Extrovert Learning Strengths, ‘Black Box Thinking‘ (extract) Matthew Syed (2015)

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Matthew Syed, p135-161

Unilever had a problem. They were manufacturing washing powder at their factory near Liverpool, in the north-west of England, in the usual way – indeed, the way washing powder is still made today. Boiling hot chemicals are forced through a nozzle at super-high levels of pressure and speed out of the other side; as the pressure drops they disperse into vapour and powder.

The vapour is siphoned away while the powder is collected in a vat, where collagen and various other ingredients are added.Then it is packed into boxes, branded with names like Daz and Bold, and sold at a hefty mark-up. It is a neat business concept, and has become a huge industry. Annual sales of washing powders are over $3 billion in the United States alone.

But the problem for Unilever was that the nozzles didn’t work smoothly. To quote Steve Jones, who briefly worked at the Liverpool soap factory in the 1970s before going on to become one of the world’s most influential evolutionary biologists, they kept clogging up. ‘The nozzles were a damn nuisance,’ he said. ‘They were inefficient, kept blocking and made detergent grains of different sizes.’

This was a major problem for the company, not just because of maintenance and lost time, but also in terms of the quality of the product. They needed to come up with a superior nozzle. Fast.

And so they turned to their crack team of mathematicians. Unilever, even back then, was a rich company so it could afford the brightest and best.These were not just ordinary mathematicians, but experts in high-pressure systems, fluid dynamics and other aspects of chemical analysis. They had special grounding in the physics of ‘phase transition’: the processes governing the transformation of matter from one state (liquid) to another (gas or solid).

These mathematicians were what we today might call ‘intelligent designers’. These are the kind of people we generally turn to when we need to solve problems, whether business, technical or political: get the right people, with the right training, to come up with the optimal plan.

“They delved ever deeper into the problems of phase transition, and derived sophisticated equations. They held meetings and seminars. And, after a long period of study, they came up with a new design.

You have probably guessed what is coming: it didn’t work. It kept blocking. The powder granularity remained inconsistent. It was inefficient.

Almost in desperation, Unilever turned to its team of biologists. These people had little understanding of fluid dynamics. They would not have known a phase transition if it had jumped up and bitten them. But they had something more valuable: a profound understanding of the relationship between failure and success.

They took ten copies of the nozzle and applied small changes to each one, and then subjected them to failure by testing them.‘some nozzles were longer, some shorter, some had a bigger or smaller hole, maybe a few grooves on the inside,’ Jones says.‘But one of them improved a very small amount on the original, perhaps by just one or two percent.’

They then took the ‘winning’ nozzle and created ten slightly different copies, and repeated the process. They then repeated it again, and again. After 45 generations and 449 ‘failures’, they had a nozzle that was outstanding. It worked ‘many times better than the original’.

Progress had been delivered not through a beautifully constructed masterplan (there was no plan), but by rapid interaction with the world. A single, outstanding nozzle was discovered as a consequence of testing, and discarding, 449 failures.