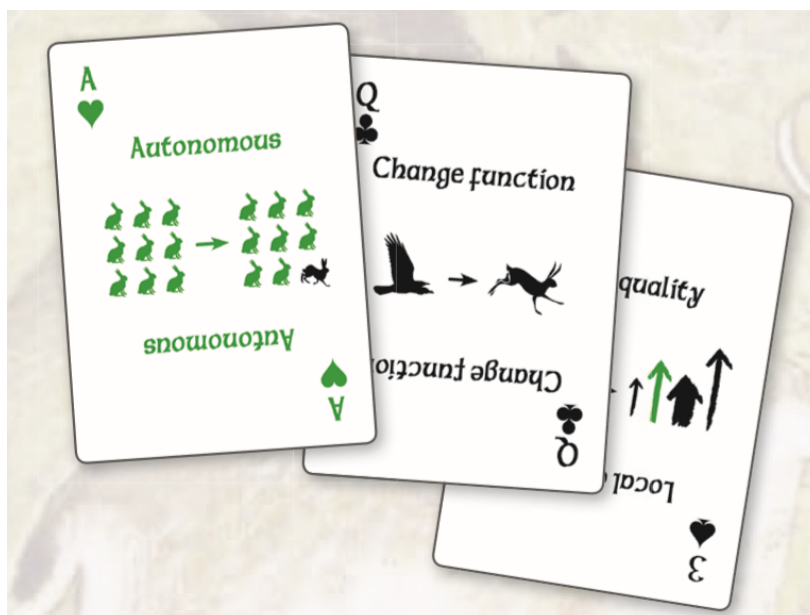


Dividing 40 into 52: TRIZmeta



Next month sees the launch of our new 'TRIZmeta' playing cards. Readers with a very long memory may remember that, back in the early CREAX days we made a set of playing cards featuring the 40 Inventive Principles. They're something of a collector's item these days. That's been part of the intrigue of re-instigating the idea. The bigger part, however, is that we finally think we've cracked the 'TRIZ game' problem of how to make a game that teaches people about breaking rules. Details of how that's been achieved can be found at the dedicated TRIZmeta website. Meanwhile, this article tries to deal with the somewhat more practical and immediate problem of how to meaningfully divide the 40 Inventive Principles across a deck of what is fundamentally 52 cards. With the old CREAX deck, the feat was achieved by a fairly random process if we're being honest. With TRIZmeta – because of the 'meta-game' part of the story, this wasn't going to be possible any more. As any TRIZ user will attest, some of the Inventive Principles are easier to deploy than others. Some are also more 'powerful' idea generation provocations than others too, and the TRIZmeta game needed to reflect these facts.

Solving that part of the '40 into 52' puzzle actually proved relatively simple in the end: low card numbers have the easier, less powerful Principles, and the higher numbers feature the more difficult, more abstract ones.

But, what to do about the 12 'extra' cards?

The first clue came from a simple bit of mathematics: $52 = 36 + (4 \times 4)$. Which means that if we could find a sensible way to repeat 4 of the Inventive Principles 4 times, one for each suit present in the deck, the remaining 36 Principles could be split across the remaining 36 cards.

The most obvious candidate for this 'split into four' requirement was Principle 35, Parameter Change. Probably most people's least favourite Inventive Principle. For the reason that it is so generic and actually covers a lot of ground from an idea generation provocation perspective. For that reason, it's also one of the most

frequently observed Principles when we reverse engineer patents and, more recently, innovative business innovations. On that front, we'd recently had cause to conduct a fairly tedious task of mapping another idea-provocation taxonomy as developed by business academics at St Gallen University. By reverse engineering several hundred business innovations, they'd identified 55 different strategies. When we mapped their 55 to the TRIZ 40, the result looked something like the picture reproduced in Figure 1, below. (Darrell also wrote this story up as a blog article you can find at Reference 1 if you're excessively interested.)

The first upshot of the St Gallen-TRIZ mapping exercise was that, because they'd only considered hundreds of cases, the 55 'different' strategies they'd observed corresponded to only 27 of the Inventive Principles. They'd missed 13 in other words. On the other hand, some of the Inventive Principles corresponded to multiple of their 55 strategies. Principle 35, Parameter Change, for example, mapped to 4 of their 55 (4? hmm). Principle 2 mapped to 5 St Gallen strategies; Principle 3 to 4; Principle 13 to about 8; and Principle 25 to 4 (that number again).

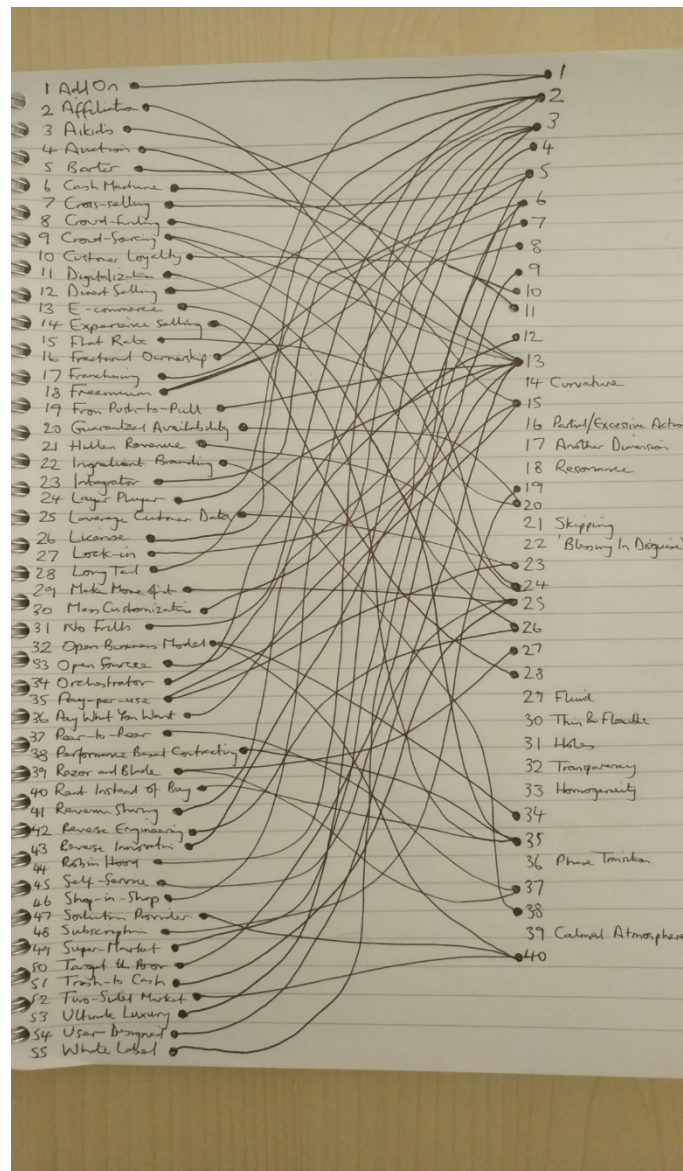


Figure 1: St Gallen To TRIZ Principle Mapping

If we take any heed of the St Gallen work, it gives us 5 candidates for the 4 Principles TRIZmeta might repeat. Perhaps not surprisingly, those 5 correspond to the most frequently observed of the TRIZ Principles, so even though ‘hundreds’ of case studies doesn’t appear to find all the Principles, it does seem to have found the most frequently used ones. As well as being ‘frequent’, the top-5 Principles are often the most powerful and or provocative. The problem, now, is that there are five of them and not four. Principle 35 was already decided as one of the winners. The other two ‘obvious’ choices seemed to be Principles 13, The Other Way Around, and 25, Self-Service. Principle 13 because it’s the most provocative Principle, and 25 because it’s the one that most directly points users towards Ideal Final Result oriented solutions.

That leaves Principles 2 and 3 for the remaining ‘top 4’ place. In many ways, the two Principles are closely allied to one another: Principle 2 says to ‘separate’ entities, and Principle 3 in effect says to separate them unevenly. Principle 2, Taking Out/Separation, however, also forms an important component of the Physical Contradiction separation strategies, of which there are several. With this in mind, the blinding flash of the obvious involved choosing Principle 2 as the ‘fourth’ TRIZmeta multiply-by-four choice, and to ‘relegate’, Principle 3 to its rather more specific role as a provocation for forcing users to look for things that are ‘all the same’, and to then make them not all the same.

So much for the ‘Top 4’, the final part of the TRIZmeta jigsaw puzzle was then to decide how to divide the four into four different cards. That’s what we’ll look at next. Starting with...

Principle 35, Parameter Change

The original Soviet definition of Principle 35 contains multiple variants, which we’ve subsequently added to and altered in the business and IT version of TRIZ. Consequently, there was no shortage of options as far as choosing four for the TRIZmeta cards. There was also, we felt, the opportunity here to add a long-missing part of the Inventive Principle story. Anyone that has read the TrenDNA book will know that we took the opportunity there to re-think the 40 Principles and get them down to, as it transpired, eighteen. We also wrote up the rationale for this in Reference 2. A part of the thinking there was that, if there was ever a case for a 41st Principle it would come from the relatively rare situation in which innovation happens by exapting a solution designed to deliver one function to a different function (think Viagra for an all-time iconic example). TrenDNA thus includes the 41st provocation, ‘Change Function’. We decided it needed to be present in TRIZmeta too, especially in light of the primary intended use of the cards in a ‘meta-game’ context. The other three TRIZ meta cards, were then a case of merging and selecting the best of the other existing Principle 35 variants. We ended up with ‘change size’, ‘change surroundings’ and ‘change form’, again to make the best connection to the game context and make it easier for newcomers to make connections to the provocation instruction.

Principle 2, Taking-Out/Separation

Principle 2 is very closely connected to the Physical Contradiction part of TRIZ. Last year (Reference 3) we finally got around to updating that part of the TRIZ story. The biggest insight I think we had was in recognizing that the various ‘separation’ strategies present in the Soviet version of the tool were confusing people –

separation in space and time, people 'got', but 'separation on condition' easily causes confusion since – blinding flash of the obvious – space and time are also 'conditions'. The Reference 3 solution involved reverting to the Space-Time-Interface pillar of modern TRIZ, and so three of our four TRIZmeta 'separation' cards could simply refer to each of the space, time and interface provocation possibilities. Which then made the choice of the fourth card easy: the 'Taking Out' part of the Principle title.

Principle 25 – Self-Service

Splitting this Principle immediately makes sense because 25A and 25B in Classical TRIZ are quite different and don't necessarily make sense as the 'same' idea generation strategy. 25A is about the 'self' part of the story, while 25B is focused on making use of 'waste' resources. This split allowed us to divide the TRIZmeta need for four cards into two. As far as the 'self' part is concerned, especially thinking about the application of TRIZmeta and an audience that in all likelihood won't know TRIZ, we have ended up with two variants, one focusing on the 'self' word, and the other on its cousin, 'autonomous'. For the 'waste' side of the Principle, we made another two-way split and thought about the 7idea of recycling – i.e. turning waste into a useful something – and the somewhat bigger idea of 'regeneration'. With this latter provocation, the inclusion of a graphic image on the cards proved to be especially beneficial:

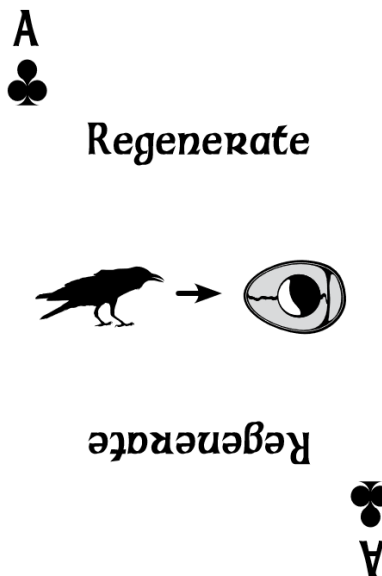


Figure 2: Ace Of Clubs & 'Regeneration'

Principle 13, The Other Way Around

The original TRIZ description divides Principle 13 into three variants: 'opposite action, make-movable-fixed-fixed-movable, and 'upside-down'. The first and last of these rarely cause users any difficulty in interpretation, while the middle one often does, being in some ways an overlap with Principle 15, Dynamics. An additional factor when it comes to the effective use of Principle 13 – especially in light of what we did with it in Reference 2 – is that it often combines with other Principles. Or rather, many of the Principles have a (Principle 13) opposite. So, Principle 38, 'Enriched Atmosphere' is the opposite to Principle 39, 'Calmed Atmosphere'; 5 is the opposite of 2; 3 is the opposite of 33; 19 is the opposite of 20, and so on. Principle 13, in other words, is kind of a 'meta-Principle'. Hence, to honour the original 'generic

provocation' intent and to best enable the Principle 13 TRIZmeta cards, we simply ended up using labels that were the most generic and easiest for people to connect to either other Principles, or to use in their own right: 'Other Way Around, Reverse, Do The Opposite, and Upside-Down'.

Hopefully, this re-assures TRIZniks that TRIZmeta has stayed true to the spirit of the original 40 Principle descriptions. The cards are – hopefully – going to find an audience wider than just TRIZ. Hence there was an opportunity to choose some Principle names that were more commonplace than the ones found in Soviet TRIZ. TRIZniks will no doubt still be able to connect each card to its respective Principle, but, lest there be any doubt, here's how the final TRIZmeta deck maps to the original Soviet list:

| | Hearts | Diamonds | Spades | Clubs |
|-------|------------------------|--------------------------|-------------------------|------------------------|
| Ace | Autonomous (25) | Self-Organise (25) | Recycle (25) | Regenerate (25) |
| King | Other Way Around (13) | Reverse (13) | Do The Opposite (13) | Upside-Down (13) |
| Queen | Change Size (35) | Change Surroundings (35) | Change Form (35) | Change Function |
| Jack | Separate (2) | Separate In Time (2) | Split Connection (2) | Take Out (2) |
| 10 | Empathy (18) | Phase Transition (36) | Fields (28) | Dynamize (15) |
| 9 | Merge (5) | Enrich (38) | Prior Counteraction (9) | Calm (39) |
| 8 | Remove Tension (12) | Bad To Good (22) | Periodic Action (19) | Composite (40) |
| 7 | Another Dimension (17) | Hole (31) | Continuous (20) | Nested Doll (7) |
| 6 | Colour Change (32) | Balance (8) | Re Sequence (10) | Intermediary (24) |
| 5 | Curve (14) | Fluid (29) | Feedback (23) | Hurry (21) |
| 4 | Copies (26) | Universal (6) | Thin & Flexible (30) | Relative Change (37) |
| 3 | Asymmetry (4) | Disposable (27) | Local Quality (3) | Discard & Recover (34) |
| 2 | Same (33) | Slightly More/Less (16) | Segment (1) | Protect (11) |

Figure 3: Mapping The 40 Principles To The 52 TRIZmeta Playing Cards

References

- 1) Mann, D.L., '55 Business Model Patterns & TRIZ', blog article, www.darrellmann.com, 20 July 2018.
- 2) Mann, D.L., 'Rethinking The Inventive Principles', part of 'Evolving TRIZ Using TRIZ And NLP', TRIZCON, 2002.
- 3) Systematic Innovation ezine, 'Re-Thinking Physical Contradictions #1: Technical Problems', Issue 181, April 2017.