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The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

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Readers’ comments and inputs are always welcome. Send them to darrell.mann@systematic-innovation.com

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Most times people tell us they ‘get’ something, it means they don’t. I hear the word all the time with S-Curves. Everyone, it seems, these days ‘gets’ the theory, but the moment they’re put in a situation where they have to relate the fundamental dynamics of the curve to their own context, I see they don’t get it at all. Now that the ABC model of human emotions is getting more broadly known, I’m beginning to see that it fits into exactly the same mis-match situation. People think they ‘get it’ – to the extent, recently, that I could see a roomful of people collectively raising their eyes to the ceiling the moment the ABC slide went up on the screen. The group had asked me to help them to better engage with their (internal) customers. If I generalize their situation to something that perhaps everyone that might read the SI ezine might be able to connect with, their job was to convince a bunch of people that TRIZ would help them to solve some of the problems they were struggling with.

In my generalized version of this scenario, there are typically two groups of people that need to be thought about when designing any kind of problem-solving intervention: the people asking us to come and help (usually ‘the managers’) and then the people that would subsequently be involved in working through the problem (the ‘workers’). The two need to be addressed separately. Both, ultimately, need to be in the right mindset if anything productive is to emerge from the engagement.

Here, meanwhile, back in the real world, is what I tend to here from people who spend some or all of their working lives facilitating TRIZ (or similar) problem-solving sessions:
“they called me in, but we didn’t make any progress, because it seemed like people didn’t want to get to an answer.”

“as usual, the person that spoke the loudest got their way, even though their answer wasn’t the best.”

“the group were pleasant enough, but they treated me like an outsider, even though we all work for the same company.”

“some of the participants seemed very dis-engaged from the process.”

“they were expecting a ‘wow’ solution, but only gave me an hour to deliver it, and so, surprise, surprise, the session was deemed only a partial success when the eventual answer seemed ‘obvious’.”

“what some people found to be ‘wow’ others in the room felt the opposite.”

“people seemed very reluctant to get ‘out of the box’, so the answers were all ones they felt they’d seen before.”

“They weren’t ready. I don’t think we’ll be invited back there again.”

All this from people that would nod sagely and tell me they understood the ABC-M model. Yes, they knew the model, but then hadn’t thought to apply it to actually thinking about the sessions they were expected to run successfully. That phenomenon probably merits an article in its own right. Except it will end up being virtually the same as this one. With the exact same conclusion: if you want to run successful workshops, think about and plan for the directions the ABC-M model tells us are inevitable in any human being involved in those workshops.

So, let’s actually try and apply the model to the two parts of the workshop design story. First up, the manager. This is the person that has heard about the capabilities that TRIZ brings – in theory at least – and has made some kind of a connection to the problem they are responsible for solving. Chances are they don’t know much about the actual methodology. Chances are, too, that they’re only tempted to call in someone from ‘outside’ the team is because they’ve crossed some kind of desperation threshold: their team has been working on the problem for some time and doesn’t appear to be making any headway.

What is the ABC-M mind-state of this manager right now? Probably something like this:
Autonomy-wise, the manager is likely to be feeling reasonably positive since they’ve been the one requesting that you go and visit them, and they’re likely to be sitting in an environment they are comfortable with. Plus, of course, they have the authority to end the meeting any time they see fit, irrespective of whether we’ve achieved our goals as facilitators.

How they feel about Belonging is a bit more difficult to generalize. In theory, we all work for the same company. In practice, however, they’ve invited an ‘outsider’ into their tribe. The fact that it’s their invitation helps, but, as yet, they probably don’t know whether we’re going to be a good ‘fit’ with their tribe.

The first real challenge for the would-be facilitator is the Competence factor. Here the strong likelihood is the manager is in the negative-Competence domain. Not only do they have a problem they don’t know how to solve, but they don’t actually understand what we’re bringing to them either. Plus, of course, there’s always the possibility that their boss is going to hear about this meeting and its aftermath, in which case, they will need to be able to say something that makes them at least sound competent. Even if its an excuse as to why they chose not to proceed with the session, or why it didn’t deliver the desired result.

Finally comes the Meaning element of the ABC-M model. Its tempting to put this one to one side, but when it comes to workshop design, the smart money is on including it. That said, the initial Meaning setting for the manager is likely to be in the negative. Mainly because the problem they’re failing to solve is important enough for them to have contemplated bringing in outsiders like us to come and help them with.

Overall, then, at least two, and quite likely three of the four ABC-M elements is sitting in the negative. Which means our immediate challenge as prospective outside assistance providers is to make sure that when we’ve finished the meeting, all four have moved in the right direction. Simply knowing that should be half of the solution. Knowing what we need to do specifically to ensure that happens is going to require some more thought. And, as much as possible, some understanding of who the manager is as an individual. And the details of the problem.

What we ought to do at this stage is construct an Outcome Map to help us to understand what outcomes the manager is wanting. Something like this:
The specifics will depend on those characteristics ultimately, but what we can say with a high degree of certainty is the following:

- We, as prospective facilitators, acknowledge that we’re entering ‘their’ territory as a privileged guest
- We demonstrate that we are from the same macro-level tribe, and that the problem represents a ‘common enemy’. If we can find other ‘common enemies’ this too will be helpful.
- Better yet, from the Belonging perspective, we can find and connect to someone that the manager knows and respects (homework required!) – a common friend.
- We emphasise that we’re not their to replace the skills of the manager or their team, and that what we bring is the knowledge to make bridges to other domains where we might, together, find insights that will help solve the problem
- We are able to provide some kind of context-relevant demonstration of our ability to do this. This is where we need to connect to the JP Morgan aphorism, ‘a person makes a decision for two reasons: the good one and the real one’. We need to provide tangible ‘good’ reasons that we/TRIZ will be able to help. I usually try and do this by spending a few minutes thinking about the problem and putting together a mini-case study showing how the situation is similar to a more extreme problem in another domain, and how problem-solvers in that domain have successfully prevailed. All the time I’m doing this, I need to walk a bit of a tightrope in that not only am I trying to demonstrate that we will deliver a tangible success, but also that all the time, we’re making sure the manager understands what we’re talking about and thus feels Competent. The ideal we’re aiming for is some kind of a ‘wow’ insight that not only makes the manager feel immediately comfortable, but also that they feel comfortable enough to be able to explain it to their boss should the need arise.

So much for convincing the manager. Assuming we’ve been able to do that, next up comes the more difficult job of getting the manager’s team on board and working with us rather than against us. Almost inevitably this is going to mean some kind of a contradiction is going to need solving. We ought to be able to see this vividly when we plot the ABC story for a typical individual in the team:

The only safe assumption when it comes to the team we’re going to be working with is that all four of the ABC-M elements are going to be negative when we all get together for our first workshop:
Autonomy: ‘people love change, they hate being changed’ – if nothing else, the fact that their manager has inflicted this workshop on them means that participants feel like they are not in control of whatever is about to happen to them.

Belonging: the fact that their manager has inflicted us onto them, almost by definition makes us a double unwelcome intrusion: not only are we outsiders, but we’re outsiders imposed upon the tribe by a higher-level outsider.

Competence: by bringing in a group of outsiders that, by definition, don’t possess the domain knowledge present within the team, a clear message is being sent: because your domain knowledge has proved to be inadequate, it’s time to bring in a group of people with some very different skills. Ergo, the team is feeling incompetent. Twice over. Their domain knowledge is ‘useless’ and they’re about to have some mysterious new stuff they’ve never seen before imposed upon them.

Meaning: a bit more difficult to gauge specifically, but in general, what we can say about any kind of hierarchical organisation is that the lower we go, the less likely it will be that people feel that what they’re doing is meaningful. Or, put another way, workers often feel like the work they’re given to do is more often than not meaningless: in this scenario it is likely to be something like, ‘you’re stuck so let’s try an experiment with this bunch of outsiders that will probably come to nothing.’

0 for 4 doesn’t make for good odds for any kind of facilitation team. Again, however, what we know is that if we’re to achieve any kind of positive outcomes at the end of the session (or cluster of sessions) is that we will need to move the four intangibles so that they are all in the positive. How we achieve this will again depend a lot on the specific context of the problem and the team we’re working with. Awareness of the problem helps, but is probably less than half of the solution this time. If we are to find the solutions we need, they are likely to include aspects of these generic solution strategies:

- Let participants know what is going to happen. If possible, give them the option of leaving if they don’t think they are using their time productively
- Incorporate subtle signals that everyone is on the same team (logos on slides, handouts, etc)
- Before the session, try and establish who the informal influencers in the team might be and ask for a pre-meeting with them to get their perspective on the ‘lay of the land’.
- Ideally, try and find some local common-ground (e.g. football team, music, etc) and possibly – if you’re feeling brave – some kind of common enemy… something to align people towards a common purpose.
- Let people know that this is not ‘business as usual’ and that what might sometimes feel chaotic or inefficient is part of the process… wherever possible try and relate to circumstances that everyone will at some time experience (this is why Dave Snowden’s children’s party story is such a powerful and widely used one).
- Emphasise that the domain knowledge of the participants is a crucial part of the process and that a successful outcome will only come through the deployment of that domain knowledge
- Any outsider is subject to ‘well, they would say that wouldn’t they’ scrutiny. Never underestimate the ability of an audience to pick up on what they will perceive as our biases. Never try and justify TRIZ or another other tool… no matter how factually correct we might be, the perception any human has when an outsider says something positive about what they’re then seen to be trying to sell does not go down well. It’s okay to say, ‘I believe…’ so long as it is swiftly followed by a
statement like, ‘...but I'm not here to try and convince you...’ Better yet, add something like, ‘if you spot something you don’t agree with, I’d love to know about it’. People will only actually ever say anything once they know you’re in the same (Belonging) tribe, so ideally, you seek to achieve a positive ‘B’ outcome before you push the ‘C’ story too far.

- Again, per the JP Morgan aphorism, sooner or later your positive intangibles strategy is also going to have to be complemented with a positive tangible contribution. Problem solvers love solving problems, so ‘telling’ people the answer to a problem is rarely going to work. Or rather, it might work tangibly, but because we’ve taken away the best part of someone’s job, intangibly it almost definitely won’t work after we’ve left the room. No matter how good the solution suggestion might have been, in other words, it is going to be rejected. When people have been working unfruitfully on a problem for a long time before you arrived on the scene, the last thing they want is some no-knowledge smart-arse telling them the answer. What they will definitely thank you for, however, is an insight that re-directs their attention to a better definition of the problem, or to an alternative strategy for attacking the problem. In this regard, getting people to focus on solving-the-contradiction is one of the safest TRIZ facilitator bets, since most people have experienced years of being told that the only way to ‘solve’ contradictions is to make trade-offs. (NB Redefining the problem might well win you friends with the team, but at the potential risk of now alienating their manager – see the Short Thorton at the end of this edition of the ezine – and, if nothing else, that may well end up being the biggest contradiction we as facilitators have to manage – the problem definition from the manager probably was wrong. Because they too don’t understand the importance of solving contradictions.)

- Meaning-wise, the closest I’ve ever come to a sure-fire bet has been to work towards a goal that by the end of the session participants will have a story they will want to tell their friends and family about. If I’ve been feeling very brave, I’ve openly declared this objective to the group somewhere near the beginning of the session. People love telling stories, and for the most part, the stories we have to tell our family at the end of a long day at work are non-existent (‘same as yesterday’).

None of this is easy. But at least knowing that our job is to achieve two lots of positively directed ABC-M trajectories and making sure our contradiction-radar is switched on and looking for contradiction solving opportunities – both in the problem and with the team – and we stand a pretty good chance of achieving what we’re expected to achieve. Far greater in fact than the domain experts we’re coming in to help. Which ultimately means that our biggest intangible-driven success factor is the confidence that our knowledge of ABC-M and contradiction-solving puts us at an enormous advantage over everyone else.

That said, it is still early days for a lot of TRIZ/innovation facilitation teams, and so there is unlikely to be a big list of past successes that can be deployed with either managers or prospective teams we might be facilitating. If the list exists, our job will be a lot easier. If it doesn’t, our primary job as a facilitation team is to build it. That might mean cherry-picking projects that we do and don’t take on. Saying no to a manager that has called you in to do something with them is never going to be an easy task. It is, however, a very necessary one when it comes to doing anything in the innovation arena. Like anywhere in life, bad news travels about seven times faster than good news. Fail with a problem solving session and you make it seven times more difficult to convince the next manager you can help them. If you work through your workshop design and conclude that you won’t be able to achieve the manager and team ABC-M-positive double, my very strong advice to you will be that you politely decline to take on the session. Or, better yet, explain to the
manager why you think it won’t work and (ABC-M heading in the right direction) enlist their help in creating a context whereby you have the best chance of getting Autonomy, Belonging, Competence and Meaning to be positive for every stakeholder and prospective participant.
Take a look at the following list of words:

Mindful  Loyal  Entrepreneurial  Thriving-In-Chaos  Collaborative
Consensus-Seeking  Impulsive  Conservative  Superstitious  Environmentalist
Assertive  Disciplined  Charitable  Detail-Oriented  Opportunistic
Directionless  Opinionated  Ritualistic  Unambiguous  Compassionate
Innocent  Harmonious  Rebellious  Patient  Problem-Solver
Animistic  Opinionated  Impatient  Family-Oriented  Devout
Pathfinder  Ego-Less  Zen-Like Calm  Attention-Seeking  Consilient
Controlling  Knowledge-Seeking  Competitive  Pragmatic  Diplomatic
Problem-Finder  Liberal  Existential  Forgiving  Ambitious
Forward-Looking  Meaning-Seeker  Independent  Connection-Seeking
Humanitarian  ‘Big-Picture’ Thinker  Restless  Sacrificing  Resonant
Nihilistic  Tempestuous  Animistic  Mindful

Now imagine someone who knows you really well looking at the same words. Which is the word or phrase they would choose to best describe how they see you?

Now, if you don’t mind, which would be their second choice? Third? And so on. What would be the eighth? Before you read on to the next page, write the ranked list down. Perhaps in a template something like this:

<table>
<thead>
<tr>
<th>People Who Know Me Best</th>
<th>Would Describe Me As…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Like</td>
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<tr>
<td>2nd</td>
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<td>3rd</td>
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<td>8th</td>
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</tbody>
</table>
Next, you need to assign a colour to each of the words in your Top Eight ‘Most Like Me’ list. Here’s how each of the words maps to the various different colours:

<table>
<thead>
<tr>
<th>purple</th>
<th>red</th>
<th>blue</th>
<th>orange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paternal/Maternal</td>
<td>Rebellious</td>
<td>Family-Oriented</td>
<td>Assertive</td>
</tr>
<tr>
<td>Loyal</td>
<td>Impulsive</td>
<td>Conservative</td>
<td>Competitive</td>
</tr>
<tr>
<td>Forgiving</td>
<td>Tempestuous</td>
<td>Disciplined</td>
<td>Forward-Looking</td>
</tr>
<tr>
<td>Superstitious</td>
<td>Attention-Seeking</td>
<td>Sacrificing</td>
<td>Opportunistic</td>
</tr>
<tr>
<td>Directionless</td>
<td>Opinionated</td>
<td>Detail-Oriented</td>
<td>Ambitious</td>
</tr>
<tr>
<td>Ritualistic</td>
<td>Nihilistic</td>
<td>Uncompromising</td>
<td>Pragmatic</td>
</tr>
<tr>
<td>Innocent</td>
<td>Controlling</td>
<td>Devout</td>
<td>Problem-Solver</td>
</tr>
<tr>
<td>Animistic</td>
<td>Impatient</td>
<td>Unambiguous</td>
<td>Entrepreneurial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>green</th>
<th>yellow</th>
<th>turquoise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative</td>
<td>Knowledge-Seeking</td>
<td>Meaning-Seeker</td>
</tr>
<tr>
<td>Diplomatic</td>
<td>Independent</td>
<td>Harmonious</td>
</tr>
<tr>
<td>Consensus-Seeking</td>
<td>Pathfinder</td>
<td>Consilient</td>
</tr>
<tr>
<td>Liberal</td>
<td>Existential</td>
<td>Zen-Like Calm</td>
</tr>
<tr>
<td>Compassionate</td>
<td>Problem-Finder</td>
<td>Resonant</td>
</tr>
<tr>
<td>Humanitarian</td>
<td>‘Big-Picture’ Thinker</td>
<td>Ego-Less</td>
</tr>
<tr>
<td>Charitable</td>
<td>Thriving-In-Chaos</td>
<td>Connection-Seeking</td>
</tr>
<tr>
<td>Environmentalist</td>
<td>Restless</td>
<td>Mindful</td>
</tr>
</tbody>
</table>

Write the appropriate colour next to each of your selected words and phrases. Something like this:

<table>
<thead>
<tr>
<th>People Who Know Me Best Would Describe Me As…</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Like</td>
<td></td>
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<td>8th</td>
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</tbody>
</table>

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Finally, allocate scores to each of the different colours such that the colour associated with your ‘Most Like’ word or phrase receives eight (8) points. The second most-like word or phrase scores seven (7), and so on, down to your eighth word or phrase, which will score one (1) point. Something like this:

<table>
<thead>
<tr>
<th>Most Like</th>
<th>Colour</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>purple</td>
<td>8</td>
</tr>
<tr>
<td>2nd</td>
<td>blue</td>
<td>7</td>
</tr>
<tr>
<td>3rd</td>
<td>green</td>
<td>6</td>
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<tr>
<td>4th</td>
<td>orange</td>
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<td>2</td>
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<tr>
<td>8th</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

(Total = 36)

If you’ve done it right, the whole lot should add up to around thirty-six. The colour with the highest score is your dominant Thinking Style. If you are familiar with Spiral Dynamics, or the work of Dr Clare Graves, or our TrenDNA book, you already know what all of these Thinking Styles are. And that none of them are any ‘better’ or worse than any other. They’re simply a way of establishing how we (and others if we do the survey with them) see the world. The idea being that if we understand our/their Thinking Style we can better understand how we/they see the world so that we can work better together. Or better serve them as customers.

We mostly do this kind of analysis using our PanSensic tools, because that way we can get an accurate result without the possibility of ‘cheating’ the system to get the answer we might wish to get. But, if we’re looking for a ‘quick and dirty’ way to get an assessment, this survey is now the fastest way we’ve found to do it. No more questionnaires. And lots more flexibility of use. Like, for example, you could also repeat the exercise selecting the eight (or however many) words that people who know you best would say are least like you. Or the Top Eight that would best describe you on a good day. Or a bad day. Or at work. Or, heaven forbid, when you’re having fun.

Have a play. Feedback very welcome.
Not So Funny – I Fought The Law

As we all know, innovation starts with breaking rules. The Laws of Physics, for example, make for very good rule-breaking innovation opportunity-finding targets. Except out-thinking people like Einstein can sometimes be hard work. For easier to find dumber rules and to have a go at beating them.

I’ve got something of a (Principle 17, Another Dimension) soft-spot for this one:

![Image of signs that read:

Notice: Due to festival rules
We are not allowed to
sell drinks, including Bottled Water.
Therefore....

August Peanut Sale:

1 Peanut for 1 Dollar!
Peanut Shell INCLUDED!
(1 FREE Bottle of WATER
comes with purchase of
a peanut)

Yes, per convention, breaking rules ends up being all about deploying Inventive Principles. The person that deploys them the best, wins the biggest. I’m not quite sure whether this next one would actually work, but it makes for a very elegant, rare outing for Principle 33, Homogeneity...
Principle 2?

And is this one Principle 17 again, or Principle 30?
‘Strictly no alcohol allowed by the side of the pool’.
Agreed…
Sometimes, however, the problem can be with the rules themselves. I hope passengers opted to not observe this flight safety instruction…

I guess that’s also Principle 17. Something of a theme emerging perhaps?
Healthy & Safety Regulations? Who needs them? Not these guys at least…

I've got a sneaking admiration for this one too. Principle 7 this time, maybe?

A lot of these ideas, of course are still at the formative stage. The ultimate goal is to test the (Principle 35) new rules, then lock them down for others. Or, in this case, framing them should do the trick…

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But then, of course, the cycle just starts over again. Just as you think you’ve re-written the electrical safety regulations, along comes another (Principle 5) bright spark…

Be afraid. Be very afraid…

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Patent of the Month - Bioelectrochemical Bioremediation

Some months are better than others. Some weeks are better than others. The first week of September saw a swarm of below-average patents. The second week, on the other hand gave us several candidates for this Patent of the Month feature. A shout-out to US10,412,819 (Plasma heating) and US10,407,320 (killing water-borne mosquito larvae using ultrasound), both very TRIZ-like in their elegance and simplicity. In the end, however, we decided that US10,406,572 was going to be our winner. Despite its mouthful of a title. And rather crude write-up.

The patent was granted to a trio of inventors at the University of Colorado (that said, the lead inventor, Jin Song, appears to have done the majority of his noble work on remediation of polluted ground while at the University of Wyoming, so it feels like at least some of the credit should head in that direction).

The problem to be solved is really simple. To describe at least. When ground becomes polluted, there are multiple ways of restoring things to their former natural glory. One way is excavating the polluting chemicals. This is the hard work option. Another way is ‘Monitored Natural Attentuation’ (MNA) which, as the name suggests, is the lazy-polluters strategy of letting time take its course. Then there is bioremediation, which is all about adding appropriate microorganisms naturally existing in the groundwater sediments to degrade or transform chemical pollutants into non-toxic forms. This is the closest the world currently has to what we might think of as a TRIZ-like solution to the problem. In crude terms bioremediation is getting nature to repair itself. The only problem being that, although it is generally faster than MNA, it is usually not nearly fast enough. Which gives us this very simple contradiction:

So, how have the Colorado scientists solved the problem? Well, sticking with the idea of TRIZ-like – and, I guess there’s a clue in the title of the patent – how about using a field (Principle 28)?

It turns out that adding a suitable flow of electrons is a great way of encouraging the microorganisms to work faster. Add a field. Simple.
Well, of course, nothing is ever quite that simple. From an academic perspective, bioelectrochemical (BEC) systems have been hypothesized and tested at lab scale for a number of years now. So maybe the real importance of the patent is all about turning the theory into a practical, deployable device to create the required electron flow. Something like this maybe?
Such has been our desperation to find something – anything! – to recommend this month, we’ve found ourselves digging a long way back into business literature history. We ended up going back over fifty years to 1967. But we did find what we think is a real gem of a book. Something close to timeless, quite probably. A book from the days when academics could still be trusted. A time when academics were given the time to think.

The argument of Austrian-born, British theorist on modern art and modern music, Anton Ehrenzweig’s classic book ranges from highly theoretical speculations to (still!) highly topical problems of modern art and practical hints for, primarily, art teachers, but also, I would argue, innovators of any persuasion. I suspect it is unlikely, that said, that I can find a reader who will feel at home on every level of the argument. But fortunately, this does not really matter. The principal ideas of the book can be understood even if the reader follows only one of the many lines of the discussion. The other aspects merely add stereoscopic depth to the argument, but not really new substance. May I, then, ask the reader not to be irritated by the obscurity of some of the material, to take out from the book what appeals to him and leave the rest unread? In a way this kind of reading needs what I will call a syncretistic approach. Children can listen breathlessly to a tale of which they understand only little. In the words of William James they take ‘flying leaps’ over long stretches that elude their understanding and fasten on the few points that appeal to them. They are still able to profit from this incomplete understanding. This ability of understanding- and it is an ability may be due to their syncretistic capacity to comprehend a total structure rather than analysing single elements. Child art too goes for the total structure without bothering about analytic details. I myself seem to have preserved some of this ability. This enables me to read technical books with some profit even if I am not conversant with some of the technical terms. A reader who cannot take ‘flying leaps’ over portions of technical information which he cannot understand will become of necessity a rather narrow specialist. It is an advantage therefore to retain some of the child’s syncretistic ability, in order to escape excessive specialization.

This book is certainly not for the person who can digest his information only within a well-defined range of technical terms. Several ezine readers have written to me over the years objecting to my apparent lack of focus. What they meant (I think!) was that the arguments I
make have a – TRIZ-like – tendency to jump from high psychological theory to highly practical recipes for art teaching and the like; scientific jargon mixed with mundane everyday language. This kind of treatment may well appear chaotic to an orderly mind. Yet I continue to feel quite unrepentant. I realize that the apparently chaotic and scattered structure of my writing fits the subject matter of this book, which deals with the deceptive chaos in art’s vast substructure. There is a ‘hidden order’ in this chaos which only a properly attuned reader or art lover can grasp. All artistic structure is essentially polyphonic”; it evolves not in a single line of thought, but in several superimposed strands at once. Hence creativity requires a diffuse, scattered kind of attention that contradicts our normal logical habits of thinking. Is it too high a claim to say that the polyphonic argument of the ezine must be read with this creative type of attention? I do not think that a reader who wants to proceed on a single track will understand the complexity of art and creativity in general anyway. So why bother about that person? Even the most persuasive and logical argument cannot make up for their lack of sensitivity. On the other hand I have reason to hope that a reader who is attuned to the hidden substructure of art will find no difficulty in following the diffuse and scattered structure of Ehrenzweig’s exposition. There is of course an intrinsic order in the progress of the book. Like most thinking on depth-psychology it proceeds from the conscious surface to the deeper levels of the unconscious. The first chapters deal with familiar technical and professional problems of the artist. Gradually aspects move into view that defy this kind of rational analysis. For instance the plastic effects of painting (pictorial space) which are familiar to every artist and art lover turn out to be determined by deeply unconscious perceptions. They ultimately evade all conscious control. In this way a profound conflict between conscious and unconscious (spontaneous) control comes forward. The conflict proves to be akin to the conflict of single-track thought and ‘polyphonic’ scattered attention which Ehrenzweig describes. Conscious thought is sharply focused and highly differentiated in its elements; the deeper we penetrate into low-level imagery and phantasy the more the single track divides and branches into unlimited directions so that in the end its structure appears chaotic. The creative thinker is capable of alternating between differentiated and undifferentiated modes of thinking, harnessing them together to give him service for solving very definite tasks. The uncreative psychotic succumbs to the tension between conscious (differentiated) and unconscious (undifferentiated) modes of mental functioning. As he cannot integrate their divergent functions, true chaos ensues. The unconscious functions overcome and fragment the conscious surface sensibilities and tear reason into shreds. Modern art displays this attack of unreason on reason quite openly. Yet owing to the powers of the creative mind real disaster is averted. Reason may seem to be cast aside for a moment. Modern art can seem truly chaotic. But as time passes by the ‘hidden order’ in art’s substructure (the work of unconscious form creation) rises to the surface. The modern artist may attack his own reason and single-track thought; but a new order is already in the making.

And, therein lies the ultimate message of the book Ehrenzweig devoted the last thirteen years of his life to completing (it was actually published posthumously) is his discovery of the organizing role of the unconscious mind in any act of creativity and his analysis of the layered structure of the unconscious mind and of the dynamic mental processes which an artist undergoes in the creative act. What, fortunately, is also directly relevant to anyone embarking upon innovative anything.

And, if that doesn’t convince you, hopefully the intriguing chapter titles will help get you across the line…

BOOK ONE: CONTROLLING THE WORLD

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Part I: Order in Chaos
1. The Child's Vision of the World
2. The Two Kinds of Attention
3. Unconscious Scanning

Part II: Creative Conflict
4. The Fertile Motif and the Happy Accident
5. The Fragmentation of 'Modern Art'
6. The Inner Fabric

Part III: Teaching Creativity
7. The Three Phases of Creativity
8. Enveloping Pictorial Space
9. Abstraction
10. Training Spontaneity through the Intellect

BOOK TWO: STIRRING THE IMAGINATION

Part IV: The Theme of the Dying God
11. The Minimum Content of Art
12. The Self-Creating God
13. The Scattered and Buried God
14. The Devoured and Burned God

Part V: Theoretical Conclusions
15. Towards a Revision of Current Theory
16. Ego Dissociation
One of the funniest things I ever saw on television happened about twenty years ago when a very hip and trendy TV music programme invited Paul McCartney onto the show for an interview. It was a big coup, and I remember the show’s hosts looking and sounding unnaturally nervous in the build-up to their superstar coup. It was the beginnings of Britpop and it felt like a return to the halcyon days of The Beatles. 50% of all Britpop bands worshipped The Beatles, and so McCartney, who’s never really been anything other than an icon, was particularly in favour again.

The interview was chugging along quite nicely. The desired hip-and-trendy aura was working. McCartney played and it was good. He was interviewed and made a couple of witty, hip-and-trendy comments. He played some more music. Then was interviewed again, this time with some more serious questions. One of which was, ‘which are the songs by other artists you wish you’d written?’ It was a good question. Macca paused like he was actually racking his brains. The host was clearly thinking, ‘please say something cool’. Macca finally answered, ‘Just The Way You Are’. The room went silent. Whatever this was, it wasn’t anything like cool.

The host wasn’t smiling any more. ‘The Billy Joel song?’ he responded, clearly looking like he was clutching at straws. Maybe there was another – cooler – song called Just The Way You Are? There wasn’t. The room stayed silent. Macca looked embarrassed, shrugged his shoulders and said, ‘well I like it’. There was no way out.

Billy Joel has never really been cool. In fact, if there’s such a thing as a guilty-pleasure Top Ten artist list, Joel would probably make the top three. In 1977, at the start of the Punk revolution, he was about as uncool as it was possible to be. But having disappointed
with his fourth album and been told by the record company that if he didn’t do better next time, he would be dropped, the pressure to make something great was on. Enter ‘The Stranger’, the eventual winner of two Grammy’s, sales of over 10 million copies, and an enduring presence in the Rolling Stone magazine list of the best albums of all time. One of the Grammy’s made Just The Way You Are the Record Of The Year. Irony of ironies, however, it was never a favourite of the artist himself, considering it a ”gloppy ballad” that would only get played at weddings.

Joel wrote this song about his first wife, Elizabeth. A pure expression of unconditional love, he gave it to her as a birthday present. Sadly, after nine years of marriage, Joel and Elizabeth divorced in 1982... which might have something to do with Joel’s reluctance to play the song live...

"Every time I wrote a song for a person I was in a relationship with, it didn't last," Joel said. "It was kind of like the curse. Here's your song - we might as well say goodbye now."

Joel told USA Today July 9, 2008: "I was absolutely surprised it won a Grammy. It wasn't even rock 'n' roll, it was like a standard with a little bit of R&B in it. It reminded me of an old Stevie Wonder recording."

After Joel recorded this, he didn’t think much of it. He credits his producer, Phil Ramone, with convincing him that it was a great song. Ramone brought Linda Ronstadt and Phoebe Snow into the recording studio to hear the song, and of course they loved it, which was good enough for Billy. On Australian TV in 2006, Joel confirmed: "We almost didn't put it on an album. We were sitting around listening to it going naaah, that's a chick song."

Joel's longtime drummer Liberty DeVitto considers his work on this track his greatest contribution to a Billy Joel song. In an interview for the Songfacts website, DeVitto said: "Me and [producer] Phil Ramone came up with that kind of crazy rhythm that started out as a samba beat, like a bossa nova with a brush and a stick." Ask people to recall the song and they usually don’t even think about the rhythm, but I suggest, next time you hear it on the radio, you focus on DeVitto's skittering, floating master work when it enters just after the thirty-second mark. A little bit Principle 37, a little bit Principle 5, and a lot of Principle 16.

The drum part alone probably justifies the song’s presence in this ‘wow’ feature, but that’s not the end of the story. The melody line is, of course, an all time up-and-down (Principle 19) the scale rollercoaster. Helped along by a very 10cc, ‘I'm Not In Love’ (Principle 26?) chorus-of-thousands (Principle 5) in the background.

Then there’s the Fender Rhodes electric piano sound. Stick a Rhodes onto any song and you pretty much can’t go wrong (see: Supertramp, Steely Dan and, especially, the Paul Simon song, "Still Crazy After All These Years.")., but it’s Joel’s use of the instrument’s phase shifter effect (Principle 18) here that made the Rhodes sound the aural icon it has since become.

Finally, as if the vocal melody, piano and drums don’t sound like enough, we get the final killer blow in the form of another in a string of iconic saxophone solos by jazzman, Phil Woods. The trick here is the (Principle 37) combination of jazz chops and pop context. Woods’ solos literally makes Steely Dan’s "Doctor Wu" from their 1975 album Katy Lied, Paul Simon’s "Have a Good Time" from the 1975 album Still Crazy After All These Years, but his work on Just The Way You Are is bang on definitive.

In the wake of the Paul McCartney interview, the ultra-hip music media in the UK decided it was time to perhaps interview Joel. I remember it being something of a non-event,
except for Joel’s admission that his main songwriting trick was to include an ‘unexpected’ wow hook in every song. Thus making him one of the first TRIZ songwriters? Well, maybe that’s stretching the point. Just The Way You Are, in the meantime, does the job in spades, featuring more wow moments than most artists manage to muster in a whole career. If that makes him a guilty-pleasure, so be it. I’m in.
CO2 could be repurposed in an efficient and environmentally friendly way with an electrolyzer that uses renewable electricity to produce pure liquid fuels. The catalytic reactor developed by the Rice University lab of chemical and biomolecular engineer Haotian Wang uses carbon dioxide as its feedstock and, in its latest prototype, produces highly purified and high concentrations of formic acid.

Formic acid produced by traditional carbon dioxide devices needs costly and energy-intensive purification steps, Wang said. The direct production of pure formic acid solutions will help to promote commercial carbon dioxide conversion technologies.

Wang, who joined Rice’s Brown School of Engineering in January, and his group pursue technologies that turn greenhouse gases into useful products. In tests, the new electrocatalyst reached an energy conversion efficiency of about 42%. That means nearly half of the electrical energy can be stored in formic acid as liquid fuel.

"Formic acid is an energy carrier," Wang said. "It's a fuel-cell fuel that can generate electricity and emit carbon dioxide - which you can grab and recycle again. It's also fundamental in the chemical engineering industry as a feedstock for other chemicals, and a storage material for hydrogen that can hold nearly 1,000 times the energy of the same volume of hydrogen gas, which is difficult to compress," he said. "That's currently a big challenge for hydrogen fuel-cell cars."

Two advances made the new device possible, said lead author and Rice postdoctoral researcher Chuan Xia. The first was his development of a robust, two-dimensional bismuth catalyst and the second a solid-state electrolyte that eliminates the need for salt as part of the reaction.

"Bismuth is a very heavy atom, compared to transition metals like copper, iron or cobalt," Wang said. "It's mobility is much lower, particularly under reaction conditions. So that stabilizes the catalyst," He noted the reactor is structured to keep water from contacting the catalyst, which also helps preserve it.
Xia can make the nanomaterials in bulk. "Currently, people produce catalysts on the milligram or gram scales," he said. "We developed a way to produce them at the kilogram scale. That will make our process easier to scale up for industry."

The polymer-based solid electrolyte is coated with sulfonic acid ligands to conduct positive charge or amino functional groups to conduct negative ions. "Usually people reduce carbon dioxide in a traditional liquid electrolyte like salty water," Wang said. "You want the electricity to be conducted, but pure water electrolyte is too resistant. You need to add salts like sodium chloride or potassium bicarbonate so that ions can move freely in water. "But when you generate formic acid that way, it mixes with the salts," he said. "For a majority of applications you have to remove the salts from the end product, which takes a lot of energy and cost. So we employed solid electrolytes that conduct protons and can be made of insoluble polymers or inorganic compounds, eliminating the need for salts."

The rate at which water flows through the product chamber determines the concentration of the solution. Slow throughput with the current setup produces a solution that is nearly 30% formic acid by weight, while faster flows allow the concentration to be customized. The researchers expect to achieve higher concentrations from next-generation reactors that accept gas flow to bring out pure formic acid vapors.

The Rice lab worked with Brookhaven National Laboratory to view the process in progress. "X-ray absorption spectroscopy, a powerful technique available at the Inner Shell Spectroscopy (ISS) beamline at Brookhaven Lab's National Synchrotron Light Source II, enables us to probe the electronic structure of electrocatalysts in operando -- that is, during the actual chemical process," said co-author Eli Stavitski, lead beamline scientist at ISS. "In this work, we followed bismuth's oxidation states at different potentials and were able to identify the catalyst's active state during carbon dioxide reduction."

With its current reactor, the lab generated formic acid continuously for 100 hours with negligible degradation of the reactor's components, including the nanoscale catalysts. Wang suggested the reactor could be easily retooled to produce such higher-value products as acetic acid, ethanol or propanol fuels.

"The big picture is that carbon dioxide reduction is very important for its effect on global warming as well as for green chemical synthesis," Wang said. "If the electricity comes from renewable sources like the sun or wind, we can create a loop that turns carbon dioxide into something important without emitting more of it."

Read more:
Many would say that there are only three different films. Some would say seven. Either way, that’s never stopped film companies from making thousands of the damn things. Occasionally, they run out of ideas so badly, they decide to remake films they already made. Not so good for audience sanity, but potentially quite enlightening from a generational cycle’s perspective.

That’s what I was thinking the other week when I accidentally found myself watching the 2011 remake of the 1984 teen-movie, Footloose. I won’t bore you with the details of the script. Or the soundtrack. Needless to say, both were virtually identical. Perhaps not such a bad thing when it comes to the title song – an all-time classic that I imagine will one day feature in the musical wow section of the ezine – but fairly depressing in terms of producer imagination. Or lack thereof. Perhaps they thought it best not to tamper with a universal bad-boy-does-good/boy-meets-girl teen story? Perhaps they figured the GenX audience for the original was no different to the GenY audience for the remake? Who knows. At first it looked like there was no difference at all. In the original the hero is from Chicago, in the remake he’s from Boston. You say tomayto, I say tomatro.

But then you dig a little deeper. All the GenY characters are a bit prettier. They all dance better. More Heroically. That fits. Then you hit the real generation-shift nail on the head, and realise that in the original, the hero comes to the small town with his mum. In the remake, she’s gone and he’s an orphan. Now the perfect GenY Hero in other words. Just like Harry Potter or the latest incarnation of James Bond.

Here’s what the movies look like when mapped onto the Generation Map. Both of them hitting the heart of their respective teen audiences:
How about another one? 
Strictly speaking the 1976 movie, Carrie, was targeted at the tail-end of the Baby-Boom teenage audience, but in reality it was picked up much more by the emerging Nomads. In part because John Travolta, who had a bit part in the movie, was about to become a major icon for the Nomads, but also because Carrie was in so many ways the outsider every lonely Nomad could empathise with. Carrie was made again as a TV movie in 2002, in retrospect, a tad too early for the emerging Hero’s, but then finally got its big GenY moment with a 2013 major re-remake from Hollywood.

The differences between the ’76 Nomad version and the ’13 Hero version are more noticeable this time, and are again highly symbolic in terms of tapping in to generational differences:

1) Cissy Spacek, the titular star of the ’76 original, with her ginger eyelashes and almost translucent skin, had precisely the sort of weird alien beauty that might turn your peers against you. Drab styling couldn't disguise the fact that the 2013 Carrie, Chloë Grace Moretz, is cute, altogether less of an outsider and thus much more in tune with the Heroic needs of GenY.

2) Director Kimberly Peirce's remake begins with a prologue showing a traumatised Margaret White (Julianne Moore) giving birth to Carrie. Moore, giving a typically committed performance, is a self-harming bundle of neuroses who seems more disturbed and more emotionally damaged than Piper Laurie, the actor who played Cissy Spacek’s mother. The new Carrie isn’t quite an orphan, but it is very clear in the remake that Mom is the root cause of Carrie’s problems.

3) Carrie’s chief tormentor, über-bitch Chris Hargenson (Portia Doubleday), looks as though she's been taking make-up tips from the Kardashians. Apart from some twins (whom you notice only because they’re twins, not because they do anything of interest) the classmates merge into an indistinguishable mass of meanness, with no individuals making their mark the way PJ Soles and Edie McClurg did back in 1976. In Hero-world it doesn’t do to make more than one baddy stand out by having a personality of their own.
4) Pretty new-Carrie polishes her telekinetic powers, practising them in her bedroom. When she turns into a one-woman WMD at the school prom, she even seems to be relishing them, striking angry Vogue-type poses. But by making her appear more in control, the film also makes her more malevolent. Moreover, whereas semi-catatonic Spacek barely registers the death of the Tommy Ross character, Moretz reacts to it, making her subsequent behaviour less the mechanical response of a traumatised victim than a calculated act of vengeance. Maybe her mom was right all along? New-Carrie IS a monster!

5) It's hard to top the original director, Brian De Palma when he's flexing his fancy show-off muscle by way of split-screen and revolving prism lens effects, but even so Peirce's prom is oddly perfunctory. You would have thought that with today's CGI she could have served up a more spectacular climax – the mass electrocution of the townsfolk as described in King's book, for example. Images from the 1976 film seared themselves into the viewer’s brain forever, whereas in 2013 the whole thing feels rather forgettable. Perhaps best to not dwell on the bad stuff?

6) Perhaps the most shocking moment in the 1976 film is when Carrie kills the sympathetic gym teacher (Betty Buckley). It's also the pivotal point, when the catharsis curdles, the destruction is exposed as non-discriminatory, and we're reminded that killing classmates and teachers will never, ever make things right. In the remake, the gym teacher (Judy Greer) survives, suggesting Peirce and Aguirre-Sacasa didn't think this through. In their version, new-Carrie kills only the characters who "deserve it".

7) Chris and her partner-in-crime Billy Nolan, dispatched relatively cleanly in the original film (something that always seemed a little unfair, given the more gruelling fates of some of their friends), are subjected to more explicitly gruesome treatment in the remake.

8) Inspired by the end of Deliverance, De Palma ended his film with a now-classic jump-out-of-your-seat shock. The remake, instead of trying to either top that or aim for something different, settles for such a half-baked anti-climactic effect it's an insult to the audience. Whether this is just bad film-making or whether there's an important inter-generational point being made, I can't be sure. Except to say that it was perhaps okay to leave (abandoned) Nomad audiences emotionally scarred by the final scene, but not so much for (protected) Hero's.
It is one way of seeing the world from a different point of view. This short-eared owl made sure to turn heads, by swivelling its face completely upside down. The bird was captured by wildlife photographer Alain Balthazard in Champagne-Ardenne, Northeastern France, but the same species can also be seen in Northern England and Scotland.

Owls are largely nocturnal and live lifestyles in which high visual acuity is important. In order to maximise visual sensitivity without losing resolution, owls have evolved large eyes that are tubular in shape. They are also forward-facing in order to retain reasonable binocular vision. However, a consequence of the eye being both large and tightly fitted within the orbit is a substantial loss of eye movement, and, being forward facing they have a narrow field of view.

Owls compensate for these constraints on eye movement and visual field by having an extremely well-developed capacity to move their heads, linked to long and flexible necks. As a result, they can turn their heads through up to 270 degrees, whereas a hawk or falcon could manage no more than about 180 degrees.

The new problem that emerges from the need to re-orient the head by such a large amount is enduring continuity of blood supply to the brain. As various different muscles stretch and twist to move the head, arteries become squashed and so aren’t able to flow enough blood.

This makes for a classic angle (of moving object) versus loss of substance contradiction. About which the Contradiction Matrix has this to say:
So how do owls solve the conflict? Well, first, they have (Principle 1, Segmentation) double the number of bones in their necks compared with humans, fourteen instead of seven. Next, they (Principle 15, Dynamics) manage oxygen in the blood to allow a steady supply even when the twisting effect is restricting blood flow. Thirdly, (Principle 4, Asymmetry) the arteries are positioned in a centralized position (as opposed to being homogenously distributed throughout the neck) so as to minimize their distortion as the neck twists. And then, fourthly, (Principle 10, Prior Action) they are able to ‘pool’ blood in a kind of plenum chamber, just in case a twisting motion does impede the blood flow too much.

Simple when you know how. Especially when written up by our friends at Sketchplanation:
Short Thort

Innovation Tightrope #155:
managers want to challenge solutions, but don’t want their questions challenged;
enengineers want to challenge questions, but don’t want their solutions challenged…

MANAGERS

INNOVATORS

SIXSIGMA BLACK-BELTS

ENGINEERS

DESIRE TO HAVE QUESTION CHALLENGED

DESIRE TO HAVE SOLUTION CHALLENGED

...innovators have no (ABC-M) ego.

News

IMSTA
Darrell will be conducting a breakfast session, ‘Towards An AntiFragile Medical And Surgical Industry In Ireland’ at the Irish Medical and Surgical Trade Association in Dublin on 23 October.

Innovation In Music
Darrell will be launching the new ‘music’ edition of the TRIZmeta card-game series at the Innovation In Music conference being held at the University of West London from 5-7 December. More details and registration: https://www.inmusicconference.com/.

TRIZ Expert Day
The dates and schedule for the Germany-based TRIZ Expert Day have now been finalized as 6-7 February 2020. The event will take place in Nuremberg, starting on the afternoon of the 6th and ending at the end of the 7th. Darrell will be in attendance throughout and will be conducting a workshop on getting the most out of the 40 Principles (and TRIZmeta) on the afternoon of the 7th.

IMechE ‘21st Century TRIZ’ Workshops
The last of the public one-day TRIZ Introduction workshops run by us for the IMechE takes place in London on December 9. (More details and early-bird discount registration at:
The Institution have informed us that we will be running two more dates in 2020, the first during April. More details of precis dates and venues closer to the time.

**PMI**
Following the 2000+ download success of our ‘Systematic Innovation In Complex Environments’ webinar for PMI earlier this year, we’ve been asked to do a follow-up, ‘Project Management In Complex Environments’, which currently looks like it will take place on October 23. More details on our website and, no doubt, Twitter feed.

**USA**
It looks like Darrell's next two trips to the US will take place, firstly, the last week of November, and then, secondly, the last week of January 2020. Both weeks currently have one or two ‘available’ days. If anyone thinks they might want to book something, please get in touch with Darrell directly.

**New Projects**
This month’s new projects from around the Network:
- Conglomerate – Design-Thinking & TRIZ Workshops
- Insurance – SI Workshops
- Manufacture – Problem-Solving Workshop
- FMCG – Innovation Dashboard Project
- Education – SI Workshops
- Automotive – Problem-Solving Workshops
- Mining – Big Data Analytics Workshop
- Agriculture – Design/Make Project
- FMCG – Novel Materials Design Study
- Healthcare – ICMM Study