Stunning Simplicity: An Interview with Puzzle Designer David Pitcher

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By Jamie Hovis

The first thing to know about David Pitcher is that he’s wonderfully helpful and eloquent when it comes to the world of twisty puzzles. I prefaced our interview by explaining that I was a person who’d never solved a Rubik’s Cube. He didn’t blink an eye. In fact, he seemed to relish the opportunity to explain his passion to the uninitiated.

And uninitiated I certainly was. Through the course of our conversation, I was led through the dizzying world of twisty puzzle terminology and culture. I came away with a staggering appreciation for the art and mathematics involved in the design and production of these objects that all operate on the same very basic principles yet provide the opportunity for literally infinite variations.

David’s expertise and eloquence on the subject comes from almost 20 years of practical experience in the art of puzzle making. He began creating twisty puzzles in earnest when he was working as an industrial designer in a company with a design lab equipped with 3D printers (an added perk of the job that he admits was not entirely unplanned). Back then, David explained, 3D printing was a relatively new technology. The first technology David used for puzzle making was a printing process that created fragile wax parts. These then had to be cast by hand in a time-consuming process. Later, a switch was made to fused deposition modeling technology (FDM). This gave the ability to make puzzle parts that were strong enough to be usable straight off the machine, but at the sacrifice of accuracy. Only relatively simple puzzles could be made due to the low resolution. Today, various web services have made high resolution, high strength 3D printing technologies available to anyone.

“I was in the first wave of puzzle makers to use 3D printing,” David tells me. “Unfortunately I initially didn’t show my puzzles to a lot of people. I came from a world of corporate competition and fierce patent law, so I was very careful about who I showed my designs to. What I didn’t realize is that the puzzle world is very different in regard to intellectual property.” Even the twisty puzzle manufacturers (and there are many of them these days) are very careful to give credit to the puzzle designers and to work with them to produce their designs. This is despite the fact that there are very few designs that actually get patented.
In 2006 David met Oskar van Deventer, a veritable god in the puzzle world. “Oskar is probably the most prolific puzzle designer out there,” David explains. “He stopped by my house since he was traveling through the Boston area. He was also an early adopter of the 3D printing technology, and we had previously exchanged some puzzle files. Oskar wanted to meet up while he was here. He really convinced me that I needed to start publishing.” The world of puzzles, according to van Deventer, was about community. Generally speaking it isn’t cost effective for an individual to own a patent on a twisty puzzle; it’s nearly impossible to recoup the patent costs. Instead, many puzzle designers publish their creations on the internet. This allows for the designer to constantly receive feedback and ideas from the puzzling community (David is an avid participant in twistypuzzles.com, the go-to site for twisty puzzle enthusiasts).

These days puzzle-design is a self-funding hobby. “I’m probably an anomaly,” David explains, “in that I approach puzzles from an artistic standpoint rather than that of an engineer or mathematician. People always assume I’m an engineer, and I’m just not, you know? I went to art school. I consider puzzles my artistic outlet. To that end, I try to keep things as simple as possible and focus on the beauty of the design. I call it my search for simplicity. I try to encourage the puzzle solver to think differently, think outside the box.”

David demonstrates some of his designs to the Eureka staff.

Luckily, 3D printing technology has expanded by leaps and bounds since his initial experiments more than a decade ago. This has allowed David and many other designers to create a feasible business model using online 3D printing technology that gives him access to equipment that costs hundreds of thousand dollars. Nowadays the 3D printers David uses operate via a process known as Selective Laser Sintering, the process of fusing layers of powdered nylon with lasers to create the individual puzzle components. The pieces are then extracted from a block of powder. “It’s sort of an archeological process,” he explains.

David uses the software Solidworks, one of many 3D printing programs that have emerged in recent years. “There’s a lot of software out there,” he says, “but I’ve found Solidworks has the best features for making puzzles.” With this software, David is able to create 3D models for the parts of his
puzzles. These are then uploaded to a 3D printing service (David uses Shapeways, he has DIY puzzle kits for sale at shapeways.com/shops/pitcherpuzzles) and he receives the parts in the mail in a matter of weeks. Typically these kits are sold directly to people on Shapeways so that they may assemble their own puzzles. Occasionally he’ll assemble a puzzle for a customer for an additional fee.

David is very excited about the direction in which 3D printing (a hot topic these days) is taking puzzle making. The challenge, he says, becomes discovering designs that are new and different. New ideas often come to David by taking an old idea and “turning it on its head,” or expanding on existing themes.

Cubic puzzles, for example, seem to be the most sought-after twisty puzzles on the market, a fact David attributes at least partly to the early success of the Rubik’s Cube. There are, however, an infinite number of shapes and mechanisms possible when designing a twisty puzzle. One of David’s most successful creations, for example, is the “Octo-Star Cube,” a puzzle design David arrived at by taking advantage of the fact that an octahedron and a cube are geometric duals (one can be created from the other by connecting the face centers, and thus one can fit inside the other with every vertex centered on a face of the other form). Realizing that, David was able to reconstruct an octahedral puzzle he had previously designed but which was too complex to appeal to him for production, repurposing it into a cube shape that operated on the same principle. This type of puzzle design is known in the twisty puzzle community as a “shape mod.” You really have to see him hold the two next to each other for all of this to make sense. It’s as if he’s taken the octahedral shape comprised of all triangular sides and squashed it into the shape of a cube. When he moves them (twisting the sides to solve the puzzle), it becomes clear that they are related.

I was lucky enough to get a demo of the presentation David will be making at Knight Moves Café in October. He gave me a sample of the six-page guide he’ll be handing out to the audience. He also brought along a briefcase full of puzzles he’s designed. I was awed by the beauty and complexity of the designs and the craftsmanship of the puzzles. Those of us at Eureka! who have had the opportunity to play with them agree they’re the most smoothly functional 3D printed objects we’ve ever seen. He gave me the short version of his talk, explaining the differences between “bandaged” puzzles and “jumbling” puzzles, defining terms such as “shape mods” and “shape-shifting.” Most of these are terms that have been coined during the recent explosion in twisty puzzle designs. But you’ll hear about all of that at the event, which includes David’s explanations of:

- Turning types
- Slice types
- Cut depth
- Order
- Basic geometries
- Mechanisms
- Classifications
- Other Crazy stuff (this last one absolutely blew my mind)
To someone totally new to twisty puzzles, it was a fascinating introduction to the history of the field and the basic concepts of solving the puzzles themselves (the last section of David’s presentation is titled “Solving (this is what you’re really after, right?)”). For those who are already part of the twisty puzzle community it will be fascinating to hear the philosophy of a veteran puzzle maker who approaches his craft as a true artist.

Hearing David speak, one really begins to understand the deeper, more elegant beauty behind the idea of a twisty puzzle. I’ve heard of people being turned off by the competitive nature of speed cubing (the art of solving cubic puzzles as quickly as possible). To hear David describe them, the most appealing elements of twisty puzzles are their uniquely beautiful geometric designs. “One of my favorite elements,” he says, “besides the beauty of the shapes and their geometry, is the element of surprise. Sometimes I design a puzzle and it takes me a while to understand what I’ve made. Twisty puzzles are unique in that you don’t have to know how to solve them before you make them. They’re amazing in that the possibilities are inexhaustible. There are an infinite number of puzzles and an infinite number of ways to solve them just waiting to be discovered.”

David Pitcher works professionally as an industrial designer, holographer (hologram designer), and personal trainer. For more information go to: http://www.shapeways.com/shops/pitcherpuzzles, visit his youtube channel: youtube.com/pitcherpuzzles, or contact him at pitcher42567@yahoo.com.

For more information about the event at Knight Moves Café on 10/7/14, visit the events page at eurekapuzzles.com.

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