

So here is an extract from our book, "How to Invent Almost Anything", written by David Straker and Graham Rawlinson

To buy from the UK call 0870 400 1000, or get on line to Amazon.com:

Chapter segment: The TAO Design Process

Having looked at invention from the analytical, scientific, TRIZ and psychological creative viewpoints, this leaves us with the question of 'Which approach should we use?' The creative answer, of course, is 'yes'. All methods are valid and may be used in many different ways. Still confused? Good: confusion without damaging frustration is a splendid place from which to invent.

To help nudge the confusion in the right direction, this chapter offers an integrating mental model from which you can hang the different principles and methods from the previous chapters, thus providing an overall approach to creating new and wonderful inventions.

The problem with defining a process for creative invention is that there is no one right way. You cannot say 'start at step one and then do step two' and so on with any guarantee that you will be successful. The TAO Design Process? is thus deliberately vague in parts, because to say 'at this point, do this' would miss all of the other possibilities.

You can think of TAO as standing for Thinking Around Objectives or you can create your own words. The casual suggestive nature of 'thinking around' deliberately contrasts with harder 'objectives'. Alternatively you can just think of it as Tao, which means 'The Way' (We like ancient wisdom!). You can choose to take any of the sections at any time and follow the idea path it suggests. Jump around, be playful, start one and then jump to another. Each time you work on one of the steps you should be slowly building a better understanding of what you are trying to do and have a better set of ideas about how you might do it. Don't forget to take notes not just of your thoughts but where your thoughts have come from - or when you look at them again you may not understand them!

At some point you will arrive at an 'aha' experience where you suddenly see how to put your ideas together to make it all work. Don't try to force this - remember what we have said about how to use your brain. If you are feeling you are getting stuck then jump to another step, take a break or consult Chapter on getting past blocks.

If you follow these steps and just let your brain do the work of putting ideas together, somewhere in its hidden depths, then the solution will be created!

At first you may find this wandering around a bit slow and not too easy to put the various ideas together. Think of it as being like learning to juggle. First it is two balls, then three and eventually, with a lot of practice, you will find yourself juggling with all the balls at once!

The big picture

Imagine that you are looking to make your fortune by discovering gold in 'them thar hills'. You cannot just go and dig somewhere, first you need to broadly explore, just

getting a feel for the hills and creating a big picture of the territory. You can then start using your experience and knowledge to find a likely-looking place. When you have narrowed it down further, you might do some test digging and finally dig out the mine, extract the gold and refine it down to glorious ingots.

Fig. Spiralling process

Inventing is a bit like looking for gold and there is seldom a direct route to the answer you want, but there are broad stages that you may use. It is often like Fig., where you gradually spiral in towards the solution, yet can also be throw back out to previous stages. Like the children's game of 'Snakes and Ladders', luck can be both kind and cruel.

Overall, there are five broad stages you might go through to find the pot of gold that is the final invented solution. Although these could take roughly similar times to complete, different problems are more likely to result in very different time profiles through each of the stages.

Exploring

Exploring is a broad wallowing in the overall situation in which you are inventing. You know that you have done some good exploring when things start to look familiar and when you feel you have a good general understanding of the big picture.

If you are starting by saying 'Right. Let's invent something,' then in this stage you might be investigating general areas in which there may be scope for useful invention. For example, you might consider 'home appliances', then finding that area rather over-done you could wander further afield and think about the potential of the internet.

Alternatively, if you already have a known problem, your exploration may be to find out all you can about the situation in its broadest sense. For example when looking at improving the timbre of telephone speakers, you might look at the physics of sound, hi-fi systems, at transducers in general (including non- sound ones), and so on.

The very best exploring happens when you are not looking for anything, because when you are looking for something then your mind filters out all of the other possibilities that pass before your eyes. Cast your attention widely, see things without judgement and just be curious. Sometimes you might even be lucky enough to find a nugget of gold lying on the ground, just waiting to be picked up.

Prospecting

Prospecting is where the serious search starts. A good indicator that you are finding the right area is a need that seems to be unfulfilled. For example, hotel rooms are not always completely silent and the sounds of the people in the next room can disturb the occupant's sleep. Note that the need here is 'a good night's sleep', not necessarily 'sound-proof walls' (which is only one way of achieving the need).

There are surprisingly simple ways of finding needs, such as really listening to people, seeking the little (and large) things that irritate them, or discovering their deep wishes. Another good approach is to watch people. If you can set up a video camera

of them working in the area of interest, then this gives an even better record that can be studied in detail.

For example, if you want to improve the telephone, watch people closely at every step: how do they pick up, dial and speak? Find how and when they want to use the phone. You can also chunk out to consider communications in general or go deeper into telephone technology.

Digging

Having found the need or goal to which a solution would be valued (and hence paid for!), the next stage is to find the specific problem or situation that, if changed, would result in the need or goal being met. This may need a fair amount of analysis and/or creative thought, and you may also want to go out and do some more exploration around this more constrained area.

Defining the problem can be a critical task, as this will frame the creative question and hence greatly affect what you might invent. In improving the telephone, there is a great deal of difference between a problem of 'inaccurate reproduction' and 'caller is unable to understand': the former might lead you to replace the speaker or improve the transmission technology, whilst the inability to understand may simply require greater amplification and a volume control.

Extracting

This is the traditional creative stage in the process, where you start pulling out the golden nuggets of brilliant ideas. Unfortunately, this is not always easy and the gold may be buried deep, requiring a lot of patient work.

Sometimes you have to dig a deep hole before you are sufficiently convinced that the mine is empty. When this happens, you can either give up or, more realistically, backtrack to a previous stage and try again.

Many of the creative and inventive methods described in this book may be used in this stage (although this does not preclude their use in other stages!). Sometimes it may be easy to find the right tool to use, but it can be a more successful strategy to simply try different approaches until something works and the spark of creation is successfully ignited.

Refining

When Thomas Edison said 'one percent inspiration, ninety-nine percent perspiration,' he was primarily talking about the hard work that goes into turning the bright idea into a usable and marketable product. Refining is often an iterative process of testing and improvement, with rigorous and creative thought at every stage. Dreamers often hate this stage as it can lack the joys of raw creation, but this is where the real gold of true value is created, where inventions that better mankind (and, hopefully, your pocket!) are crafted.

Each iteration of refinement may itself involve a complete or partial TAO loop of invention, as you discover and resolve successive problems and contradictions.

Not or but and

When should you use the analytical scientific approach and when should you take a softer creative way? Sorry, the answer again, is 'yes'. The secret is not one or the other, but one and the other. There is great creative power in using more than one system, as multiple lenses on the problem not only lead to more solutions, but their combination can be synergistic, creating even more possibilities. More than one lens also breaks the limiting fixation that a single viewpoint may bring.

Fig. ... shows the TAO Design Process again, this time in the form of a loosely linked sequence (same thing, different lens, with consequential benefits), along with parallel scientific and psychological tracks. Although there are sequences of activity there are also 'clouds' of methods that are roughly distributed where they might be most used, but which are sufficiently general to be usable in other circumstances.

When using these, if you have a naturally scientific tendency, try the psychological track first. Similarly, if you normally take a softer approach to creativity, try the more rigorous scientific and TRIZ approach. You can also switch back and forth at any stage, using the alternative views to stimulate and challenge one another. Try different elements, but the bottom line is always 'what works for you'. It is a rich and complex model which gives you a wide range of tools. It may seem rather overwhelming at first, but if your goal is serious invention, it is designed to provide serious help. Ross Ashby described the 'law of requisite variety' which states that a method must be as complex as the system that it wishes to control. With many tools and broad thinking at your disposal, you will be well-equipped to tackle even the stickiest of inventive problems.

The rest of this chapter explores each of these tracks.

Fig. The full TAO Design Process

The Scientific track

The Analytic sequence

In the analytic sequence, we use rigor and structure to ensure that we reach a predictably profitable and satisfactory solution.

Fig. The Analytic sequence

(Well, there is a big chunk missing here because if you want more you need to contact us!)

The Psychological Track

The psychological track means making full use of your subconscious, recruiting its vast powers to your bidding. The problem is that this is not always easy, and the subconscious may fight back by whispering to you how stupid this is and how the scientific approach is much more sensible and that if people knew what you were doing, they would not think much of you. Ignore the nagging! Open your mind and play. Try things. If they do not work, just say 'never mind' and know that means it simply means that they did not work today. Tomorrow is another day!

The Dreaming Sequence

Dreaming is, in many ways, the ultimate psychological technique, as it is all about what is happening in the subconscious. This is a waking dream, but it is important to start in a dreamy way, and then steadily progress towards reality. In dreams, anything is possible. Starting from the dream will help you to discover much more than if you start from the limited thinking of a waking now.

Fig. The Dream Sequence

Fantasy: Make a Big Wish If you are going to go for the Big Wish then think about the points we made about getting your brain working in the right mode. Pin some wonderfully creative pictures on the wall, get some toys out, play and draw and maybe write some poems! Stimulate your brain in lots of different ways and it will pay you back in connecting your Big Wish to the many different experiences you have had all through your life. Check out with your senses whether you are in fight or flight mode. If so, then read through Chapter 3 again, check your motives and try the technique for getting yourself in a Creative mood. Make your big wish a fantasy, the impossible and perfect future where all problems are solved and every need is fulfilled.

Fiction: The Dream The most important first step is to get ready to Dream. This is not about believing in the impossible. It is about opening your mind to seeing that what you now believe to be impossible, may just be possible. The future is open to an infinite number of possibilities. Infinity is a big number and we can think of the future as containing an infinite number of impossible and possible events. Rather than wasting time on working out what we think is impossible we can simply start with some dreams and see where these take us. It may seem like an endless list so don't try to force it - just relax, draw, write some nonsense and see where it takes you.

Draw from your fantastic wish and create a story where things just might be possible. Move as slowly as you need to build an almost-credible fiction.

Possibility: Daydream

A daydream is just a touch closer to reality. Take a dream and then walk yourself through it. What does it look like? How bright? How large? What about the sounds? How sharp and clear are they? What does it feel like? Play with these imagined sensory elements until the dream becomes even more real and stimulating.

Explore your dream through other eyes. Go closer - imagine you are an ant, or a virus, or an atom! What does it look like now? Then go further away. Now you are a tree, or an eagle or looking from a spacecraft or another planet. What does it look like now?

Imagine you are different - such as 1 year old or 200 years old - how would things seem now? Imagine you have four arms or just one. Imagine you move fast or slow, have strength or are weak. Explore all the changes in how you see the value of your dream as you explore it through other eyes.

Write another story, but not just about a fictional future, but a real future. Stretch back from your dream until you are just touching reality.

Actuality: Plan

The final stage is to turn your dreams and stories into reality. Pull on the strings of your story, bringing it closer again to present feasibilities. Think about the resources that you have now or can realistically acquire. Think about how your dreams and possibilities may be made real.

Draw up a plan containing the details of your creation, who it will benefit, how you will create it and how you will profitably get it to the people who will benefit from it. Let this plan pull you forwards into the ideas and solutions that will realise your dream.

Reality: Persist

As you move close and close to real solutions, split your mind in two and hold the two parts both separate and together.

In the first half of the split, think of practicalities, from how you will get parts made to costs and timescales. Also seek out more sub-problems and find answers to these, as you spiral inwards towards the final solution.

In the second part of your thinking, hang onto your dreams. Remember your ideal and always keep the wish up-front and visible. Stay charged up and enthusiastic. Maintain your passion when others might give up, for it is only when we cast our eyes downwards and give up that we fail.

The cloud

In the cloud, although methods generally tend to get used from beginning to end, you can use any methods anywhere. People who tend towards the more psychological/creative end of the spectrum often work holistically, in parallel on many activities at once. Thus they might simultaneously be playing with potential solutions whilst also discovering different needs. Like an Elizabethan multi-voice choral motet, their thoughts wander all over the place, only coming together in a harmonious whole right at the end.

The cloud diagram of Fig. shows just the tips of the iceberg of techniques you can use. The prompts below and the methods of Chapters provide many more methods to expand your thinking and explore the problem and solution spaces.

Fig. The cloud

Do things backwards

Start with a solution and see what Problems it might solve. Do this again and again. Keep asking what problems you have with these solutions and explore how these might be solved.

Wish for the world

Close your eyes and make a wish. Write it down, starting 'I wish.'. Imagine fully and completely that it is totally true. Look at what you have wished for. Feel it: what is the texture and sense of shape? Does it have sounds, smells or taste? ?What is this like? How would the world change if your wish was true? How could you make some of those changes happen now?

Take a child-like perspective

Take away your knowledge - imagine you see it for the first time. Imagine taking it apart and exploring the bits. Imagine putting them in your mouth to see what they taste like and feel like!

Envision an ideal future

Create a vision of what you want, not what you think is possible. Write it down in a few, powerful words. Carry it with you. Show it to people. Let it tug at your heart and your head, pulling you forwards in the right direction.

Demolish psychological barriers

Take courage and look inside yourself to see what is really stopping you from creating. Is the internal critic chattering in your ear? Tell it to shut up! Are you concerned with what others might think? Ignore them or go elsewhere. What is the one question you could ask yourself that would cause you to be completely unblocked? Go over, around, under or through every barrier you can find until there is nothing that can stop you from succeeding.

Challenge assumptions

Look at the assumptions and presuppositions people (including yourself!) are making. Are you thinking things cannot be done? Or that they will not be needed? Look at what we are putting up with, just because we think that there is 'no other way' or just because 'that's the way it is'. Challenge them. Reverse them. Assume all things are possible!

Create tension

Let your wishes and vision build internal tension that breaks down psychological barriers. Make the tension inherent in assumptions visible. Stretch the rubber band until it twangs and snaps you into different thinking.

Use an analogy

Move your mind to another place. What problems exist that are essentially like this problem but very different. How would you create the solution for these analogous problems? Somewhere the problem has already been solved

Nature is a rich resource of solutions. If you want to make a better door - what in nature is like a door? What is a door for a worm, or a bee, or a tree, or a virus? How are their doors made and how do they function?

Simplify

Take things out. Combine things. Ask how things can be simplified to the point where all that is delivered is that which is wanted. Paint it all one colour. Make it all from one piece. Do it all at the same time. How can you create a really simple invention?

Draw pictures

Engage your visual senses. Draw pictures of the problems and solution. Draw the whole and individual parts. Draw generalisations and complete solutions. Doodle and see what your subconscious is trying to tell you.

Ask a clown - or ask an expert

Your resources for evaluation also include others! Don't think about others as just being there for expert opinions. There are times when you need to ask a clown and times when you need to ask an expert. The time to ask an expert is when you really know what you want!

If you ask an expert when your ideas are just forming you will be guided to all the known solutions that the expert feels comfortable with. That is, after all, why they are experts!

Always ask the clown first!

Change your mind and try something absurd!

Even when you are really sure you know what you want and how you will put it together it can still be useful to challenge your ideas by changing your mind.

This will really test your commitment to your ideas. If they do not stand up to the change your mind test then maybe they should be dropped. If you have challenged them and they still come up with roses then you are highly likely to see your idea through to the end, no matter what obstacles are put in your way. Slay a sacred cow, break some rules, break the mould.

And the final test is how different would things be if you took away the rules that are governing your thinking or that of others. If a little bit of rule-breaking really changed what you would do then maybe you start again when you have changed the rules.

Are your rules really that sacred? Many ancient and modern battles have been lost when someone broke the rules. Army generals plan their campaigns on beliefs about what their opponents will do - the opponents know this so they change the rules - and win!

Maybe your business idea is like that? Which side are you on?

Enjoy yourself

Being an inventor will feel risky, it will take up your energy and can leave it dead on the floor. Make sure you have some fun while doing all this thinking stuff! It isn't about only having fun - some hard work is needed but this is why the fun is also essential. And take time to relax!

Just do *something*

Whatever goes on, you need to keep doing something! You started with some energy to do something so however difficult it seems and however lost you feel, keep up the momentum.

and finally...

Being creative means wandering around in your thinking, dancing lightly from place to place to see what your brain comes up with. Sometimes zoom in and sometimes zoom out. And always be playful with a serious purpose!

Use the various guides in this book to analyse, think, wish and wonder, over and over, looking for how you might put several different ideas together. Because it is often the combination of ideas that yields the great `aha', we cannot and should not try to give you a magic sequence that will guarantee `results every time'. You will probably need to get lost before you find your way, which is a perfectly normal part of the inventive business, which is why it needs persistence and a bit of courage.

So don't forget to give yourself a reward every now and then for your efforts.
But above all - Be happy!

Well, this is what you are here for!

(This is the only bit of religion in the book!

What does everyone think?