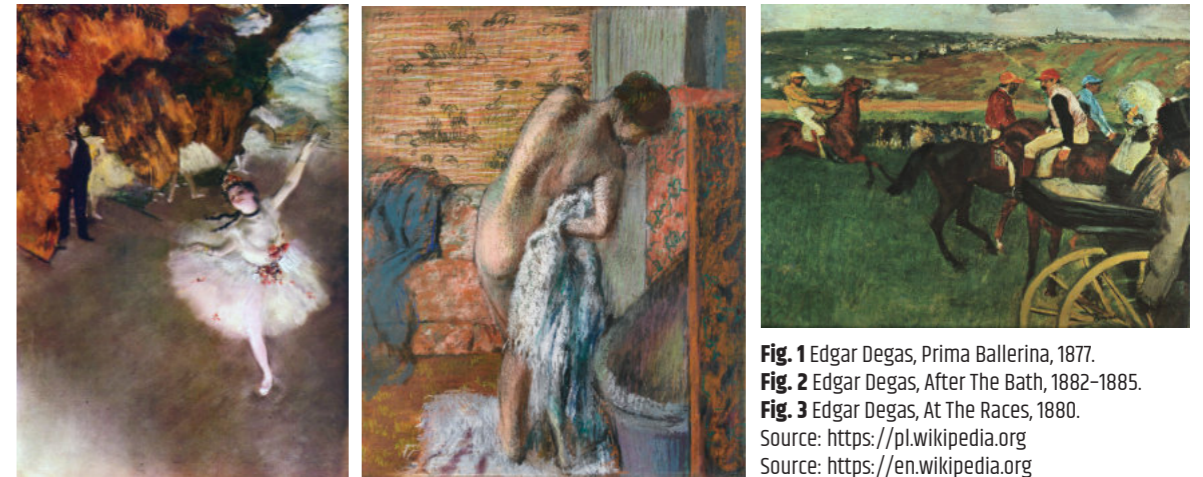dard line of thought connected with the presentation of "frozen" elements suggesting movement on a motionless plane. My goal became not to "mobilise the immobile" but to "include dynamic changes in the immobile". By expanding the understanding of motion and its role in art, I wanted to open new perspectives for future research and exploration of this fascinating topic.

Many looks

During the search for individual, original language of expression, I turned my attention to artists' frequent interest in issues connected with the perception and interpretation of movement of objects in space. As a result, this way they crossed the thin boundary between statics and motion.

For example, figures in Edgar Degas's canvases, despite being halted in one specific phase of movement, created an impression of being animated, trying to go beyond the canvas area. The interpretation of these figures as remaining in motion arises from the viewer's knowledge gained through their lifetime. Rudolf Arnheim, in his book entitled "Art and Visual Perception. A Psychology of the Creative Eye" touches upon this topic, noting that "this knowledge fools him into seeing motion where there is none, or at least into endowing the immobile object with a vague mobility" [1]. While observing objects and phenomena in their surroundings and their movement through space, we can sometimes experience an illusion that an actual change of location of physical objects is taking place, often connected with changes of their shape, direction, and colour tonality. Additionally, the dynamism of communication is among other things the result of Edgar Degas's interest in the recently invented photography where the asymmetry of the frame or cutting the depicted motif constituted a common artistic device.

Just as the work by Edgar Degas changed artists' approach to composition, becoming acquainted with the chronophotographic experiments of late 19th century transferred me to a completely different dimension of perception of dynamic events existing in the surrounding world. I was aware that, due to the limited capabilities, both the build of a human eye and the quality and speed with which information acquired is processed by the brain, the human being is able to learn about their surroundings only to a very limited extent.

The novel sequences of photographs by Eadweard Muybridge, presenting individual phases of animals in motion, made me aware of the huge complexity of dynamic processes, impossible to observe with the naked eye, that take place during the movement of objects in space. His experiments conducted using many interlinked cameras confirmed that information reaching the eye constitutes only a fragment of real-world events. In turn, Étienne-Jules Marey, using a chronophotographic gun of his own construction, created works which "show the same object at a number of locations in the same picture […]. The sequence of the locations forms a simply shaped, consistent path, and the internal changes of the object – for example, the change in posture of a leaping athlete – also occur gradually" – as Rudolf Arnheim notes in his book "Art and Visual Perception. A Psychology of the Creative Eye" [2]. Breaking down the actual movement into a sequence of stop frames in chronophotography became the motor for my searches connected with the sequential presentation of the world on motionless planes, to depict originally the characteristics of motion and changes taking place in the shape of the object with the passing of time.

The interpretation of movement previously recorded on photographic film or an image sensor ▸▸
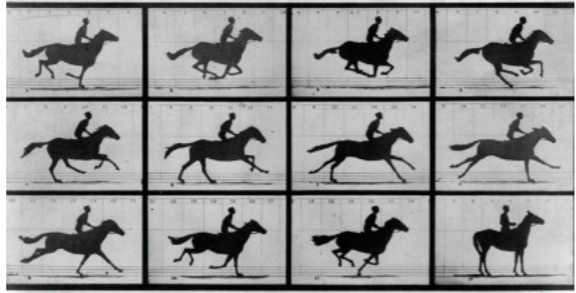
Fig. 4 Eadweard Muybridge, Sallie Gardner at a Gallop, 1878.
Source: https://pl.wikipedia.org

Fig. 5 Étienne-Jules Marey, Bird in Flight, 1882.
Source: https://pl.wikipedia.org

Fig. 6 Étienne-Jules Marey, Man Running, 1883.
Source: https://pl.wikipedia.org

is most frequently created through the selection of one, stopped phase from the entire event recorded. However, in many cases, such practice leads not so much to the depiction of the entirety of movement taking place in the given period, as to only the presentation of a static, "frozen" object at a selected moment. I have observed the strive to overcome this limitation and to introduce a completely new approach to the presentation of movement in the work of Italian Futurists. In their pursuit of continuous increasing of the expression of their artworks, they tried to use the latest inventions and scientific discoveries in the artistic communication. Initially, fascinated by the physics experiments connected with the splitting of a beam of white light into spectral colours, "Boccioni, Carrà and Russolo took up the problem of vision perceived live, in direct contact with reality. Making this assumption, they turned to the Divisionist technique" [3] wrote G. Lista in the publication entitled "Futurism". They were, however, aware that in order for their actions to be truly revolutionary, they needed to step outside the previous framework adopted by other artists. Futurists, fascinated by the technological progress, propagated the cult of machines, space, and speed. This is how they described the revolutionary perception of the world in the "Futurist Painting: Technical Manifesto" of 1910: "Indeed, all things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but

it constantly appears and disappears. On account of the persistency of an image upon the retina, moving objects constantly multiply themselves; their form changes like rapid vibrations, in their mad career. Thus a running horse has not four legs, but twenty, and their movements are triangular" [4]. Analysing their activities, I understood that, contrary to impressionists who focused not so much on the realistic depiction of the reality found as on the impressions that accompany the human being in the chosen very short moment, Futurists decided to synthesise the information about the largest possible number of changes occurring in the given time and space and deliver it to the audiences. The continuations of chronophotographic experiments may be noticed both in many paintings by Giacomo Balla, and in Umberto Boccioni's sculptures. As emphasised by E. Princi in "Great History of Art. 20th Century Avant-Garde", Anton Giulio Bragaglia, a Futurist operating in the field of film and photography, using long shutter times and image multiplication, "recorded body twists and gestures, i.e. he practiced what we would call today the »motion photography«. The process of movement interested him more than the documentation of subsequent phases" [5]. Translation of information about the dynamism of objects and their movement in space into the language of art became one of the key topics appearing in the oeuvre of the entire group of Futurists.

During the depiction of information about movement of individual elements in space, in order to enhance the dynamism in a static work, it is not enough to select just one phase from the entire movement observed. It is essential to analyse the entire process of movement, moments, both earlier and later ones, to then combine them into one cohesive picture. Thanks to this treatment, we do not obtain the reproduction of a fragment of reality in the given unit of time, but the synthesis of all of the transformations. However, it is difficult for me to admit that they were right in the claim they promoted – assuming that what had been created so far would have been forgotten or even destroyed. I believe that the discovery of an artist's own path should be through the analysis of predecessors' work, modification and development of their theories. Activities of this type, in my opinion, are much more beneficial than the revolutionary rebellion and destruction of predecessors' output.

The illusory movement of elements presented in their works put me into a state of instability and disorientation. Doubt appeared whether the

artworks I was looking at were static or whether they remained in constant motion. The surface vibrations observed in them inspired me to take up activities based on the stroboscopy phenomenon discovered by Joseph Antoine Plateau.

Triggering a very high-frequency flash lamp, I was able to obtain apparent multiple stops of a moving object against a dark background. The continuous movement was interpreted by me as abrupt jumps of the observed elements. The whole event was recorded in this case not through the repeated exposure of photographic material, as was the case in chronophotography, but through the use of very long exposure times on just one frame. Rudolf Arnheim describes the stroboscopic vision of the world in a way which illustrates its essence: "All motion perception is basically stroboscopic. When a bird flies through my field of vision, its physical displacement is continuous. What I see of the flight, however, derives from a sequence of recordings by the individual receptors or »receptive fields« in the retina. As the bird arrives from the left, the receptors on the retina's right side will be ▸▸

Fig. 7 Carlo Carrà, The Red Horseman, 1913.
Source: https://wikiart.org.

Fig. 9 Umberto Boccioni, Unique Form of Continuity in Space, 1913.
Source: https://pl.wikipedia.org

Fig. 8 Giacomo Balla, Dynamism of a Dog on a Leash, 1912.
Source: https://en.wikipedia.org

Fig. 10 Anton Giulio Bragaglia, Bow, 1911.
Source: https://www.italianways.com

activated first, the ones to the left, last. The nervous system creates the sensation of continuous movement by integrating the sequence of these momentary stimulations, none of which records anything but a static change" [6]. This phenomenon is so interesting that, despite the fact that many years have passed since it was discovered, its application is visible until today even in the most technologically advanced works. Xu Zhongmin's unusual multimedia creations have riveted my attention through the weaving of the stroboscopy effect into their structure so that the connections between the human figure and cosmos are portrayed. Thanks to the spatial animation created, the artist tries to communicate to the audience a vision of a utopian, systematised world in which standardised, sexless people are eternally marching monotonously with no known aim.

Both chronophotography and stroboscopy proved to me explicitly that the movement of objects in space is much richer and much more complicated than I had originally imagined, and that it has huge energy and artistic potential. However, staying only within the scope of activities connected with the recording of the path of moving objects would cause my research to just reproduce the activities of other artists and would have more in common with purely physical experiences than art. This is why I decided not just to continue the work of such masters as Étienne-Jules Marey, Eadweard Muybridge or Giacomo Balla, but to enrich it with new, artistic elements as well as innovative solutions which, among other things due to the technological progress, have only become possible in the recent years. As we read in the "Sociology of Art" by M. Golka, "these rare truly innovative models are created for the very purpose of being imitated, changed, developed" [7].

Photographic technology, the original overriding goal of which from the very beginning of its existence is to record situations encountered as accurately as possible, has also turned out to be an excellent tool to break through the objective, almost perfect depiction of reality. I agree with H. Belting's claim from "An Anthropology of Images. Picture, Medium, Body", that "photographic images […] remain mute remains of our transitory gaze" [8] and are a kind of an echo of fleeting events. My work has been strongly influenced by Byung Wang Cho, South Korean artist who, by separating fragments of emulsion, interfered with the originally recorded image. Through the reduction rather than addition of the surface materials realistic works were transformed into fragmented, abstract works, referring both to works created on the photographic material and to those acquired contemporarily using digital printers. The exploration of structural features of the source material that are originally invisible to the viewer which you can notice in his works has provoked me to delve into topics connected with attempts to supplement the image with information carrying an additional message, not immediately identifiable.

Many areas

Although I oscillated around the language of abstraction, I did not aim to completely reject any connotation with reality, as in the case of suprematists' work. While the creator of this movement, Kazimierz Malewicz, tried to capture mutual relationships and tensions between simplified geometric forms and the background of the image, I appreciated the importance of nature as the prototype, an impulse for further interpretations. I wanted to portray the real world, however considerably processed due to conscious artistic activities.

In my works, I often used long exposure times, which enabled me to present in an original way the scale and directions of changes taking place during the selected unit of time in the dynamic, crowded urban space.

This caused me to turn my attention to the energy reserve contained in the stratified, rhythmic phenomena existing beside me, a reserve that I had never noticed before. The nature itself also provided

Ryc. 14 Byung Wang Cho, Geometric Knife drawing 04-01-10, 2010.
Ryc. 15 Byung Wang Cho, Geometric Knife drawing 09-01-10, 2010.
Ryc. 16 Byung Wang Cho, Geometric Knife drawing 02-02-10, 2010.
Ryc. 17 Byung Wang Cho, Geometric Knife drawing 08-04-10, 2010.
Source: https://artsandculture.google.com

me with inspiration for further searches. Observing a slightly cloudy sky or flowing river, I noticed in many cases the visible repetitiveness of forms arising from the displacements in space and transformations of certain elements in time by a similar value.

Wiesław Babik, in his work entitled "On the mass of information and the related information overload", states that the "world is filled with the scream of the information market in which everyone wants to outbid someone. We all feel »flooded« with information which cases among other things the information overload" [9]. By restricting, and in consequence completely replacing the full colour palette with monochromatic presentation of topics, I decided to remove the excess of redundant – from my point of view – data. I wanted to enhance the hidden, essential graphic information and separate it from the cacophony of marginal, irrelevant stimuli that we receive in the traditional perception.
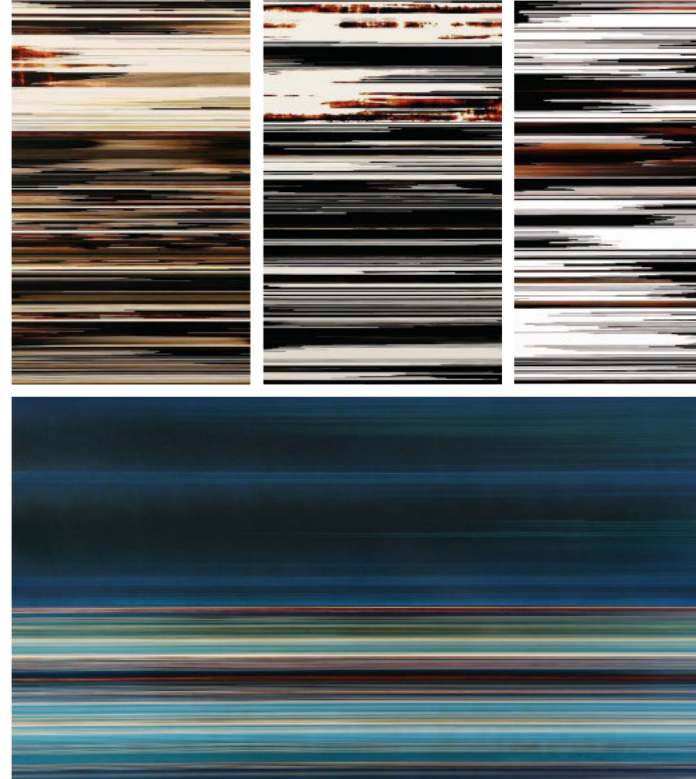

Fig. 18 Zenon Balcer, Przemieszczenia 5 (Displacements 5), 2014. Source: Own study.

Ryc. 19 Zenon Balcer, Warszawa 1 (Warsaw 1), 2014. Source: Own study.

Ryc. 11 Xu Zhongmin, Cloud No.2, 2011. Source: https://artsandculture.google.com

Ryc. 12 Xu Zhongmin, Poppy No.1-Detail, 2011. Source: https://artsandculture.google.com

Ryc. 13 Xu Zhongmin, Trekking Around..., 2011. Source: https://artsandculture.google.com

Fig. 20 Zenon Balcer, Powtarzalność form 2 (Repetitiveness of Forms 2), 2017. Source: Own study.

Fig. 21 Zenon Balcer, Powtarzalność form 6 (Repetitiveness of Forms 2), 2017. Source: Own study.
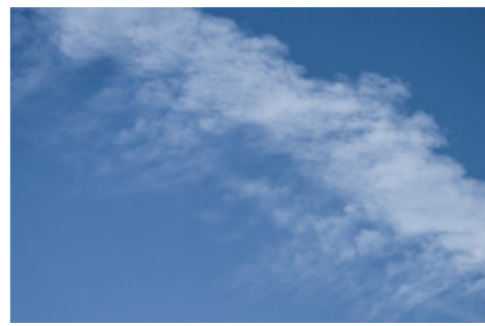
Fig. 22 Zenon Balcer, Powtarzalność form 9 (Repetitiveness of Forms 2), 2017. Source: Own study.

Fig. 27 Zenon Balcer, Ursus 6-7 (diptych) (Impressions cycle), 2016. Source: Own study.

Fig. 28 Zenon Balcer, Rotor (Impressions cycle), 2016. Source: Own study.

The most important conclusion drawn from the experiments conducted so far is for me the ability to abandon the thinking about the image plane as space in which the scene displayed had to be presented from one place only. I decided to refer not just to the contemporary artistic work, but also creative solutions from the early 20th century. Although many years have passed, the cubistic way of showing the surroundings presented in their works among others by Georges Braque and Pablo Picasso still seems topical to me.

I wanted not so much to simplify the phenomena observed as to show objects from many directions simultaneously in order to add new values to the information presented on an immobile surface. Therefore, I gave up the fixed registration point and the sequential taking of photographs caused minimal shifts of subsequent images in time. Thus recorded "events characterise by a very ephemeral structure; they exist just for a moment that is necessary to transfer the effect from the previous event to the next event. Therefore, the reality is a huge complex process, the dynamics of becoming" [10] as M. Heller wrote in "Philosophy and Universe". The portrayed elements, due to the mutual imposition of many takes from different positions, gradually lost their original form, on the one hand being partly identifiable objects, known from the surroundings, and on the other hand – completely new phenomena. They had both dynamic, sharp edges in places (the result of fast shutter setting being used), and diffused, unclear fragments which provoked the viewer not only to find their "own observation point", but also to attempt to decipher the original shape and function of the objects presented.

I tried to make as much use as possible of the capabilities of a digital matrix and the most important elements in photography that is optics. Thanks to the use of extremely bright lenses with the maximum aperture, I was able to achieve the depth of focus that was sometimes several millimetres. The objects stopped in the frame, due to their transformation through a set of lenses, in many cases became so significantly distorted that they started to be perceived as a set of lines, spots, rhythmic, unrecognisable forms. I wanted for the audience to impose internal, subjective associations on the observed phenomena. So that they wanted to remain in their presence for longer.

Due to the unique possibilities of creating new movement, unrestricted by nearly any rules,
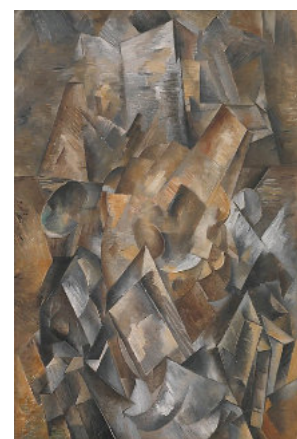
Fig. 23 Georges Braque, Still Life with a Metronome), 1909.
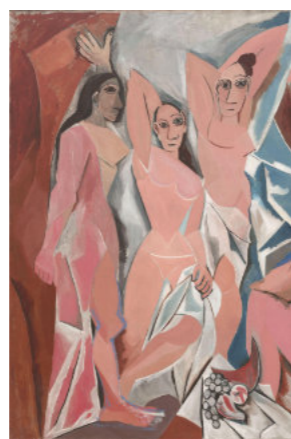**Fig. 24** Georges Braque, Portrait of a Woman, 1910.
Source: https://en.wikipedia.org
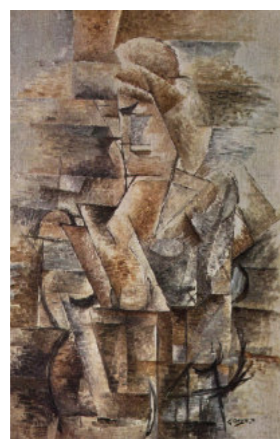
Fig. 25 Pablo Picasso, The Ladies of Avignon, 1907.
Fig. 26 Pablo Picasso, Girl with a Mandolin, 1910.
Source: https://en.wikipedia.org
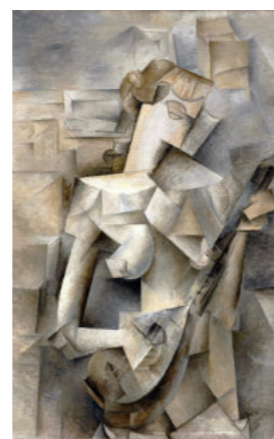
animation became another important segment of my artistic activity. The work of such animators as Jan Lenica, Mirosław Kijowicz, Ryszard Czekała or Stefan Schabenbeck, was an impulse to pay attention to the delicate changes of the form of objects that occur as a result of the passage of time, which may be unnoticeable or irrelevant for an average viewer. I learned to appreciate the importance of transformations of elements caused by internal movement, their displacement in space, change of the viewing angle, or watching the same object at different times of day. I became fascinated by not so much the possibility of reproducing movable events which had taken place previously in reality, as the possibility of creating completely new movement which previously had not existed. Lidia Zonn, in her book about film editing, included the following quote from Robert Bresson: "What is a film? Rhythm. And at the same time, the relationship of mutual images, the crossing of these relationships, repetitions, clashes – exchange between one image and another" [11]. Besides the events directly presented in the finished film, the invisible, consciously built, dynamic interactions occurring between the ostensibly accidental, individual shots, just like, for example, in Jerzy Kucia's films, seemed to me particularly interesting. The real situations they present are often transformed in abstract forms, and the true contents are revealed only as a result of the subjective interpretation of ambiguous moving events. The important feature of his films is the rhythmic nature which becomes visible also in synthetic productions of Piotr Dumała. The emphasis placed on the traces left by moving elements in the frame made it possible for me to observe at the same moment both the present and fragments of the past.

The rhythmic, simplified style of Piotr Dumała's and Jerzy Kucia's productions became particularly close to me. Individual, handicraft work that required drawing hundreds of drawings produced a particularly strong emotional connection between me and the films I made. Not just the final effect of my actions but also the very labour-intensive creation process became important to me. In P. Sitkiewicz's book entitled "Polish School of Animation" we can read that "a short animated film is by nature friendly to original artwork, as the handicraft-like production method does not mean there is absence of professionalism (unlike in the live action cinema). It is the method of »animating« matter or the art form that determines the artistic value or its absence" [12].

Searching for alternative methods to depict issues connected with the presentation of time, I paid special attention to the experimental films by Zbigniew Rybczyński. In "New Book" or in "Tango", by combining animation with feature film, he is trying to include processes "which in reality took place at different intervals. The simultaneity achieved this way results in time losing its past and future dimensions, becoming only the present" [13] as K. Chmielecki wrote in the publication entitled "Relativisation of the space-time continuum in audiovisual communications on the example of Zbigniew Rybczyński's films and video works".

Inspired by his later works, such as "Imagine", "Steps", or "The Orchestra", produced using the latest digital technologies, I understood that, despite the huge benefits of the analogue recording, electronic forms of recording offer much greater possibilities connected with the subsequent processing of the image. I became particularly interested in the possibility of computer generation of 2D and 3D graphics and superimposing of many images on one another without visible loss of quality. The media art, by combining traditional art forms with the electronic equipment, significantly changed the method of conveying information about the mobile reality surrounding us and the processes taking part in that reality.
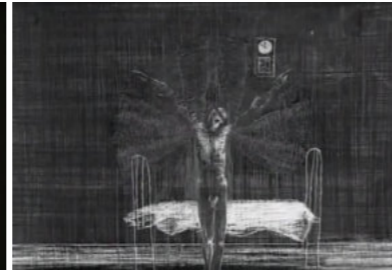
Looking at the achievements of artists operating within the area of media art, I came to a conclusion that technology is not just a tool but, in many cases, becomes also an inseparable part of the whole, ▶▶

Fig. 29 Jerzy Kucia,
Tuning the Instruments, 2000.
Source: https://www.youtube.com

Fig. 30 Piotr Dumała,
A Gentle Spirit (film still), 1985.
Source: https://www.youtube.com

Ryc. 31 Piotr Dumała
Freedom of the Leg (film still), 1988.
Source: https://www.youtube.com

creating a bridge between the artist, the idea and the audience. In his installations, thanks to the conscious use of the capabilities of multimedia, Bill Viola was able for example to put the viewer into the state of uncertainty connected with the reading of the reality. Subtle changes in the form of recorded events in the images broadcast could be both the result of the slowed down intra-frame movement and an optical illusion. Nam June Paik, in turn, provoked the viewer to abandon the safe position of an observer and become a direct participant of the artwork. Looped fragments of reality, presented simultaneously on many screens, in my opinion, subjected the observer to an attempt to find themselves in the closed cycle of repetitions. I noticed further development of these ideas in the work by the "teamLab" art collective. The use of interactive tools causes the disappearance of the boundary between what is physical and what is immaterial. The viewer not only has the possibility of interacting with the video material presented but they become completely "immersed" in the alternative, created world. They experience the abandonment of their own physicality and becoming one with the surrounding new, magical reality.

Considering the huge creative potential offered by digital technology, I decided to expand my possibilities of artistic expression by combining the experiences gathered during film animation with the use of classic techniques with new opportunities offered by computers. Regardless of whether I created original animated films, TV title sequences, dynamic virtual film sets, or interactive activities based on real-time graphics, I had always tried to draw the viewer's attention to an element that was of greatest importance to me, i.e. the creation of new, dynamic reality through motion. Looping of action and rhythmising of multicolour elements put into motion had become one of the basic means of expression, balancing between two worlds: analogue and digital.

Confronting my own artistic experiments with experiences of other artists, I was confirmed in my conviction that, regardless of whether the presentation of moving events is through a narrative that is chronological, looped, or devoid of logical continuity, the wish to interpret information about changes taking place in the reality surrounding us and to encapsulate it in works of art constitutes a real problem which still offers great opportunities for creative communication. Going deeper and deeper into the matters researched, I noticed that it was worth risking and trying to find your own path, sometimes very difficult to follow. Despite the ease of using beaten tracks, sometimes the change of the previous train of thoughts and seeking atypical solutions sometimes brings unexpected results. Analysing works both from the field of animations and multimedia activities, I gradually

Fig. 32 Zbigniew Rybczyński
New Book (film still), 1975.
Source: https://www.youtube.com

Fig. 33 Zbigniew Rybczyński
Tango (film still), 1980.
Source: https://www.youtube.com

Fig. 34 Zbigniew Rybczyński
The Orchestra (film still), 1990.
Source: https://www.youtube.com
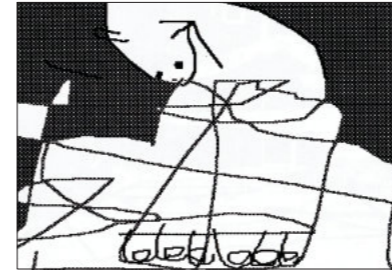
Fig. 35 Zenon Balcer, Teddy bear (film still), 1996.
Source: Own study.
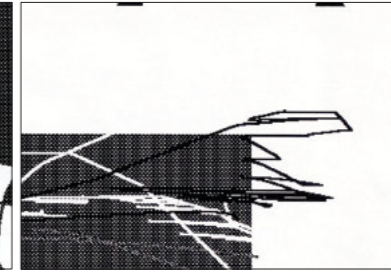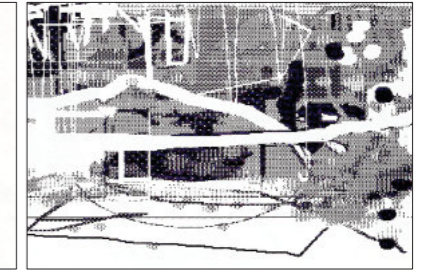
started losing my feeling of certainty as to one of the basic values in the contemporary world, i.e. time.

Condensation.
Author's interpretation of movement

Despite the fact that both film and photography are techniques with a shared origin and strongly overlap, in my work they functioned as two independent fields of artistic activity. Due to the final effect, in one case an illusion of movement appeared on the screen, and in another, I received interpretation of nature in the form of a static image.

I decided to condense the dynamic process contained in the video recording in my own innovative way in order to create a new value which is a static image. My aim was not so much giving "mobility" to the elements presented as including information about change of form in a selected time fragment on an unmoving plane.

The most important decision which completely changed my previous approach to the methods of interpretation of reality was the abandonment of the comprehensive recording of the phenomenon observed at one moment, typical for photography, in favour of recording subsequent, fragmentary, vertical areas of the image. Following the example of the technology directly borrowed from graphic scanners and specialist cameras used to create panoramic photographs, I breached the visual integrity of elements moving in space.

Breaking down their structure into many time sections recorded in different time intervals created a unique dynamism of new forms, containing both information about the object itself and about its displacements in space and changes of shape due to the passage of a specific segment of time. At the same time, I redirected my attention from inanimate to animate matter. A pulsating city with crowded streets, shops and cafés became an excellent catalyst for further experiments. Previous abandoned, soulless factory halls, paint flaking of the walls, and glass panes made way for the human silhouette that is constantly in motion. Different speeds, directions and ways in which people move in the urban space made me aware of the multitude of dynamic phenomena surrounding me. By analysing everyday activities, I opened myself up to the human being in a new way and I started searching for the traces of human existence in my surroundings. I wanted to achieve a less technological, more biological character of my works.

In order to increase the dynamism contained originally in the film recording, after its translation to the language of immobile graphics, I came to conclusion that not just the information about the movement of one object within the given time interval should be taken into consideration, but it is worth combining many such events. By breaking down ▶▶

Fig. 36 Bill Viola, The Veiling, 1995.
Source: http://www.
fabricworkshopandmuseum.org

Fig. 37 Nam June Paik, TV Buddha, 1974.
Source: https://www.tate.org.uk

Ryc. 38 teamLab, Flower Forest Lost, Immersed and Reborn, 2017
Source: https://www.youtube.com

Fig. 39 Zenon Balcer
Animated color works
(Film stills), 1994 – 2015.
Source: Own study.

the time and space cohesion of the original components, I showed interactions between them. Processes occurring in extensive time intervals had been condensed and presented in one immobilised space. Hundreds of elements intertwined into one, unbreakable magma which constitutes a synthesis of processes taking place originally in front of the camera lens in different time intervals. The compilation of materials resulted in the blurring of identifiable forms, losing of their clarity, but the structure of works achieved thanks to such interpretation of reality, in places rhythmical, additionally highlighted changes of events that took place as time went by.

Remaining with the human silhouette as the source of dynamic information, I decided to significantly narrow down the amount of information used. Instead of interpreting the simultaneous displacements of all parts of the human body, I focused exclusively on hands. Through the holding of a paintbrush, a pencil, rubbing paint into the graphic matrix, holding the

camera or a video camera, they became the precursor and symbol of the creating factor for me. "Among the organs of the human body the hand has the most refined motor behaviour to be encountered anywhere in nature" [14].

Combining the smoothness of a human hand with creased, shiny, semi-transparent film symbolising the material effect of its action, I obtained varied complex structures. The topic of my works was this way directly linked to the act of creation.

The aim of the above activities was to analyse reality in more detail and interpret it, and to significantly enhance the impact of the work on the viewer. I wanted to focus the audience's attention on key problems of the project as much as possible. I concentrated on the new look at changes in the dynamics and shape of objects presented due to the movement and on interactions created between the original forms. As a result of these actions, the dynamic processes contained in the video recording were condensed and a new value was created, i.e.
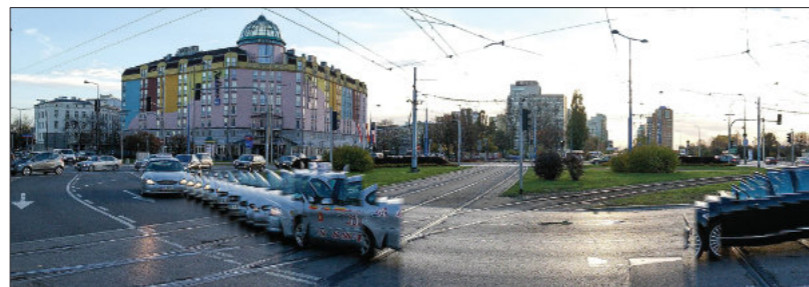
the static image. In order to achieve the intended artistic objective connected with the capture of ephemeral information about changes in the dynamics and movement of objects, it was necessary to look anew at the issues discussed and to create appropriate tools.

Description of the work production process

Using the skills acquired during the production of many projects in the field of graphics, photography and animation, and based on other artists' experiences and solutions, I developed an innovative unique creative method relying on video film and digital postproduction.

In order to obtain the necessary information about changes taking place in the movements of human hands and the interacting semi-transparent films, in a professional photographic studio I took film shots constituting the basis for subsequent stages of creation. Through the use of studio incandescent lamps with continuous lighting, 650W each, I obtained strong, even lighting which, with the relatively low speed of the camera sensor, enabled me to work using very short shutter times, within the 1/500 to 1/2000 range, which guaranteed the recording of the created dynamic events without characteristic blurring which may be observed when using long exposure times. The semi-transparent background made of styrene provided

me with the possibility of setting up additional lighting minimising the appearance of unwanted shadows, at the same time increasing the plasticity of the filmed elements through illumination, and thus accentuation of their contours. As we can read in the book entitled "The Complete Guide to Light and Lighting in Digital Photography", according to M. Freeman, "light is a visual commodity. The quality of lighting has the ability to make a picture worthwhile shooting" [15] or a camera being deployed. For the short, one-minute film shots, I chose a full-frame DSLR camera (Digital Single Lens Reflex Camera) with a possibility of recording video in the 4k format at 50 frames per second, which made it possible for me to record material that was free from uneven exposure, moiré effect and untrue colours. In order to achieve plasticity of the image, it was necessary to use the fixed focal length, very bright standard lens with the focal length of 50 mm. By opening the aperture to the value of f/1.4, I was able to obtain the minimum depth of focus which sometimes amounted to several millimetres. Thus selected parameters were directly translated to great "defocusing" of certain fragments of the image depending on their distance from the lens. After the shots taken have been imported into Adobe AfterEffects, a program used among other things to create special effects in film, I separated them into sequentially numbered frames.

Fig. 40 Zenon Balcer
Breaking Down the Structure, 2017.
Source: Own study.

Fig. 41 Zenon Balcer,
Disintegration, 2017.
Source: Own study.

Fig. 42 Zenon Balcer,
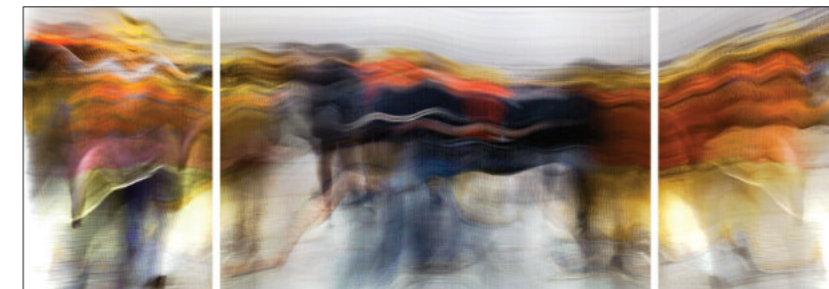Progression 0, 2016.
Source: Own study.

Fig.43 Zenon Balcer,
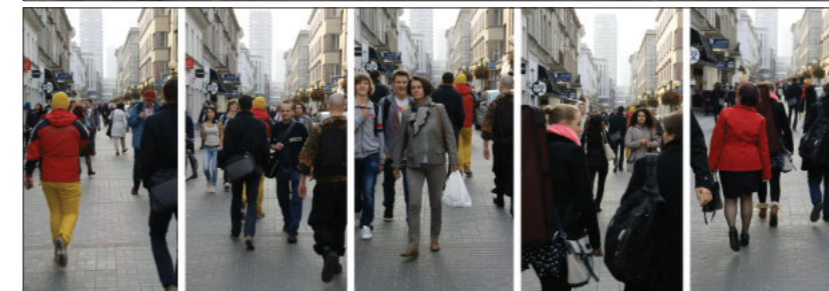Progression 1-2-3), (triptych) 2016.
Source: Own study.

Fig. 44 Zenon Balcer, Example shots from the video material constituting the basis for the work Progresja 1-2-3, 2016.
Source: Own study.

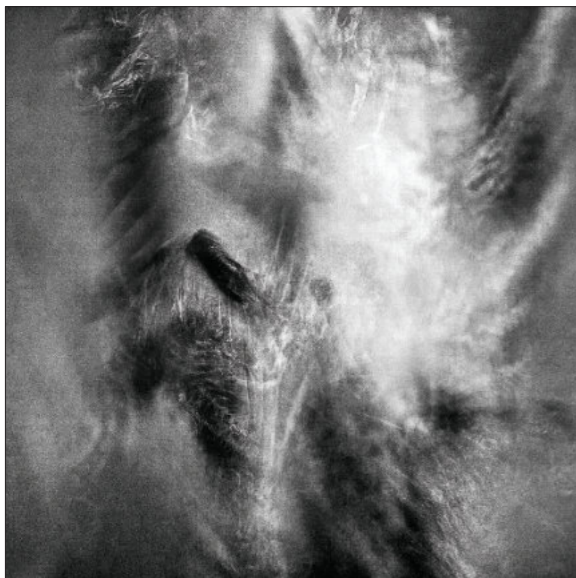**Fig. 45** Zenon Balcer, Standstill 4 (Standstill cycle), 2017. Source: Own study.

Fig. 46 Zenon Balcer, Standstill 5 (Standstill cycle), 2017. Source: Own study.

**Fig. 47** Zenon Balcer, Standstill 7 (Standstill cycle), 2017. Source: Own study.

Fig. 48 Zenon Balcer, Standstill 8 (Standstill cycle), 2017. Source: Own study.

Fig. 49 Zenon Balcer, Condensation 05, 2020, 105x105cm pigment print. Source: Own study.

Fig. 50 Base video material (film still). Source: Own study.

Fig. 51 Separation of the video material into individual frames. Source: Own study.
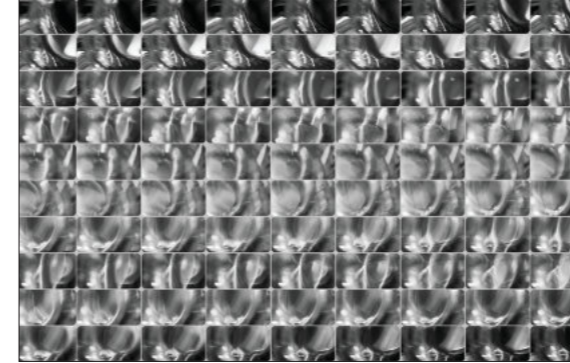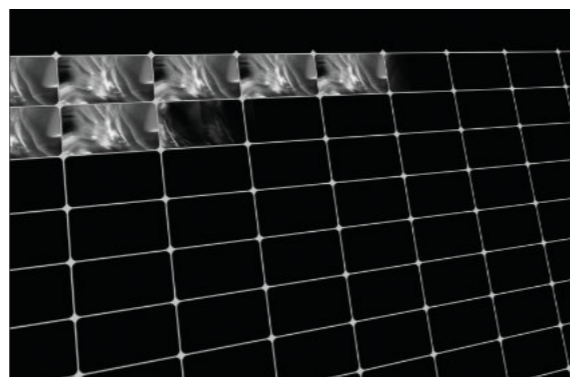
Fig. 52 Sequence of frames created from the base video material. Source: Own study.

Fig. 53 Superimposition of subsequent frames. Source: Own study.
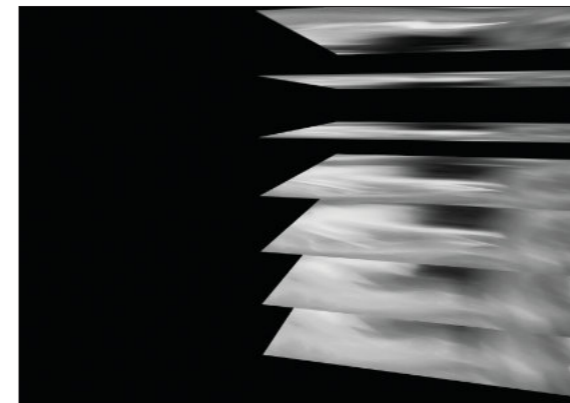
Fig. 54 Composition built of many superimposed frames. Source: Own study.
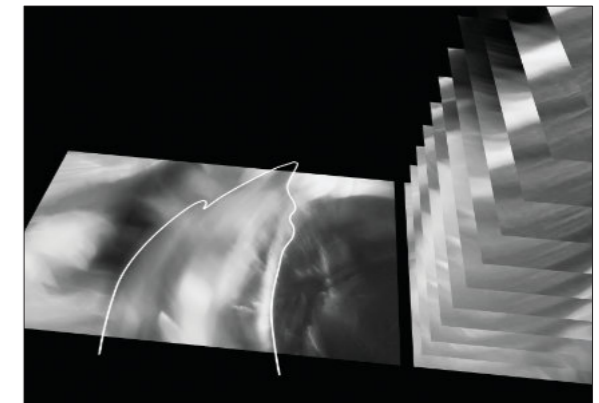
Fig. 55 Creating a vector mask on individual frames. Source: Own study.

The next stage required me to change the software used and start working in Adobe Photoshop, a program that is excellently prepared to create static, raster images. After determining the final resolution of the file, number of bits per channel, and the colour profile, I created multilayered compositions by grouping and superimposing hundreds of independent frames.

In order to separate the previously recorded events of moving elements from the background, I used many individually modified vector masks adapted to the form of the selected objects. I recorded thus created elements again in the form of a sequence of graphic files in the TIF format, however this time with the "alfa" channel attached, containing information about the "masked" areas of the image.

By moving tens and sometimes even hundreds of layers created this way by very small values, I achieved the breakdown of the form of original objects into many components. Thanks to the very time-consuming process, I showed changes which took place in the selected elements due to the passage of time and the movement they had completed. Through the loss of identifiability of the original elements, the dynamic processes contained in the source material were thus condensed, which made it possible for them to be presented in the form of a static graphic image.

The type and quantity of frames imported, the selection of objects separated from the background, direction and degree of displacement of individual layers, the final modification of the colour scheme, tonal values, and adding granularity directly referring to analogue photography – each of these processes was individualised. This activity constituted a creative act, dependent on the nature of the original material and the intended effect that I wanted to achieve, and could not be automated in any way.

Conclusion

Own artistic experiments and the analysis of works of such philosophers as Plato, Heraclitus of Ephesus, or Aristotle enabled me to understand the complexity of the reality metamorphosis processes due to the passage of time. I was confirmed in my conviction that the echoes of previous, already completed actions constitute a link joining "now" and "before". The "new" is created on the ruins of the "past", and changes existing in the past constitute the basic building block of the present. Relying first and foremost on own artistic and technological experiments, and utilising the conclusions arrived at by other artists, such as Edgar Degas, Carlo Carrà, Giacomo Balla or Umberto Boccioni, I moved closer to the elusive "impossible", ▶▶
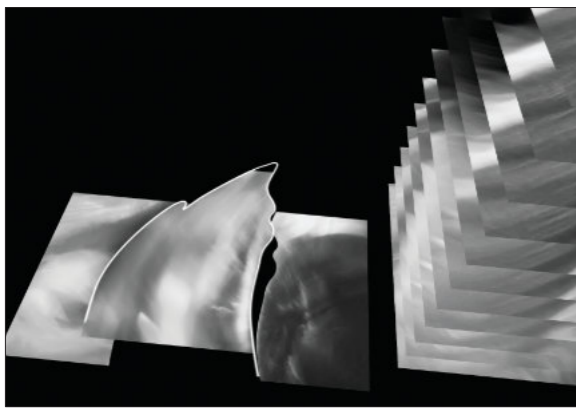
Fig. 56 Separation of a selected part of the image from the background using a mask. Source: Own study.
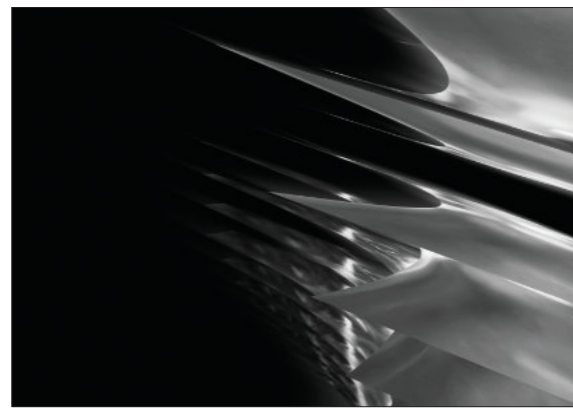

Fig. 57 Moving the masked layers against one another. Source: Own study.

blurring the thin line between motion and motionlessness. In a static work, I included information about the nature of dynamic changes in the surrounding world. Through modification and development of information acquired, I found the individualised language of artistic expression which followed the visible trend dealing with the representation of movement on a plane.

The conclusions drawn from my research show the important role of transformation and continuation in the creation of new reality. I believe that our contemporary perspective, however, may constitute just a small section of what we will be able to perceive in the future. I believe that my work will constitute an inspiration for future research and explorations of this fascinating topic that still remains in the sphere of mystery and awaits further discoveries.

■

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The hidden graphics:

visual research on the construction of Chinese characters and graphics by dot matrix arrangement

Xu Li, PhD

In recent years, I have started to create the plane graphic works from different perspectives, such as point, line and plane visual elements, color, materials, printing techniques and so on. I have also explored the various possibilities of its visual expression from perspectives above as well. Hidden graphics are an interesting phenomenon in the course of graphics practice. My hidden graphic inspiration comes from the feeling I have when I view the exhibition. We often focus on the shape and impression of the work when we look at the work from a distance, so we will get the overall feeling in this case. On the contrary, when approaching the work, we pay more attention to the details and content of the work, and obtain a small partial viewing experience. It gave me a kind of philosophical thinking from the relationship between integral and overall, big and small, outlines and details, far and near. The duality of things is a universal phenomenon in the world. It is a meaningful thing to show the characteristic of duality, if we could integrate philosophical thinking into the form of graphic expression. So I began to try some graphical visual explorations which have this hidden characteristic.

"After victory" (Fig. 1) is a GIF dynamic poster that I started to try "hidden graphics" in early days. In the picture first appears is the victory gesture ▸▸
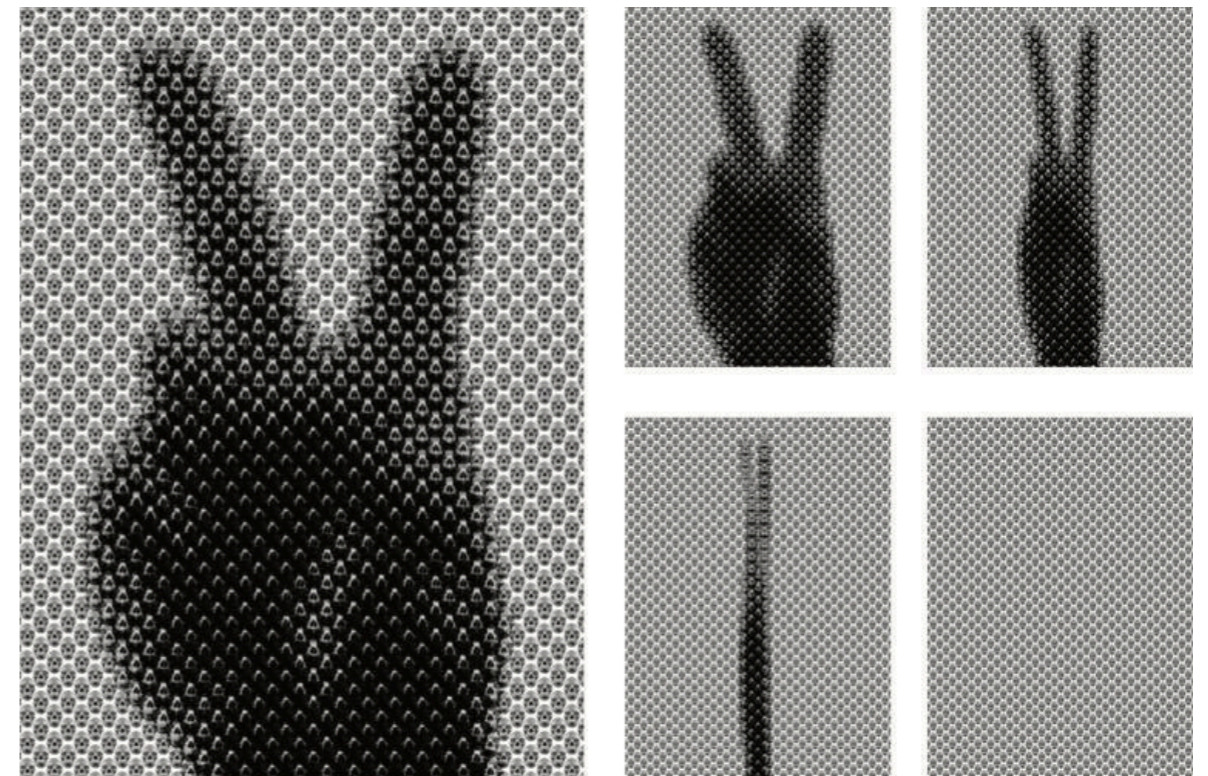

Fig. 1 Xu Li, "After victory", Source: Own study.
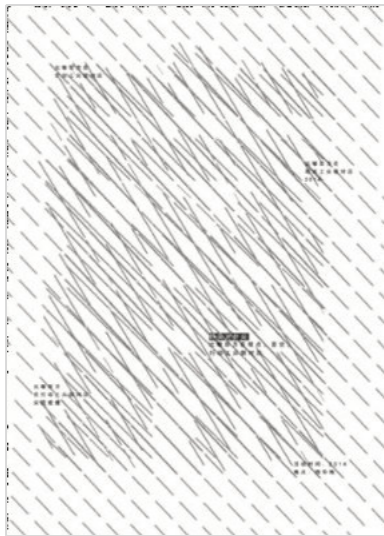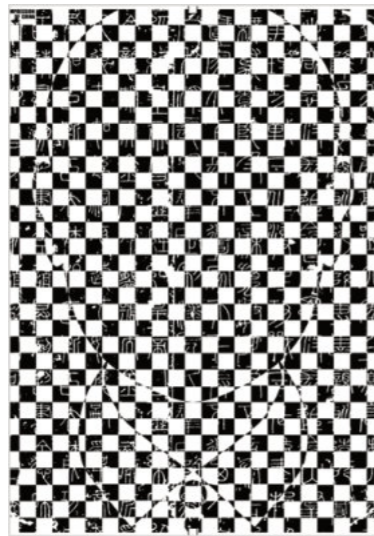
Fig. 2 Xu Li, "Pain".
Source: Own study.

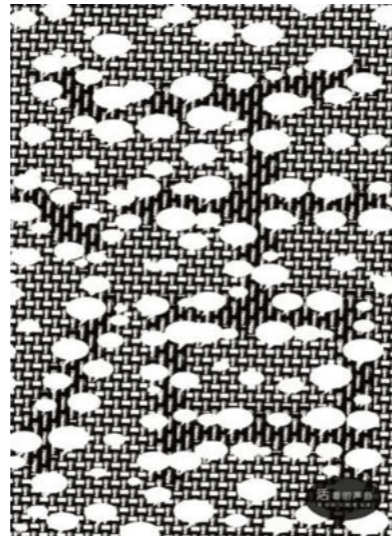**Fig. 3** Xu Li, "Impression of China".
Source: Own study.

Fig. 4 Xu Li, "Hubbub of life".
Source: Own study.

which is composed of a skeleton lattice, and the victory gesture gradually disappears, leaving a skeleton head full of the whole picture at last. The skeleton gradually swallowed the hand of victory. The author expressed that when the cheers of the victory of the war faded, but the threat of death did not disappear, and people's mental trauma would last for a long time, which was indelible. Five series of posters are combined by GIF animation. This dynamic effect makes people feel the gradual fading process of the victory cheers and understand the information conveyed by the posters.

The lattice arrangement forms a new figure, which makes the work novel and interesting. I continue to deepen this expression, integrate into the creation of Chinese character posters, explore and study the visual performance of Chinese Poster.

"Pain" (Fig. 2) expresses the theme of order. There are always people in the world who break rules and order without moral restraint. Disobeying order not only brings pain to individuals, but also to society. The scattered nails are a metaphor for people who break the order. The poster is arranged in a staggered lattice of nails to form a Chinese character "pain (痛)". Nails make people feel pain in vision, and show the collision and pain brought by disorder through the visualization of words. This kind of expression skillfully combines the two figures. There are characters in the picture and pictures in the character. This nested form and technique is implicit, ingenious and imperceptible, just as some disordered behaviors and phenomena in society are not easy to be found. We need to look carefully and patiently to find the hidden destruction under the appearance of harmony. The hidden graphics

appropriately express the theme, and the form and content are perfectly unified. His works were invited to participate in the "Tolerance poster exhibition", which was exhibited in 15 countries including the United States, South Africa, Poland, Italy, Dubai, Colombia and Russia.

"Impression of China" (Fig. 3) shows the theme of Chinese seal culture. The seal is divided into Yin and Yang, and the seal also contains the Chinese Yin and Yang, so black and white is the main color of the picture. The picture is made up of a portrait with a dot matrix of Chinese seals. Instead of a clear portrait depiction method, the work uses simple black and white color and square dislocation arrangement, this method makes the portrait hidden in the seal. Strong contrast and dense square impact on the audience's vision, resulting in the effect of wrong vision. Through the visual effect, it evokes and combines the visual image to give people a new experience that is different from the traditional expression language.

"Hubbub of life" (Fig. 4) is about living in a crowded city where we are swallowed up by various pressures. The continuous repetition of personal portrait in the picture is like the monotonous and boring life day after day and year after year. The mechanical and boring life brings invisible pressure to people. I try to make the character "活" present a faint visual affection through the form of visual illusion. The invisible "活" character in the picture means that normal life has been swallowed up by invisible pressure. Through the sound of shouting to wake us to have quality to live. The work is not limited to a single complex arrangement to form a new figure, but also a new graphic element "dialog
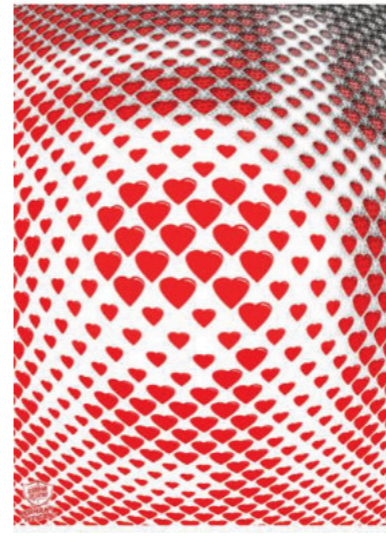

Fig. 5 Xu Li, "Full of love".
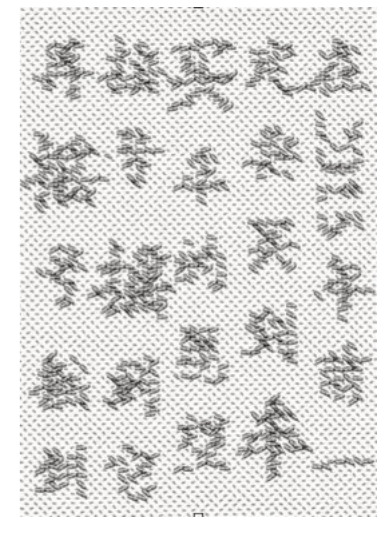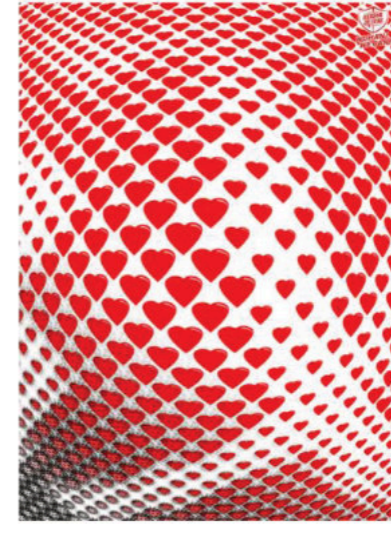Source: Own study.

Fig. 6 Xu Li, "Wish".
Source: Own study.

box" is added on this basis. It makes the picture effect of level is more rich, contrast more intense through the combination of the density of graphics and the change of light and shade.

"Full of love" (Fig. 5) is a work that was created for Wuhan "2020 fighting against COVID-19 Poster Exhibition" during the epidemic in this year. The poster is based on love. Through the lattice arrangement of perspective, size and density, it naturally forms two series posters of "Wu (武)" and "Han (汉)". The expanding love forces squeeze the virus into the corner of the picture, which shows the theme that love is increasing, virus is decreasing, and Wuhan will win in the future. The work tries to create a sense of space on the two-dimensional plane by changing the size and density, it makes the picture produce a raised visual effect with movement.

"Wish" (Fig. 6) is a text arranged by dot matrix of size and density, which is based on the car. This is a new attempt to change one graphic into multiple characters.

"Zero corruption" (Fig. 7) makes a new attempt. Through the poster with copper coin as the basic type, gradually into the shape of the virus. The character "O" is naturally formed with the density, size, color changes, it shows the theme of zero corruption in such way. The work evolves from one figure to three figures, which changes from 1 to 3. Through the lattice arrangement, with the passage of color, skillfully combined with the gradual change of graphics, the work has a dazzling visual effect like a kaleidoscope, and vividly expresses the theme of zero corruption. The work relies on the extension of graphics in the two-dimensional plane to establish a dazzling and confusing space. It produces an
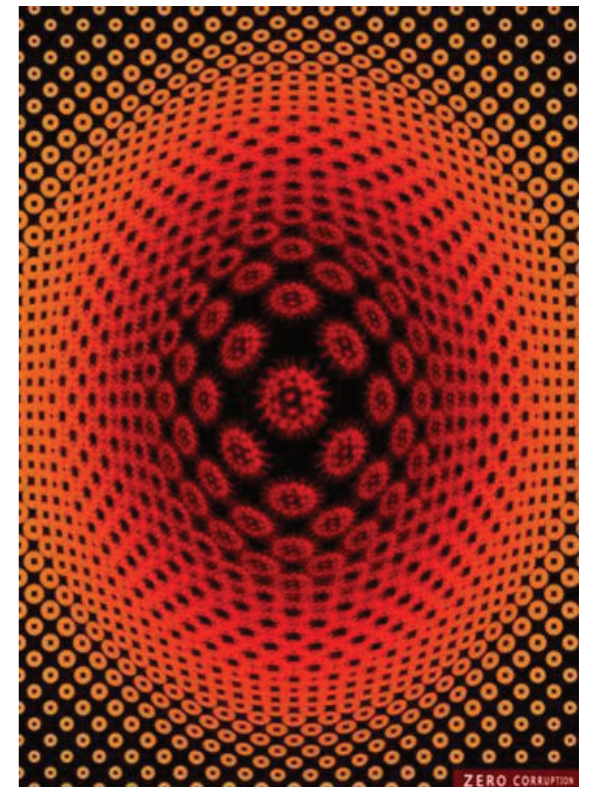

Fig. 7 Xu Li, "Zero corruption".
Source: Own study.

incredible three-dimensional sense and the illusion of movement in a completely static plane. This is a new attempt in artistic expression.

From simple to complex, the series of "hidden graphics" gradually explores the composition of dot matrix from different angles. It uses size, density, color and dislocation arrangement to express the design ideas and themes of the works, showing the new artistic charm of Chinese characters and ▸▸
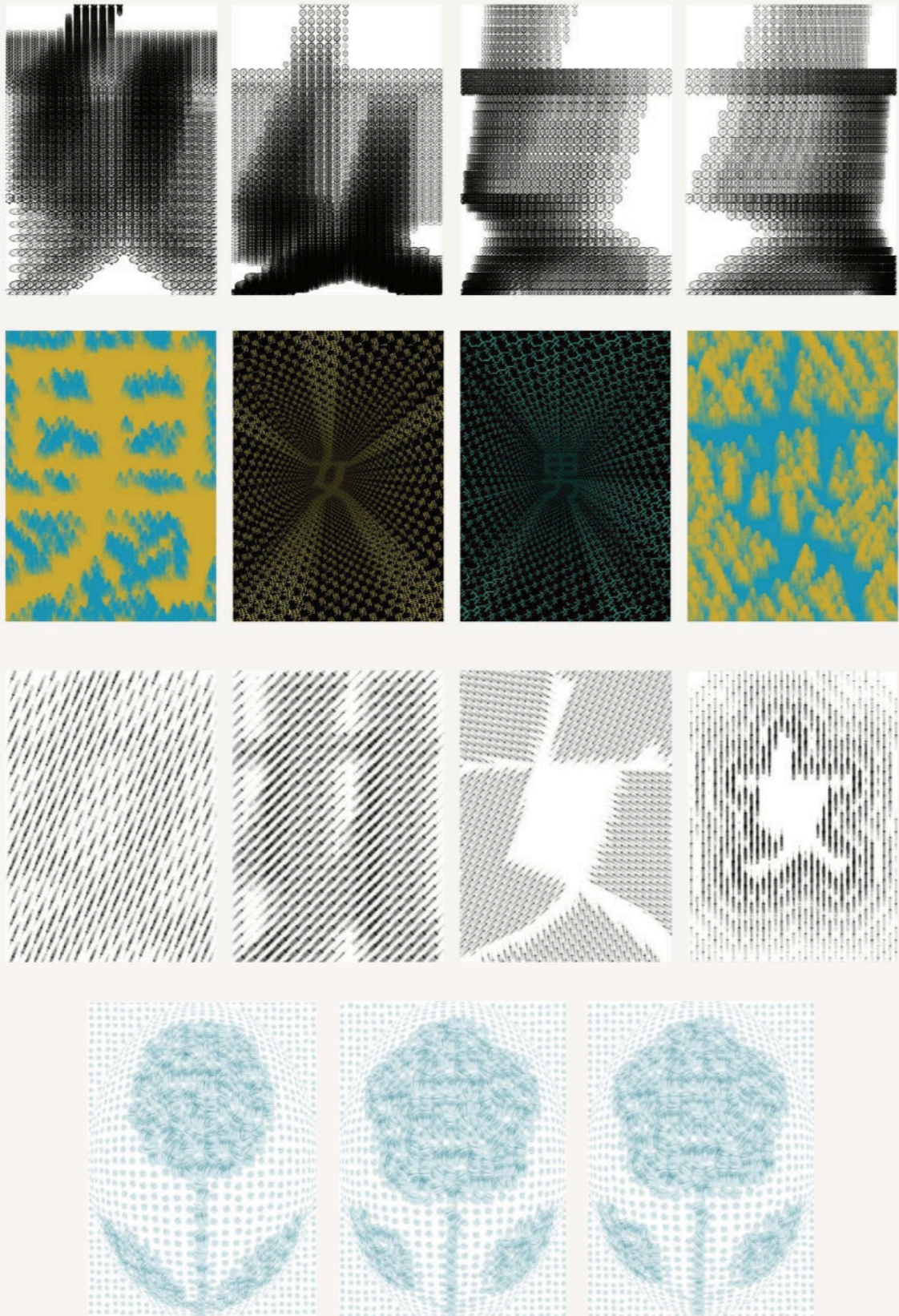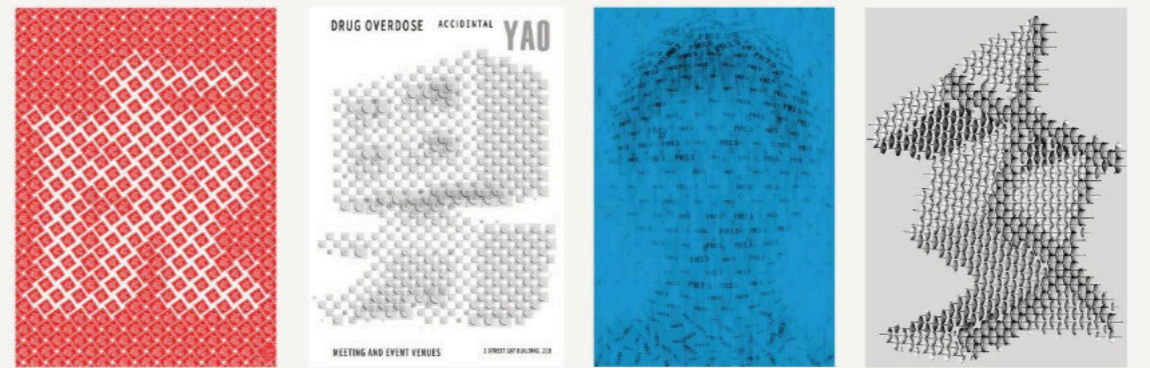
15 posters, 2014—2022

15 posters, 2014—2022

graphics. In the research of the above mentioned works, "hidden figure" starts with the simplest change from 1 to 2, and gradually deepens to the change from 1 to 3. I think that "hidden graphics" can continue to derive changes from 1 to N, which provides many possibilities for the visual expression of Chinese characters. See below, I continued to carry out research and practical exploration around characters and graphics (not limited to Chinese characters) along this direction!

The exploration of the above two-dimensional plane works is a process witnessing the increasing number of the basic pattern and the increasing complication of the arrangement. The visual effect of the picture is getting richer and richer when the number of basic patterns increases or the basic patterns' direction, size, position and density changes. By combining the ways of repeating, gradually changing, radial distributing, spatial arrangement and other construction methods, the visual impact of the picture is becoming more and more stronger, and the final hidden graphic is arranged that is also ingenious. The hidden relationship of graphics changes with the strength of the visual effect, the order of viewer's observation also changes accordingly. Visual exploration on which the two-dimensional plane makes the hidden graphics present a unique artistic attraction, it also gives the viewer a pleasant visual experience. ∎
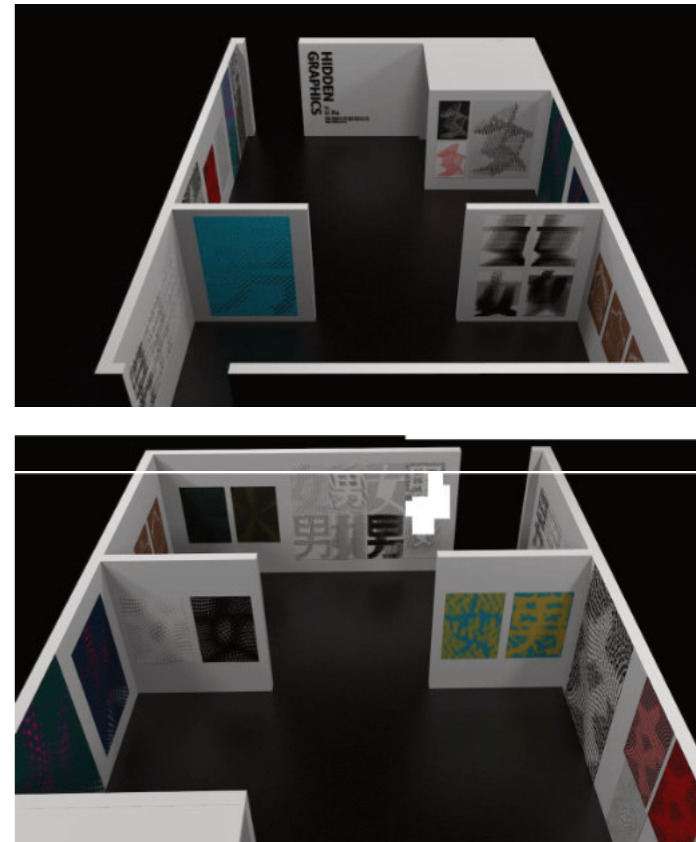
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Chinese characters Typography posters

Xu Li, PhD

Characters are silent language that expressed in silence.
Characters are figures that can speak and speak in every corner of life.
Characters are visible communication that can build a bridge among people.
As a tool to transmit information and exchange ideas, characters can travel through time and space and across regions.

As an important carrier of information dissemination and cultural symbols, character is one of the most important design elements in graphic design, and its status is self-evident. Because of the cultural differences, different countries' characters show a unique personality. The foreign characters in different cultural backgrounds are always full of mystery, which makes people curious and yearning. I have always been interested in typeface design. In recent years, I have created a lot of typeface design works. I have been experimenting and exploring Chinese characters from the perspective of visual form.

In the process of creation, I think: *"Is it possible to promote international typeface design communication through exhibitions?".* Let foreign designers also have the opportunity to understand Chinese characters and Chinese culture, at the same time, let Chinese designers better understand the Western characters and culture. For this reason, I have planned a series of international exhibitions and design forums with the theme of "characters". Since 2013, the Chinese character culture series exhibition has gone through a glorious history of 7 years. Every year, it carry out a series of international exhibitions and projects by cooperating with art museums, galleries, art centers and other cultural institutions in different countries, such as The Fifth Gallery (Virginia, USA), Fahregor hall (Iran), CSK Gallery (Lublin Poland), Sutnara Gallery (Czech Republic), TurinPalazzo Birago (Italy), LANG Gallery (Seoul, Korea), Slovak Technical Museum, Estonian Haapsalu Cultural Center and so on.

Through the exhibition, Chinese character posters were exhibited in foreign countries. Because of the difference of characters, the audience can't understand Chinese characters. They can only feel the information conveyed by the characters through the visual elements of shape and color. With the gradual increase of international communication, the audience's requirements are also higher and higher for the efficiency and accuracy of information transmission. They might have felt fresh and curious when they saw the poster of Chinese characters for the first time. They don't care so much about the character's meaning. When they look at it again, they will want to know more about what the character means and what it expresses. Therefore, I began to focus on the visual design of Chinese characters and the efficiency of information transmission in the context of international exchanges.

How can foreigners understand Chinese characters? How to solve the problem of information transmission through design? I started a lot of creative practices about how to achieve effective transmission of text information through visual design. On the basis of practice, I put forward the concept of "Zi Yi (字意)", it includes two meanings: that are ideographic – "Biao Yi (表意)" and new meaning – "Xin Yi (新意)".

"Biao (表)" means expression and communication, "Yi (意)" means meaning. Text is the carrier of information, and the expression of characters is the transmission of text information. Different from the phonetic characteristics of Western characters, Chinese characters have the
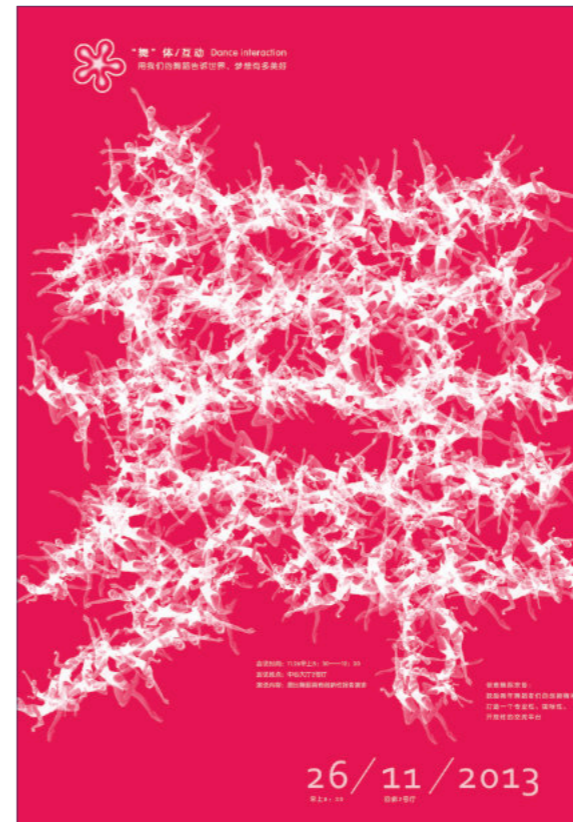
Fig. 1 Xu Li, „Dance". Source: Own study.

characteristics of ideograph, and the font itself can transmit information. In the design, through the visual design of Chinese characters, the ideographic function is enhanced to improve the efficiency of information transmission. I use some of my own practice cases to interpret the "Yi (意)" – the meaning of character.

Ballet is "a geometric pattern combination of several people dancing together". This view embodies the formal beauty of ballet. Different from Ballet's "open, jump, straight" movement characteristics, Chinese classical dance is characterized by its body characteristics of "twist, tilt, circle and tune", through the different treatment of high, medium and low space, various dance forms have produced a variety of national dance turns, which is also an important part different from ballet. According to the different characteristics of the two kinds of dances, I designed the character "Dance (舞)" (Fig. 1) – visually, visualizing the characteristics of ballet and Chinese classical dance, and created two posters with the same character but in different styles. After visualizing character "Dance (舞)", the information transmitted clearer and easier to understand.

Many Chinese characters are typography posters created by myself. It was taken as an example to explore various possibilities of typography poster visual innovation under Chinese characters. (See p. 80)

Innovative practice and exploration of Chinese characters typography posters. I have also tried new materials and technologies such as laser cutting, 3D printing and Augmented Reality in Chinese character design. In my opinion, endowing typeface design with new vitality that only by constantly innovating and striving for changes, and boldly trying new technologies, new materials and new expression techniques in design. This is also the scope of "New Meaning (新意)" in the concept of character meaning. However, no matter what way to innovate, the form of innovation must be combined with the content to form a unity. Otherwise, innovation will become mere formality and lose its meaning! ∎

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Fig. 2 Xu Li, „Typography posters", 15 posters, 2014-2022. Source: Own study.

Immaterial benefits

by **Mateusz Bugalski**

About the "40 x 40" exhibition held as part |
of the ART & DESIGN 2023/2024 IM_MATERIAL festival
at the Academic Design Center in Łódź,
in cooperation with the organizers
of the A' Design Award and Competition.

When the term "im_material benefits" is used, the associations can be either axiological or cosmic. In the first example, let them be about choices that prioritize values over objects. In such an arrangement, idolatrous motivations stand at the opposite pole of what can be hung on the wall or put in a pouch. The materiality of objects constitutes them in space, gives empirical evidence of their presence, and yet so often loses out to all sorts of imponderables, which cannot be eaten and fired in the oven, but can be imagined without limit. Immateriality and its senders are believed on their word of honor – sometimes only because such a promise seems exciting. For example, when, during observations of the cosmos – made with the help of the Super-Kamiokande neutrino telescope a kilometer below the earth's surface – it turns out that matter known and observable to humans constitutes only five percent of galactic substance. The rest is dark matter – so maybe not something absolutely immaterial, although giving this kind of benefit to all amateurs of the mysteries of the unexplored cosmos.

The name of the IM_MATERIAL festival taking place at the Academic Design Center in Łódź can hardly not be perversely interpreted. At the

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Przemek Hajek, Hyunje Joo, Maria Joanna Juchnowska,
Birger Linke, Rui Ma, Takatoku Nishi, Piotr Płoski,
Yang Pu and Ding Wen Nic Bao,
Cherin Prasopsukcharoen-Cherinadded, Gerogi Tumpalov,
Cynthia Turner, Lihsing Wang, Kauzne Watanabe,
Ruud Winder, Lisa Winstanely, Midori Yamazaki,
Ensieh Yazdani, Maja Zińczuk**

Visual identity:
Mariusz Andryszczyk

Design:
Magdalena Stecka

Curators:
Izabela Jurczyk, Magdalena Komborska-Łączna

Venue:
**Academic Design Center in Łódź,
Księży Młyn 13/15, Łódź 90-337**

international exhibition forming the festival "40 x 40", for much is said about creations that are fully tactile, sprawling in form, sometimes even extravagant. The curators of the exhibition, Izabela Jurczyk and Magdalena Komborska-Łączna, chose from over a hundred works awarded in the A' Design Award and Competition for 2023. The exhibition space is divided into two sections: "Im_material of Technology" and "Structures of Matter."

The first part includes Maria Juchnowska's work "Kintsugi, Ferrari Red," among others. It is a thoroughly luxurious bowl made of porcelain and gold in the color of a red Ferrari, refined and imperial. Set against other pieces made in a similar tone, it is very noticeable, but not only by its expressionistic look. It is a matter in economic and social terms. By its presence, it expresses inaccessibility, and as such, it makes you forget to see it in terms of utility.

The unique "Silk Blooms" brooch designed by Thai artist Cherin Cherinadded is looked at in a similar way. This universal accessory piece also used as a bracelet, made of brass and Thai silk, is an expression of exquisiteness and good taste.

This part of the exhibition also features more commercial designs – such as this one by Birger Linke, which was created for the French-Chinese brand Vitarolga that aims to "bring out the beauty that is in each of us." The title of the work, "Beauty from Below," is meant to correspond with the hyaluronic acid-based products used to revitalize the skin.

The second part of the "40 x 40" exhibition - dedicated to "Structures of Matter" - consists of works that often comment on the fleshy nature of things, their deformations, sometimes very monstrous and spectacular. One of the works depicts a duel to the death between a T-lymphocyte and a cancer cell. It's an illustration by Cynthia Turner, in which, in a quasi microscopic shot, we see a compact of two spherical creatures that look extraterrestrial. All around are splashing pieces of crystals peeled off from a cancer cell, for which the biochemical proteins released by T cells are deadly. From a human point of view, it's hard not to watch this battle with satisfaction.

No less organic seems the bio-art project of Przemek Hajek creating visual communication for the "Powidoki" magazine in Lodz. In his work, he closed the circulation of production by imitating earthworms and using their help to produce the paper. These organisms joined the editorial team. They were fed with the scraps left over during the processing of the paper, and then used the compost, which was not rich in organic matter, to produce new sheets.

The works collected by curators Izabela Jurczyk and Magdalena Komborska-Łączna in the "40 x 40" exhibition alternately evoke associations with immateriality and materiality, further complicating internal considerations of being and non-being. As, for example, in the case of the fanciful attack on the cancer cell, on whose presence humanity strongly depends, or when matter circulates in nature, giving infinite building blocks, although for a long time it was confined in the intestine of an earthworm. Matter or im_material is also seen in the context of the construction of the cosmos – as Komborska-Łączna directed in her curatorial text, citing, among other things, the observations of German chemist and natural philosopher Wilhelm Ostwald blind to the presence of atoms and molecules in the universe. Through this, it becomes even easier to connote the term "im_material," constantly resolving the accomplished and imperfect modes of materiality.

And such considerations in the era of pseudo-science and post-truth come more and more naturally, providing a sense of uncertainty, chaos, but also bringing benefits that provide an ascendant to new artistic and cosmic explorations.

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3. M. Komborska-Łączna, *A short story about non-matter, curatorial text for the exhibition* "40 x 40" held as part of the ART&DESIGN 2023/2024 IM_MAT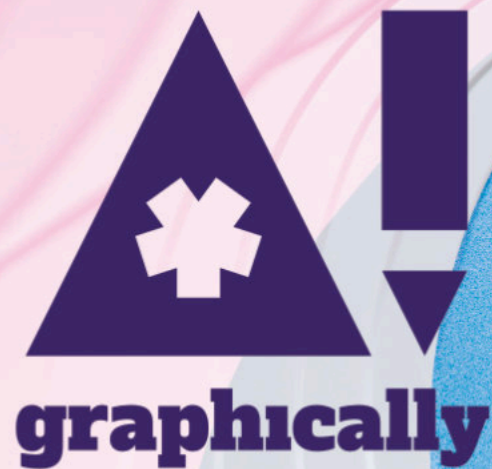ERIAL festival at the Academic Design Center in Lodz (https://www.acdesign.com.pl/wgrane-pliki/artdesign-2023-nie-materia1.pdf), date of access: 22.02.2024.
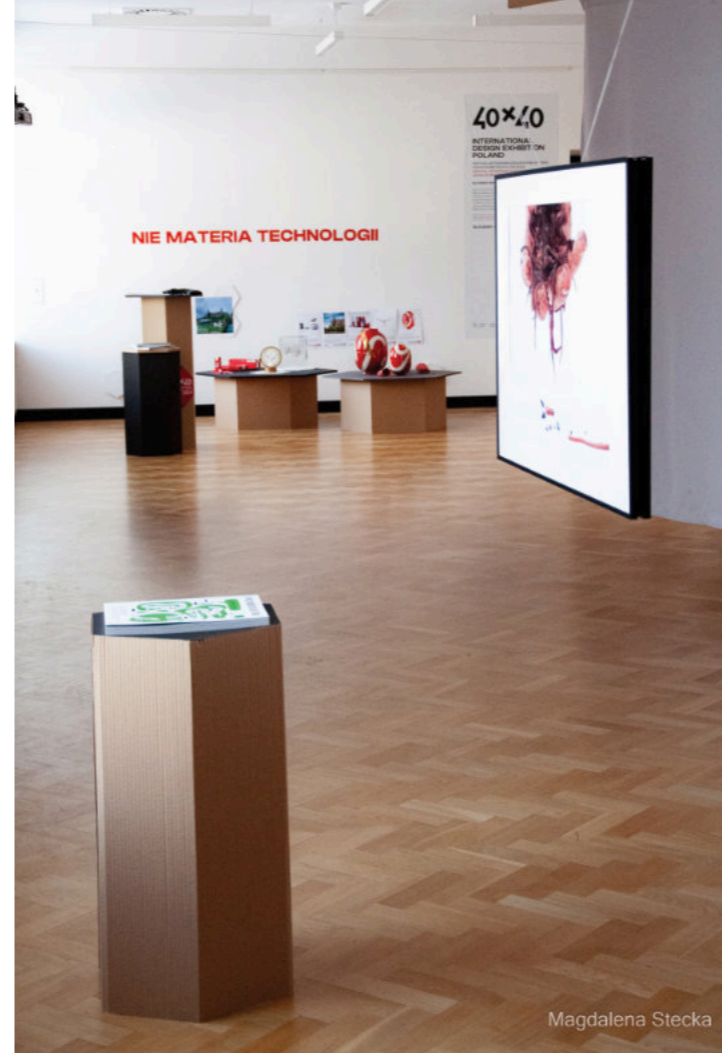
Magdalena Stecka

All photos provided by IM_MATERIAL festival

AI! graphically

Manifestations of Art through Artificial Intelligence

22–26 April 2024

WIT Academy, Warsaw, Poland

workshop.aigraphically@wit.edu.pl

Arts have accompanied human beings since time immemorial, from the cave paintings throughout various epochs to the digital age. The contemporary visual arts and graphic arts have made an enormous use of the digital tools for creating works of art. However, it is Artificial Intelligence that has revolutionized the way art is made.

We would like to invite you to the **Erasmus International Week at WIT Academy in Warsaw** during which our academic teachers and practitioners will provide workshops on the manifestations of art through Artificial Intelligence. We welcome your contribution in the way of presentations, conducting workshops or digital posters.

AI graphically has been planned as an intensive week of specialized workshops, presentations and round table discussions. There will be approximately 6 to 8 hours of interactive workshops conducted by our academic teachers and practitioners in our fully equipped computer laboratories. WIT academy has at disposal numerous laboratories with working computer stations for 20 students and two-computer working stations for the instructor connected with the screen in each classroom.

The presentations will include, among other, the topics of AI from the IT point of view, introduction of AI in graphics and its application will be explored during the workshops.

Should you be interested in giving a presentation, please contact us at:

workshop.aigraphically@wit.edu.pl

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SCIENTIFIC MAGAZINE ON GRAPHIC DESIGN AND NEW MEDIA

About the magazine
A scientific magazine about graphic design and new media, published quarterly by WIT University based in Warsaw. The magazine covers such topics as graphic design and designing for new media.

The magazine is a forum for exchanging experiences, publishing research, and presenting new design concepts. The articles and research published there are carried out by graphic designers, design theoreticians, photographers, interactive products and user interfaces designers, 3D graphic designers and creators of films, animations and other multimedia forms.

Fields of operation
Articles on specific topics in the field of graphic design and multimedia.

Research
Conducting and publishing research on the impact of various means of implementing graphic designs on recipients.

Events
Reports from exhibitions of applied and multimedia graphics.

Topics you can publish

* graphic design
* brand identity design and systems of visual information
* poster design
* typography
* graphical interfaces: design, prototyping, research, testing, usability
* artistic and creative digital photography, mobile photography
* digital press
* digital illustration, concept art
* all multimedia forms: animations, video editing, moving images
* digital and classic sculpture, 3D printing
* promotion of digital art
* digital advertising techniques

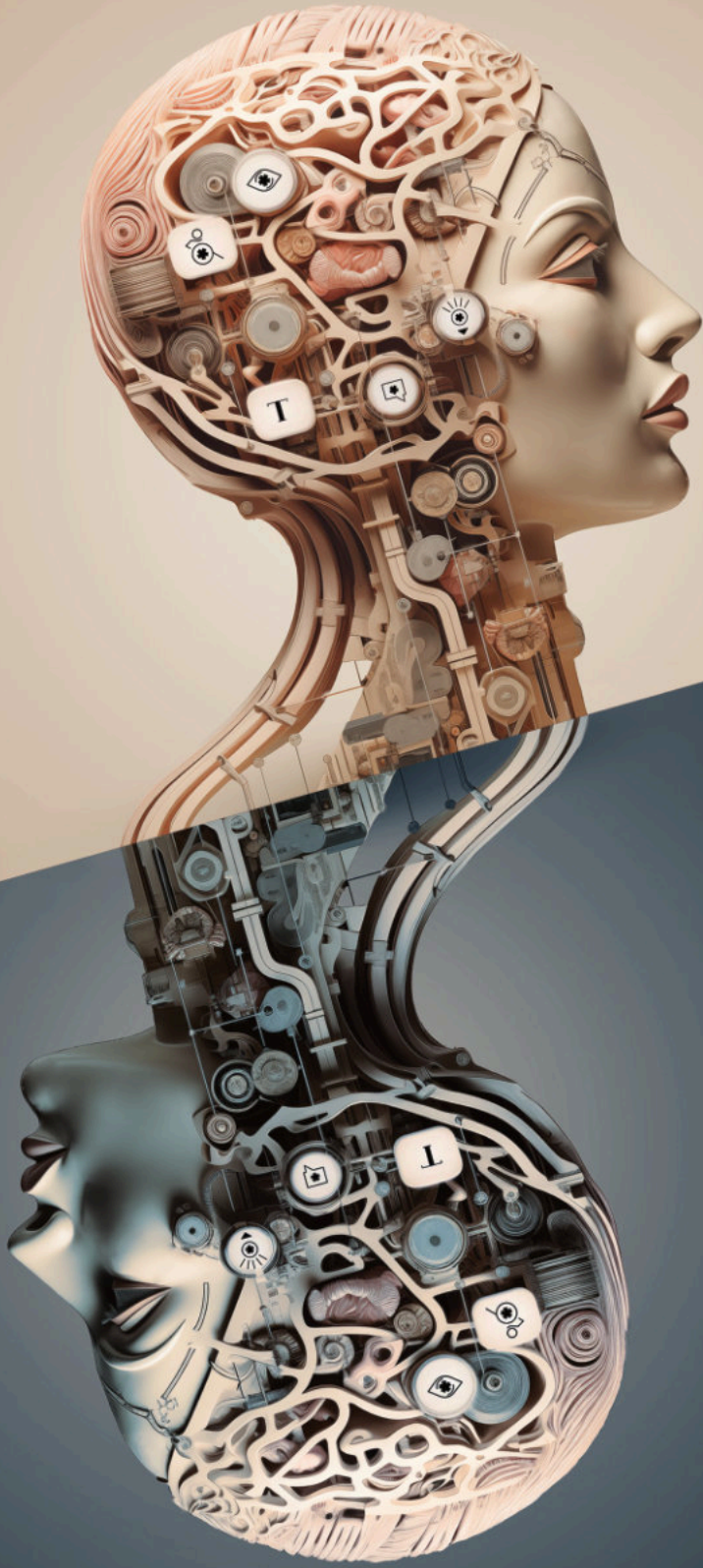## Join the authors of

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