Designer's Introduction

Daniel Lakos — *designer, inventor of the game*

The jump from paper - dimensional design

The Backstory

The story of the Logifaces game started in 2012 when we were invited to submit a tender to MOME's toy design project, 1359 cm3. I came up with the concept over the course of just one night. I was thinking of introducing a three-dimensional shift into an existing two-dimensional game, Tantrix. Just like in Tantrix, you need to connect the elements according to a simple rule. Logifaces is more similar to Triomino, however, I did not know about Triomino at that time. Right after that, the very next morning we sketched up the various elements, which still remain the same today. The jury chaired by Ernő Rubik selected our design to be one of the finalists. A year later, in 2013, we won the Hungarian Design Award.

Professor László Mérő reviewed the game on this occasion:

> Good problem solving is the basis of everything, both in mathematics and design. Without this, we cannot come up with solutions that overwrite our fixed schemes. This spirit of innovation and the search for innovative solutions characterises the creations in the design category. Why do we need new kinds of games? Isn't the fruit of the last few thousand years enough, from dice to the Rubik's cube, from the cob doll to the Barbie doll? One childhood is not enough for these either, and not even a whole life. But just as we need new literary works despite the fact that we haven't even read the old ones, we also need new games that somehow resonate with our lives today. The toy, which was awarded this year's Hungarian Design Award, presents a theme that is thousands of years old in a modern guise. Puzzle games already existed in ancient Babylon, but this game could not have existed then, as it is inspired by today's computer graphics toolkit. That's why we immediately feel at home. It's good to think. More precisely: it is good to think in moderation, just as it is good to drink in moderation or climb a mountain. Many of us like to climb mountains, but few of us like to climb the Himalayas. The thing about good puzzle games is that they require just as much thinking as they are enjoyable, and as much as the joy of finding the solution is more than worth the sacrifice made for it, the mental effort. Psychologists have shown that the greatest pleasure comes from tasks that are medium to difficult, but not too difficult. This excludes not only tasks that are too difficult, but also tasks that are too easy: they may require little effort, but they are not worth that much. This prize-winning work in the design category has hit the level of difficulty that creates a pleasant challenge exactly, its clean formality playfully draws you into the complex world of spatial geometry.

After the Design Award, we came up with the idea to use concrete, which has low investment costs for series production, instead of the more complicated and commonplace wood. In 2014, our design, now ready for mass production, debuted on the Indiegogo crowdfunding platform. The goal was 15,000 USD, which we managed to almost double with about 300 sets sold.

The concrete version became a special design object, a tabletop sculpture, and a frequent choice as a souvenir or a gift. This led us to introduce a wooden version as well, suitable for children and people who are more interested in playing than owning a design product.

The Concept

In the last decade polygonal computer design had a great impact on architects and designers. This trend manifested in faceted shapes, triangles, and organic surfaces produced with the use of polygons. The polygonal style that appeared at that time also had an impact on Logifaces. Another aspect is sophisticated and widespread computer-generated augmented reality. 3D virtual reality blurs the difference between the planar and the spatial worlds. This paradox inspires many designers and artists today as well. My short introduction with some spectacular examples introduces the designers' approach to triangular and flattened geometry.

After the turn of the millennium Computer Aided Design (CAD) programs and platforms became much more powerful than in the past. As computing capacity problems faded, designing complex shapes became much easier than before.[1] However, the implementation of organic forms is still challenging, as raw materials are usually accessible in basic shapes, typically in rectangular boards or blocks. A possible way to execute multiple-curve forms is polygonal reduction. One of the first pioneers of this method was Buckminster Fuller[2], who created geodesic domes including arrays of various triangles from the 1950's. This was possible without CAD programs. The production of reduced freely formed shapes required huge computing capacity as it involves many unique triangles and even more unique construction details. An early example of this kind of non-standard architecture is a building located in Budapest called the "Whale", which was designed by Kas Oosterhuis[3] in 2007. The organic shape covered by triangular shaped glass planes fills the void left between two old, longitudinal warehouses on the bank of the River Danube.

1   Weisberg D. E. "The Engineering Design Revolution — The People, Companies and Computer Systems That Changed Forever the Practice of Engineering" Cyon Research, 2008

2   Fuller B, López-Pérez D "Pattern-Thinking" Lars Müller Publishers 2019

3   Oosterhuis K "Towards a New Kind of Building: A Designers Guide for Non-Standard Architecture" nai010 publishers 2011

In addition to architects, faceted style inspired designers as well. A remarkable example of this in the fashion industry was created by Issey Miyake, the Distortion bag, designed in 2013[4]. This bag is made of small, identical rigid triangles attached to a flexible textile mesh. In several steps one can transform the flat structure into a three-dimensional organic shaped bag. This piece leads to my next topic, the transition from 2D to 3D.
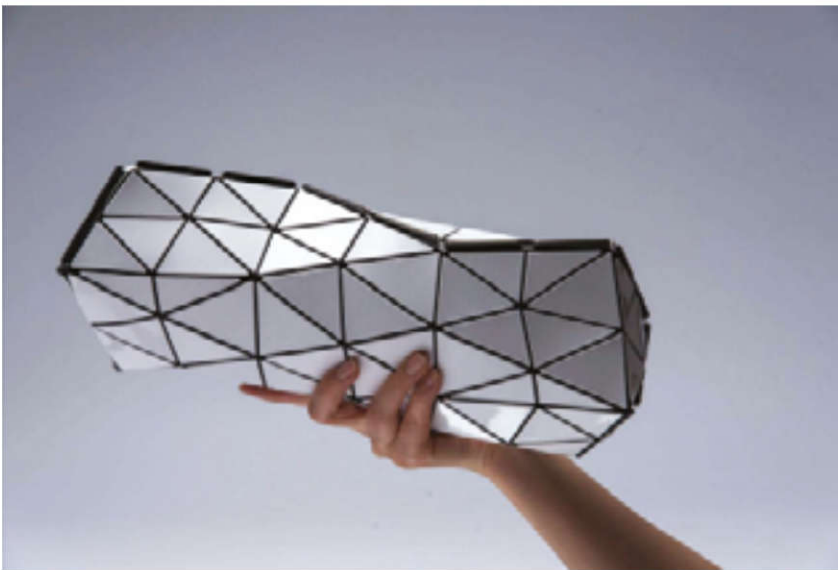
A Taiwanese fashion brand, called "Jump from paper"[5] applies graphics and 2D cartoon-like illustrations to create real-world 3D bags that literally look as if they 'jumped from paper'. Despite their bags looking completely plain, they do have some inner 3D space in order to perform the storage function. Sharona Merlin's "Slim cup"[6] from 2010 is an archetype cup from one side - though it is actually flattened. Even though it is questionable how it functions as a cup, it is a thought-provoking idea as a conceptual design.

---

4   https://design-milk.com/distortion-futuristic-bag/

5   https://www.jumpfrompaper.com/

6   https://www.dezeen.com/2010/08/11/slim-cup-by-sharona-merlin/

Figure 4:
Sharona Merlin: Slim cup, 2010
(photo: Sasha Flit)

My last example in this topic is a short animation, Rabbit and Deer[7]. It was created by Péter Vácz in 2013 and won countless awards worldwide. According to the teaser "The friendship of Rabbit and Deer is put to the test by Deer's new obsession to find the formula for the 3rd dimension..." In other words, the Deer escapes the 2D world for 3D while the Rabbit has to stay in 2D. The movie explains the dimensional differences in a funny and emotional way.

Figure 5: *Péter Vácz: A slide from the animation entitled Rabbit and Deer*

I believe that every age has an emerging vision that attracts designers. These ideas often turn into superficial styles. Looking back to the early 2010s, these visions also had an impact on the concept of Logifaces. The best ideas become timeless even if we are not certain of their specific origin. I hope Logifaces will stimulate people for a long time.

Education Opportunities

Education is currently facing many new challenges. The world of the Internet provides almost all knowledge for the children of today; they live in an unlimited network of connections. This process fundamentally changes the role of the teacher and the role of education. The entire international educational system needs to be renewed to satisfy the needs of both students and teachers too. Teachers are motivated to seek and discover new methods that help them find a connection with children and facilitate cooperation with them.

School education of recent decades mainly focused on seeing. Students used their eyes to understand geometry, the sciences and art. They learnt about different three-dimensional shapes or forms by them being

---

7   https://vimeo.com/52744406

demonstrating in two-dimensions. This method caused confusion and made the differences between dimensions less understandable. The Logifaces game helps students understand the distinction between dimensions and improves spatial skills. In addition, the use of this teaching tool gives the teacher the opportunity to place more emphasis on tactility, which results in more experienced-based learning. These qualities make the tool suitable for children living with various disabilities, such as autism, those with visual or hearing impairment, and speech disorders as well.

Logifaces gives students the opportunity to explore the connection between mathematical and geometrical thinking and works of art. This approach creates a passage from the knowledge of abstract shapes to the joy of art and creativity.

The Benefits of the Game

Although this workbook focuses on an educational methodology for Mathematics, Science, and Art classes, some important additional aspects should be considered in the curricula.

Conversation starter

Verbal skills and communication are enhanced as pupils construct projects together. Children must discuss their plans for the project and their new ideas as the project unfolds. Any changes to the plan require communication. Technical and artistic language is needed to put a project together.

Imagination developer

Most of the shapes built with Logifaces don't quite look exactly like the real thing. Part of the fun, however, is capturing the essence of an object so it becomes obvious what it is. Imagination has to fill in all the gaps. As video games become more realistic and movies improve their special effects, the need for imagination with these activities is low. Logifaces stimulates the imagination. Animals, human figures and more all spark the imagination as the scene unfolds. Imagination is a critical aspect of creative problem solving and abstract thinking. We should help children develop their imagination.

Return to tactile senses

A simple set of wooden blocks is obviously as far as one can get from high tech electronic gadgets. However, Logifaces can act as an important stepping-stone to computers and technology. Children are playing computer games and learning with computers at very early ages. The computer is a powerful learning tool. But even the very best 3D programs are merely a simulation of real life. If children bypass the step of physically playing with blocks and exploring real 3D models with their own hands, they will be at a disadvantage. When children go straight to the computer, they miss one of the critical steps in understanding how to compare quantities and analyse three-dimensional objects. There is no substitute for walking all the way around a structure to understand it from every angle. If this is started at an early age and in conjunction with computers, the creative and technical potential of children will be maximised. As Logifaces itself is

based on the polygonal modelling often applied in computer modelling, children get a sense of virtual complexity at an early age.

Team builder

It doesn't take long to figure out that building a giant surface goes much quicker with an extra set of hands. Matching the right elements one by one is a simple act that can be carried out by anyone. The repetitive method is both reassuring and logically challenging. It is possible to play it freely or aim to build a predefined shape. Leadership and project discussion happen naturally.

Artist inspirer

Many children have not explored their artistic nature. Every child is an artist and will gain pleasure from creating. Logifaces provides an easy, non-messy way to explore sculpture and design. The relief-like surfaces blend ancient aesthetics with contemporary design. Logifaces blocks have already inspired artists, photographers, and fashion designers.

Calculus head start

Early exploration with simple blocks builds a subconscious understanding of mathematics and logic. Children learn geometry as they play. By handling the blocks, they build a concrete understanding of numbers and how units interrelate.

Play-based learning in the early years is fundamental, as we learn communication and language skills in both early numeracy and literacy. This naturally leads to the acquisition of social skills, such as turn-taking and sharing, and a desire to discover more. Simple to play, magical and fun activities are vital ingredients. Later, during the years in primary education, it is important for acquiring numeracy and literacy skills but above all for developing a desire to keep learning. At secondary school positive stimulation to learn and a vision of where this is all leading are primary. Hands-on, open-ended activities help stimulate constant reflection and inquiry-based thinking, and we believe Logifaces is a suitable tool for these goals.

The analogue game for digital minds

This slogan refers to the computer-based concept of the game. The concept of Logifaces is based on polygonal surface modelling used in computers and it returns the virtual back to the real world. The tool connects the digital and analogue worlds of learning. In addition, it is a source of shared experiences and recognitions, a means of joyful creation.

The Logifaces game promotes and supports creativity in learning. The quality of the tool gives the opportunity to apply and investigate pupil-driven forms of learning and related learning materials. These innovations lead to a new definition of the role of the teacher and offer alternative ways to adapt. The project implements alternative and creative forms of transdisciplinary learning.

Our educational experts believe that the Logifaces methodology provides a comprehensive structure change in thinking in the educational system, not only in Europe but also in any part of the world. The aspects of the tool, such as interdisciplinary usage and strengthening social skills, make it a really progressive, forward-thinking educational device.

We are always open to new ideas and encourage you to share your experiences and exercise concepts with us!