

SYSTEMIC THINKING
a simple thinking technique for gaining systemic focus

presented by

GARY BARTLETT

at

THE INTERNATIONAL CONFERENCE ON THINKING
“BREAKTHROUGHS 2001”

Final Draft

Please contact the author with comments or questions
or for a copy of the Systemic Modelling paper

gb@probsolv.com

+64 9 476-2530

SYSTEMIC THINKING

Systemic thinking is a simple thinking technique for gaining systemic insights into complex situations and problems. It puts the benefits of the systems thinking revolution within the reach of everyone.

Distinctions

Systemic thinking is different from both systematic thinking and systems thinking.

Systematic Thinking	Systems Thinking	Systemic Thinking
Thinking methodically.	Thinking about how things interact with one another.	A simple technique for finding system-wide focus.

Warning

Much of the content of this paper will be familiar to you. The arrangement of that content probably won't be. If you find the content familiar, I recommend you focus on the way it is arranged – it is easy to get hung up on the slightly different spin and perspective systemic thinking puts on things.

Mind-space

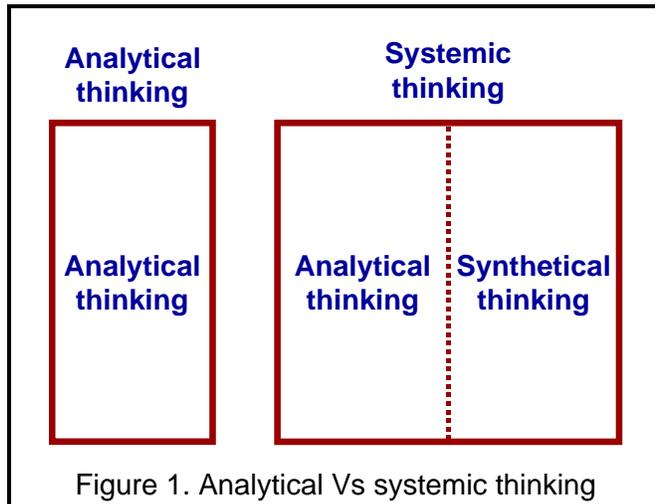


Figure 1. Analytical Vs systemic thinking

The diagram on the left will help you create a mental framework for understanding the systemic thinking concept.

Conventional thinking techniques are fundamentally analytical.

Systemic thinking is different – it combines analytical thinking with synthetical thinking.

Analytical thinking is common – it's thinking about the parts or elements of a situation.

Synthetical thinking isn't that common – it's thinking about how those parts or elements work together.

Acknowledgements

The Systemic thinking concept has its primary origins in elements and abstracts of the following thinking techniques:

- Creativity and lateral thinking: Dr Edward de Bono (generating alternatives, thinking as a skill and "mechanism of mind")
- TOC – The Theory of Constraints: Dr Eliyahu Goldratt (The "3-cloud" method and the single constraint)
- TRIZ – The Theory of Inventive Problem Solving: Dr Genrich Altshuller (patterns in problems and solutions)
- ST – Systems Thinking: Joseph O'Connor & Ian McDermott et al (system interactions)
- NLP – Neuro-Linguistic Programming: various (mental modelling)

Some illustrations of results achieved with systemic thinking

- Doubled revenues in less than 6 months on lower costs: import/export manufacturer.
- Losses transformed to wins within weeks: junior soccer team.
- Key client threats converted to referrals within weeks: software development company.
- Patient visit duration halved within a month: orthopaedic follow-up clinic.
- Attitude and academic performance turned around within days: primary school student.

THE CONCEPT

The fundamental assumption on which the systemic thinking concept is based, is that everything is systemic.

In other words, everything interacts with (affects and is affected by) the things around it.

Everything.

If we want different **outcomes** from a situation, we have to change the system that underpins the situation in such a way that it delivers different **outputs**.

In other words, we have to deal with things systemically.

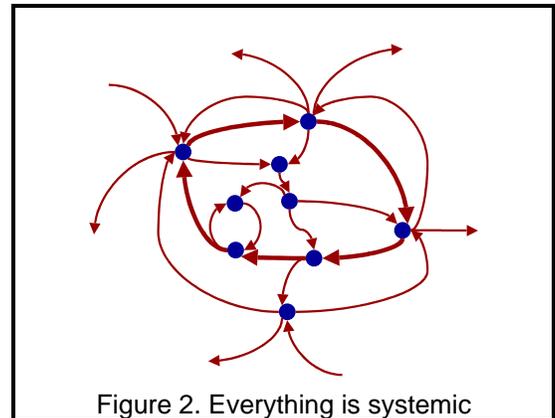


Figure 2. Everything is systemic

We can't deal with the parts of a situation in isolation; we have to deal with them in concert. We have to deal with both the elements of a situation **and** how they interact with one another.

There is nothing new in this – it's common sense. In the business world, for example, everyone knows that price, cost, volume, quality and profit are interrelated. Everyone knows that we can't change or expect to change one of those elements without impacting on or having to change some of the others.

We all deal with things systemically all the time. In fact, everything we do is systemic.

A successful solution or strategy indicates that our mental paradigm (the model of the system in our minds) reflects the situation (real system) well.

A failed solution or strategy indicates that our mental paradigm doesn't reflect the situation well.

Systemic thinking is as much about troubleshooting our own mental paradigms as it is about troubleshooting the situations we face.

We need another thinking tool

In spite of our awareness that everything's systemic, our society's primary thinking tool is analysis – taking things apart.

Make no mistake, analysis is a powerful thinking tool – for understanding the parts of a situation. It's just not that crash-hot for understanding how those parts work together.

When we break things down into smaller and smaller components, we tend to lose sight of the interactions between them.

It's a case of "When the only tool you have is a hammer, every problem begins to look like a nail" – and we end up with analysis paralysis.

Analysis paralysis is when a vicious cycle is set up.

Analysis makes the interactions less visible, so insight diminishes, so we analyse things further – and things go from bad to worse.

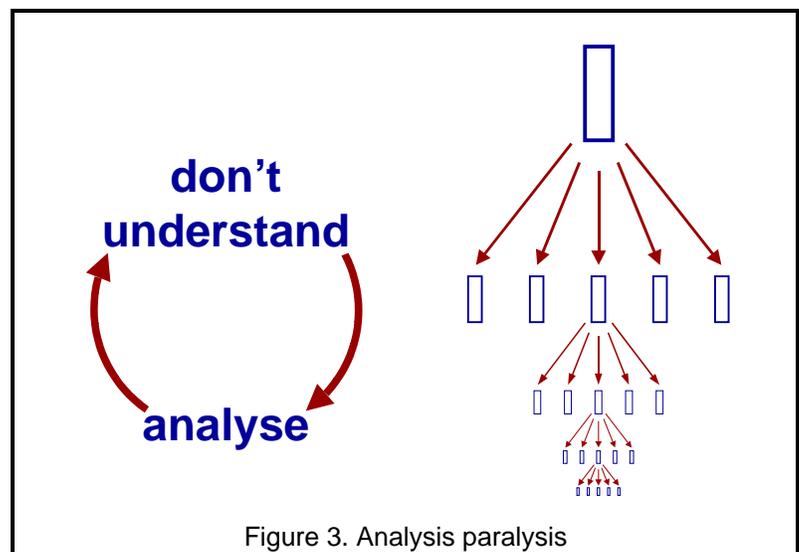


Figure 3. Analysis paralysis

What our society needs is a thinking tool specifically designed for making sense of interactions – a thinking tool for making sense of how things work together.

That tool is **synthesis** – seeing how things work together.

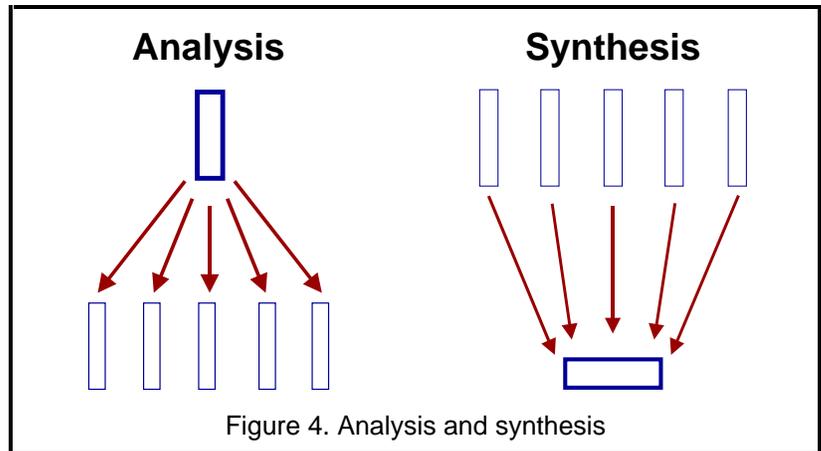
Synthesis is more than putting things back together again after you've taken them apart: It's understanding how things **work** together.

Analytical thinking enables us to understand the parts of the situation.

Synthetic thinking enables us to understand how they work together.

We need both analysis and synthesis. Each is of only limited value without the other – in a systemic world.

Systemic thinking is nothing more than a combination of analytical thinking and synthetic thinking.



Analytical thinking is the easy bit. We've been taught to do it from birth.

Synthetic thinking is harder because we haven't been taught to do it deliberately. We do it unconsciously all the time, of course – we wouldn't get very far if we didn't – because everything is systemic and needs to be approached systemically.

The reason we haven't been taught to think synthetically could well be because synthetic thinking is a lot harder than analytical thinking. Interactions are harder to deal with. Not only are they often invisible to the naked eye, they're also dynamic rather than static. They change all the time and affect each other differently every time they do so.

It's no wonder we find dealing with interactions – and consequently with entire systems – hard: how on earth can one get one's mind around a plethora of interactions that are changing all the time?

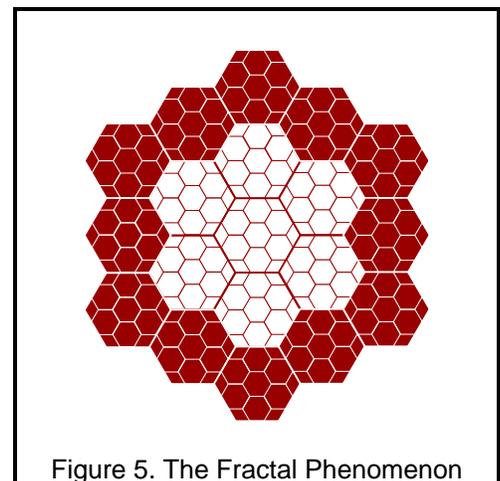
The Fractal Phenomenon: the repeating patterns concept

The key to synthetic thinking – and consequently to systemic thinking – is the Fractal Phenomenon¹: **systems are made up of repeating patterns.**

The Fractal Phenomenon is both a commonsensical and a counter-intuitive concept.

It's commonsensical because it's easy to think of examples of common patterns (like rules of thumb, mental paradigms and the benefits of experience).

It's counter-intuitive, because, until you've found the pattern in a particular situation, it doesn't seem as if there could possibly be one.



¹ My term, originating from and/or supported by TOC's 3-Cloud, TRIZ's limited solution set, ST's archetypes and Chaos Theory.

Notice how the pattern in Figure 5 is part of a larger version of itself – and made up of smaller versions of itself. That's the essence of the Fractal Phenomenon. It's like systemic DNA.

Thinking is about pattern management. We see patterns in things. We learn how to manage those patterns – which in itself is a pattern: a management paradigm.

A management paradigm is really a solution pattern for solving a pattern of problems in the situation we're managing. The problem is that, before long, the solution has solved all the problems it can solve and all that's left are the problems it can't solve, many of which the solution created itself.

It's difficult to change management paradigms – to think outside the box – because we live within our management paradigm. It is the box within which we think. Systemic thinking enables us to identify the pattern (draw the box) so that we can think outside of it.

Synthetical thinking

Synthetical thinking is deliberately finding repeating patterns (or common themes) across a system or situation.

Although analytical thinking enables us to find those repeating patterns and common themes too, it doesn't do so directly – or anywhere near as effectively – because analysis is more focused on identifying **differences** than **similarities**.

Because it's counter-intuitive that there should be a pattern, we seldom make a conscious effort to find one and so we discover patterns more by serendipity than design.

It seems likely that the brain uses common parts of its neural network to deal with the similarities it encounters while analysing things – and at some point it dawns on us that there is a pattern.

The implications of us being unaware, consciously, of patterns that we are aware of subconsciously – or at a neural network level – are interesting, to say the least.

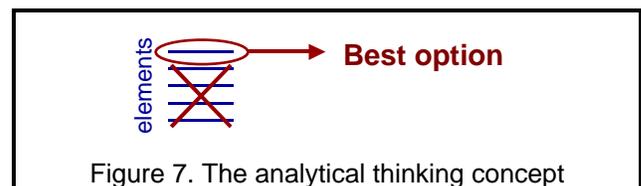
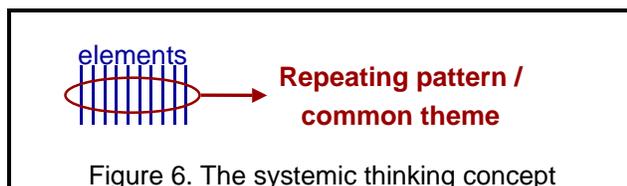
The important thing to realise is that we can train ourselves to think synthetically in a deliberate way. The primary barrier to overcome is the cognitive dissonance that arises from searching for something before you know what it looks like – especially when you aren't even certain it's there!

The systemic thinking concept

The basic idea in systemic thinking is to list as many different elements as you can think of, then look for similarities between them.

Conventional analytical thinking is different.

The basic idea in analytical thinking techniques is to list a handful of elements, compare them, rank them and then select the most valuable one, discarding the rest. This is all very well, unless the rest of the elements have specific value that the selected one doesn't.



Analytical thinking breaks things down into their component parts; synthetical thinking finds the patterns across those component parts.

Analysis is about identifying differences; synthesis is about finding similarities.

Synthesis needs analysis – how can you find the similarities across different things, if you haven't listed the different things first?

Analysis needs synthesis – understanding how things behave in isolation is pointless. We have to understand how they behave in concert in order to intervene intelligently.

Analysis, in the context of systemic thinking, is different from analysis outside of that context.

Outside of the systemic thinking context, the tendency is to list only a manageable handful of elements, in order to reduce the workload. (Remember that analysis breaks things down into their component parts, so you get more and more things to think about. This creates a tendency to list only a handful of elements). Within the systemic thinking context, it's desirable to list as many different elements as possible, in order to ensure the most representative pattern possible.

Systemic thinking combines analytical thinking and synthetical thinking.

The first step is analytical: list as many elements as you can think of.

The second step is synthetical: find the common theme / repeating pattern across those elements.

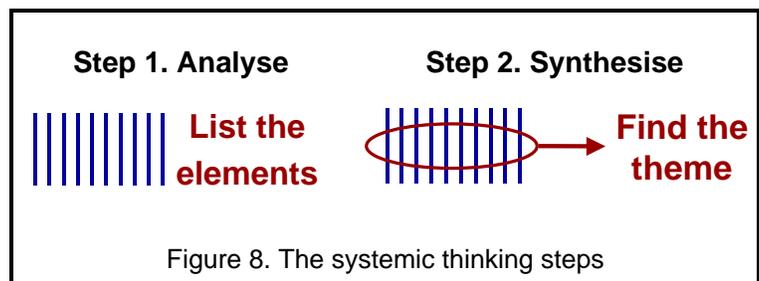


Figure 8. The systemic thinking steps

It would be foolish to assert that synthesising doesn't happen in conventional analytical thinking. Of course it does! It just happens unconsciously – almost unintentionally – while you're taking things apart and putting them together again.

It's a bit like Dr Edward de Bono's lateral thinking concept – people had lateral thoughts long before he discovered, named, defined and promoted the concept.

What Dr de Bono gave us was general awareness and understanding of lateral thinking – and a way of developing it as a thinking skill. This enabled everyone to consciously and deliberately generate lateral thoughts, ideas and solutions – virtually on demand.

The purpose of this paper is to do for systemic thinking what Dr de Bono did for lateral thinking: identify and define it to equip our society to think systemically and synthetically in a conscious and deliberate way instead of merely in an unconscious and accidental or casual way.

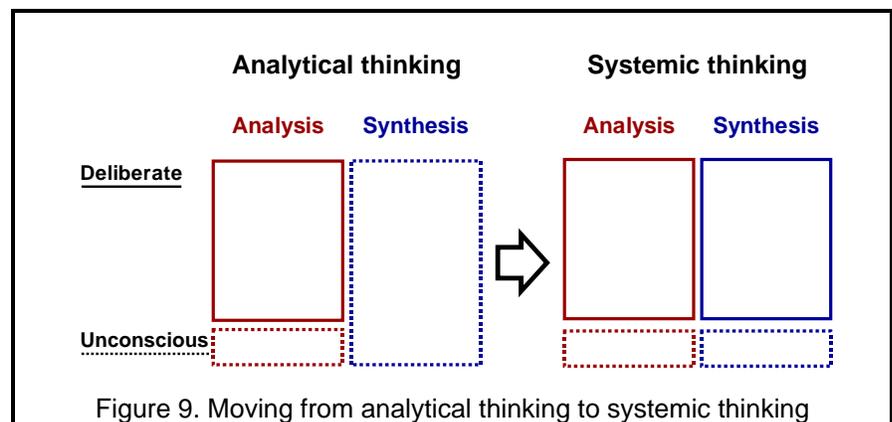


Figure 9. Moving from analytical thinking to systemic thinking

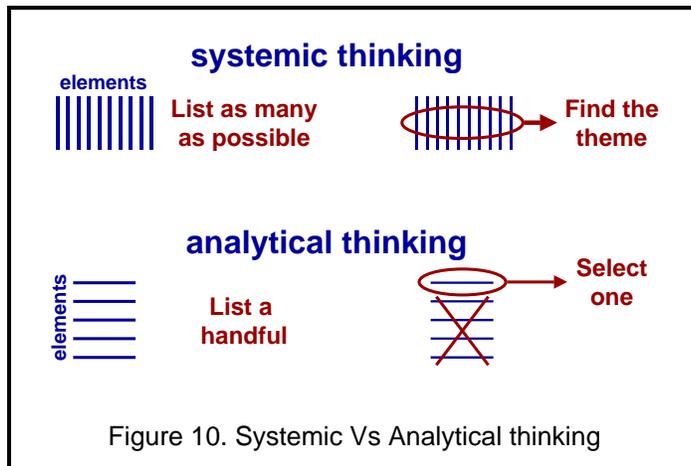
Another warning

The difference between analytical thinking and systemic thinking might appear clear with the above diagram in front of you, but experience has shown that the systemic thinking concept has what I call "a half-life of one sleep".

It's true! Test yourself on the systemic thinking concept tomorrow morning – you'll barely remember half of it. Test yourself the next day, without revising it, and you'll be lucky to recall a quarter of it!

The following comparison will help you to remember the distinction.

A comparison of systemic and analytical thinking



The key differences between the two thinking techniques are:

- Systemic thinking lists as many elements as possible (to ensure that the theme is as representative as possible), while analytical thinking lists only a handful of elements (to make the workload manageable).
- Systemic thinking finds and focuses on the theme across the elements, while analytical thinking selects and focuses on the most attractive or promising element.

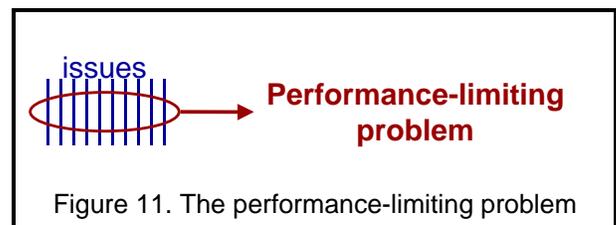
Key Systemic Patterns

There are many patterns in any situation. Here are two highly significant ones:

The performance-limiting problem²

This is the repeating pattern across all of the issues we face.

Unless we solve this problem, we can't improve the situation much – if at all.



Many creative thinkers regard problem solving to be at odds with creativity. While it's true that analytical problem solving inhibits true creativity, systemic problem solving is different. It doesn't define the problem narrowly, but systemically.

In other words, it helps one define one's frame of reference (the box, mindset or management paradigm) clearly, thereby creating a freedom that ignoring that frame of reference can never create.

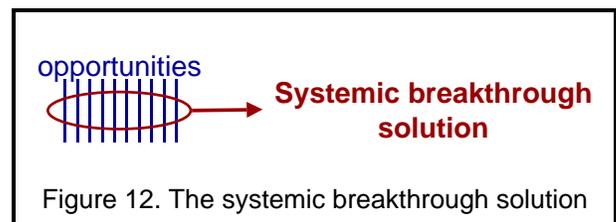
Unless you're able to draw the box, you can have no certainty that you are thinking outside of it. In fact, it's unlikely that you **can** think outside of it.

Once you've drawn the box, you can escape it and this is where the second critical pattern becomes invaluable.

The systemic breakthrough solution

This is the repeating pattern across all of the solutions to the performance-limiting problem.

It solves the performance-limiting problem and improves end-to-end performance dramatically.



The systemic breakthrough solution is very different from the symptomatic ("band aid" or "fire-fighting") solutions that are typical of the non-systemic approach.

Systemic solutions address the broader system in a profound, self-perpetuating and reinforcing

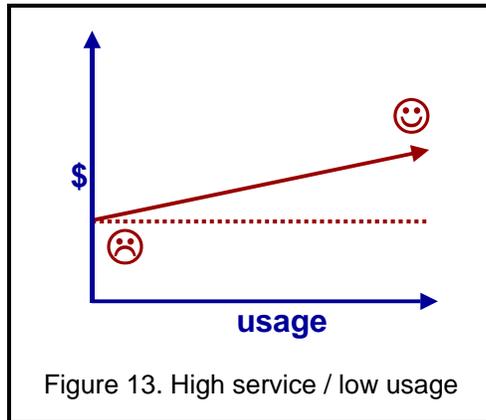
²This concept has its origin in The Theory of Constraints.

way.

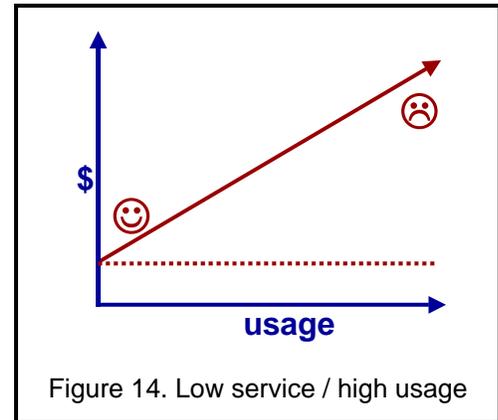
Case study 1³

A public utility had just been privatised and was attracting highly critical media attention because of the pricing policies it was forced to take to retain revenues in the face of changed legislation.

The repeating pattern (performance-limiting problem) across the issues it faced, was found to be the difficulty in treating – and being seen to treat – different customer groups fairly.



For example, low-usage customers weren't happy to be subsidising high-usage customers by paying a **high service charge**, while high-usage customers weren't happy to be subsidising low-usage customers by paying a **high usage rate**.

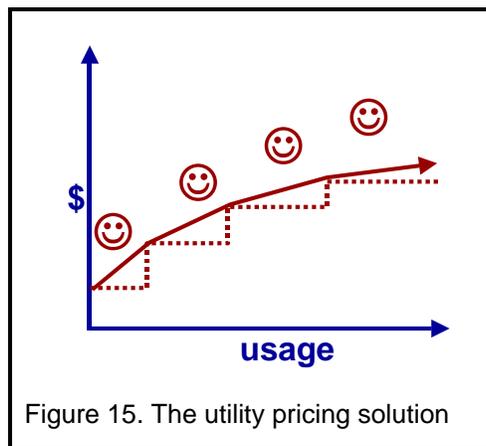


The theme across the potential solutions was to treat (charge) each of the parties involved differently – based on their usage – and automatically change their “deal” to the most favourable one for them if those needs changed.

This allows the utility to divide its customers into usage categories and charge

- lower-usage customers a lower-fixed charge with a higher usage rate and
- higher-usage customers a higher fixed charge with a lower usage rate

Customers are automatically billed according to the usage category they fall into for that



billing period.

The bill reflects what they would have paid if they'd been charged the formula applying to the usage category on either side of theirs.

This is to prove that they're getting the fairest deal possible – and ensures the perception of fairness.

Implications of the systemic problem and systemic solution patterns

Even if they were the only patterns in a challenging situation (they aren't, of course!) the implications would be staggering.

The fact that there is a single performance-limiting problem and a single breakthrough solution to it – and having a simple process for finding them deliberately and predictably – is highly significant.

It's significant, because it guarantees dramatic improvement in system performance by providing systemic focus.

³This case study focuses on only one facet of the business – the solution concept applies to many other parts of it.

Systemic Focus

First, having a systemic focus point enables one to focus on the element of the situation that will improve the entire situation the most rather than on the element of the situation that can be improved the most.

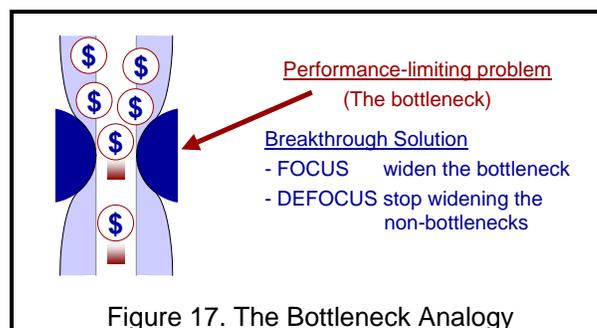
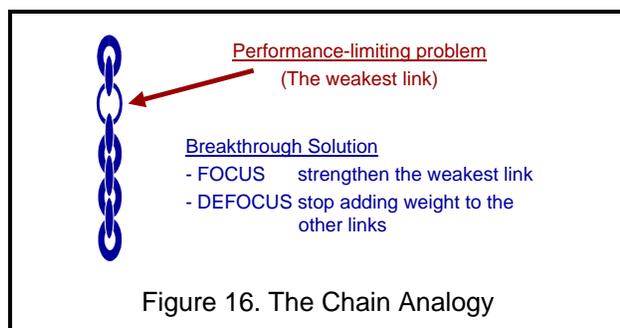
Did you get that? We don't want to focus on the **place** that we can improve the most, but on the place that will improve the **entire situation** the most.

Second, focus may be everything, but focus **on** everything is focus on nothing. Defocus is essential to focus.

In business terms, systemic focus and defocus secures dramatic performance improvement on the bottom-line. Focus secures a significant increase in revenue, while defocus secures a significant reduction in cost.

Returns, both on investment and on capital employed, are impacted dramatically as a consequence of systemic focus/defocus.

Here are some analogies to illustrate the focus/defocus concept:



The tendency, with a non-systemic approach, is to strengthen the links of the chain that we can strengthen the most – or widen the part of the channel that we can widen the most.

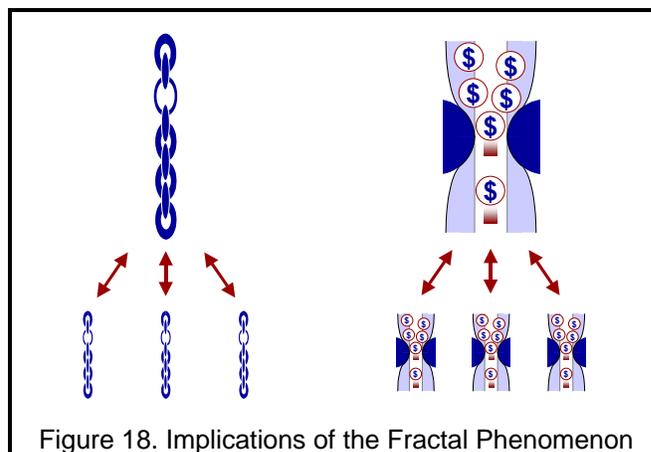
The parts that can be improved the most – or most easily – will never include the weakest link or bottleneck. Weak links and bottlenecks exist because they were hard to find or fix in the first place.

Implications of the Fractal Phenomenon on systemic focus and defocus

The equivalent of the weakest link in the chain or the bottleneck, is more than just a department or person.

It is a systemic issue and so everyone within the situation faces a version of it⁴.

If, for example, the weakest link in the chain is communication of benefits, this weakness will not be restricted to marketing or sales, it will be evident throughout the organisation – and even extend beyond it. Even customers will be unable to express those benefits.



⁴ In the first case study, for example, the issue of being fair and being seen to be fair – and the solution concept of treating each interest group as their needs dictate – is applicable across just about every area of the business.

Systemic focus resolves the dilemma between focusing on the detail and focusing on the big picture, by enabling one to focus very precisely on the same thing everywhere.

Case study 2

A developer of customised software dominates the New Zealand market in its field, but was battling to secure the same results internationally.

Systemic thinking discovered that the company was being held back by its focus on development speed. This was understandable given the huge demand of the international market.

Although development speed is important, the real performance-limiting problem was establishing the client's real need, in terms of functionality.

No two clients use this company's software in exactly the same way – and clients can't possibly specify their requirements without knowing what the software is capable of.

The common theme across the solutions offered was to involve the customer in the continuous customising of the software before too much time was spent refining things that would later be discarded.

The systemic breakthrough solution was a simple prototyping technique which we call Explore. Explore takes three times as long as previous "needs analysis" techniques took, but decimates development times and, more importantly, enables the "explorer" to establish the real customer need very accurately – before charging off to "deliver".

Explore has been trialled in a number of areas of the business (it has yet to be implemented company-wide), with staggeringly good results, for example:

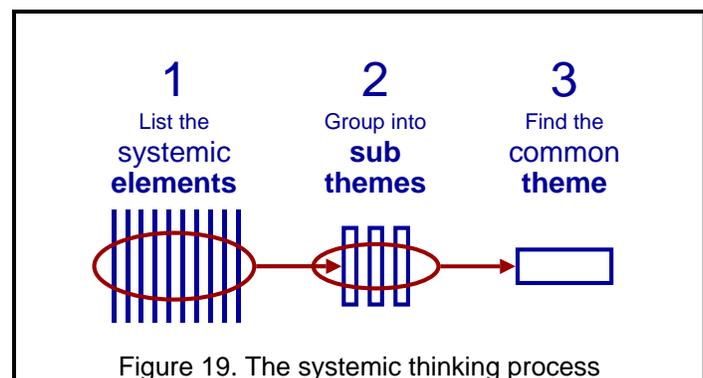
- A key client in a strategic market changed threats to referrals within a week.
- A product-marketing manager was able to reduce a 3-month backlog to manageable proportions within 24 hours – and reverse her personal credibility within the company dramatically in the process.
- The product development cycle on a key product was reduced from six months to one month.

THE SYSTEMIC THINKING PROCESS

The systemic thinking process is straightforward:

1. List as many elements as possible.
2. Group the elements into sub-themes.
3. Find the central theme – the common theme across the sub-themes.

In a sense, systemic thinking is the reverse of analytical thinking. Analytical thinking breaks things apart in stages – systemic thinking groups things together in stages.



This grouping of things together in stages is the first trick for dealing with the greatest barrier to systemic thinking – the cognitive dissonance from the conditioned belief that there is no pattern.

A second trick is to realise that the message from your brain saying "there is no theme and it's pointless looking for one!" is really nothing more than an indication that your brain hasn't found the theme yet.

A third is to develop a library of systemic solutions – they all follow a similar pattern, so once you've seen or developed a few, things get much easier.

Finally, it's worth noting that progress is better than perfection with systemic thinking. The benefit of the feedback generated when you trial a solution – conceptually or for real – is inestimable!

Case study 3

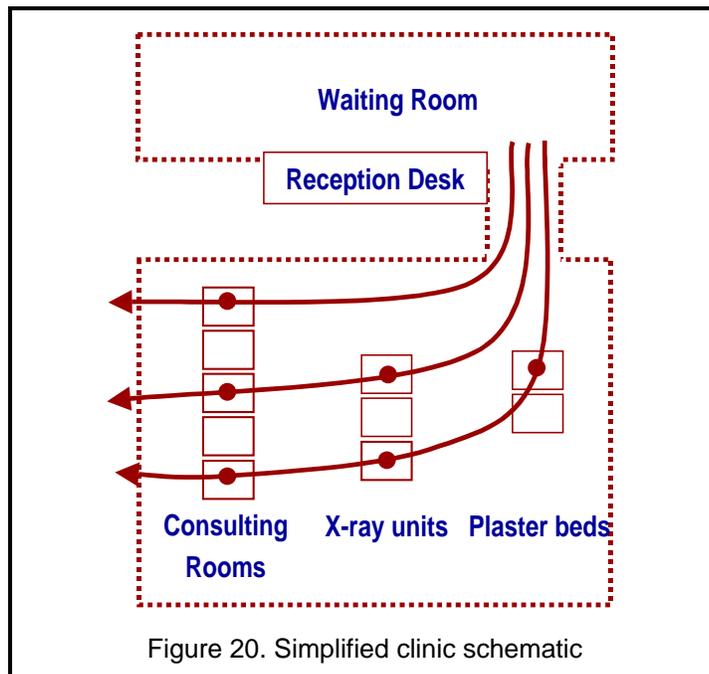


Figure 20. Simplified clinic schematic

An orthopaedic follow-up clinic was suffering from a 12 year, 14-failed-attempts “capacity problem”.

Orthopaedic consultants, nurses, radiographers (that do x-raying) and patients all complained of excessive wait-times.

This repeating theme – wait-times – led us to realise that everyone was waiting for everyone else. Downstream units were waiting for upstream units to “process” patients. Patients were waiting for other patients to be processed⁵.

The performance-limiting problem wasn't processing speed, as everyone had assumed, but scheduling – because it's difficult to predict exactly how long a process is going to take⁶.

The solution had to reduce waiting – not improve processing speed.

The primary themes across the solutions offered were:

- Schedule appointments more rigidly – to stop queue jumping and reduce patient waiting.
- Schedule appointments more flexibly and get patients to arrive early – to reduce the wasting of unit time, especially consultants' time.

The systemic breakthrough solution we developed was simple:

- schedule clinic appointments – not unit appointments.
- process patients at each unit in clinic appointment time order – not unit arrival time order – unless a downstream queue is being starved.

In practical terms this involved

- colour coding patient folders – by orthopaedic consultant
- marking clinic appointment time on the patient folder on arrival
- ensuring that patient folders join queues ahead of everyone with a later appointment time
- advancing folders of a particular colour if a downstream queue is running short.

The result? Average patient visit duration is reduced from nearly three hours to less than one hour and total capacity has improved by more than 20%⁷ – on the cost of a colour-coded sticker to write the appointment time on!

As one would expect, given the Fractal Phenomenon, versions of the performance-limiting problem and the systemic breakthrough concept are applicable elsewhere in orthopaedic healthcare and healthcare in general, including operating theatre capacity and the national waiting list problem.

⁵ For example, if a patient has a long session at plaster, the queue at x-ray has had a long time to grow – and the patient gets a double penalty. Worse, the long wait at x-ray means that the queue at the consultant has had time to grow too: triple penalty!

⁶ Total processing time in a 3-process scenario amounted to only 45 minutes; the rest of the 3-5 hours was spent waiting!

⁷ The average amount of consultant time no longer being wasted by waiting for patients held up at other units.

APPLICATION

Systemic thinking can be applied just about anywhere. In any situation in which there are one or more “less than ideal” options, systemic thinking can be used to gain systemic focus.

It can be applied by global trouble-shooters and young children⁸.

Systems can always be optimised. They are always made up of repeating patterns. They always have performance-limiting problems. They always have systemic breakthrough solutions.

Here are some illustrations of the uses of systemic thinking:

1. Systemic modelling

Systemic modelling is using systemic thinking to model complex situations.

The idea is to model many interactions of a particular type and find the repeating pattern or common theme across those.

For example, Probsolv Comprehensive – the most powerful version of Probsolv’s systemic modelling technique – has models for the three primary systemic

interaction types: conflict, feedback loops and flow constraints.

Any model can be used: Covey’s 4-quadrants; Porter’s 4-P’s; Senge’s systems archetypes; de Bono’s PMI or Six Hats; cause-effect diagrams; whatever models you normally use. (The 3-component model in Figure 21 is merely illustrative of the concept and has no deeper meaning.)

Please see the Systemic Modelling paper for more detail on this application of systemic thinking.

2. Systemic problem solving

This is a simpler version of the systemic modelling concept mentioned above.

It’s derived from the repeating pattern across the many interaction types in complex situations.

It is ideally suited for quick and easy problem solving, where the effort of modelling the entire situation isn’t warranted.

4. Systemic decision-making

This application is so simple it runs the risk of being simplistic, but it is very effective, because the options are really solution options – and carry a sense of the

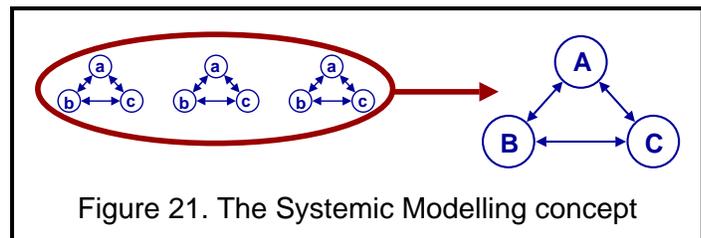


Figure 21. The Systemic Modelling concept

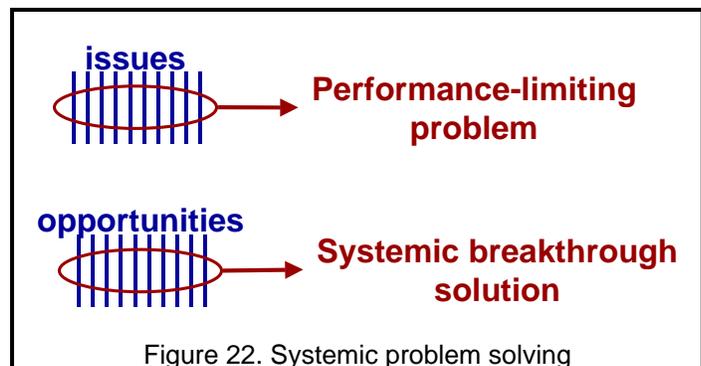
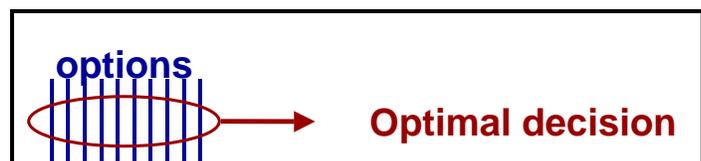


Figure 22. Systemic problem solving



⁸ A simple process for teaching young children to think systemically is to ask for a possible solution; ask for alternatives; select two solutions and then ask “What’s the same about solution A and solution B?”

problem they're trying to solve within them.

Needs and wants

Whether we're dealing with a business or personal relationship, the ability to quickly identify the hidden needs that underlie the visible and expressed wants is invaluable in helping people in a meaningful way.

It's easy to secure other people's participation in determining what their underlying need is – and satisfying to be able to take the expressed wants (perceived needs) seriously in the process!

5. Report/proposal writing

Next time you have a formal document to write, whether it is a business plan, business case or quarterly report, apply the systemic concept to your material.

You'll be amazed to see what clarity emerges – and how insightful the document ends up being as a result.

Just list all the pieces of data you can think of including under each section and look for themes across them.

You can then use the central theme as the main point of the section, the sub-themes as subsections, and the elements you listed to illustrate the point.

Figure 23. Systemic decision-making

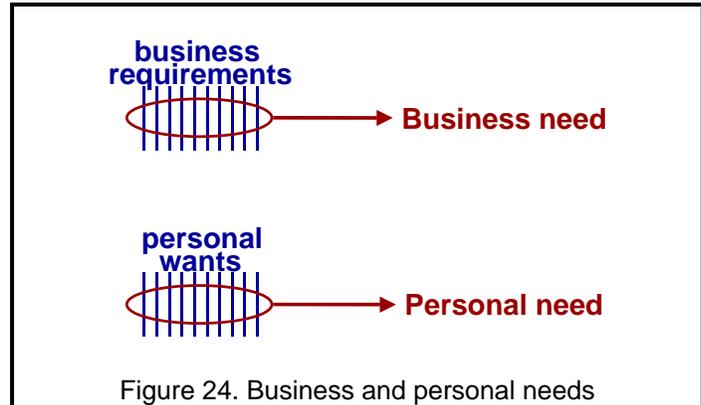


Figure 24. Business and personal needs

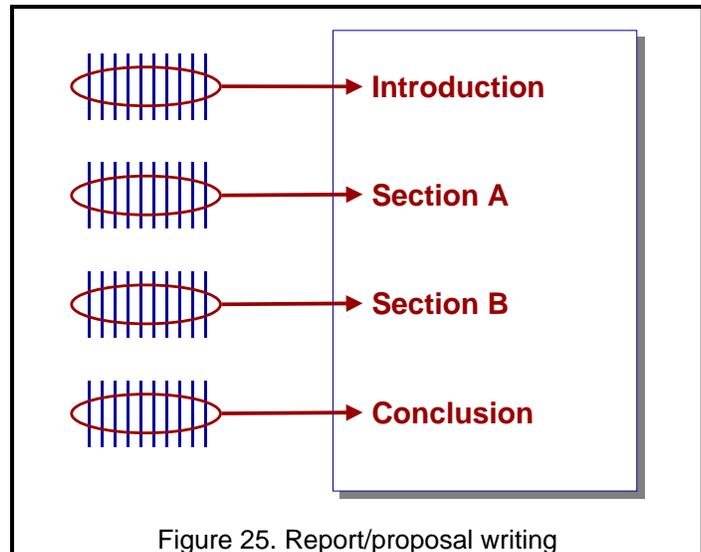
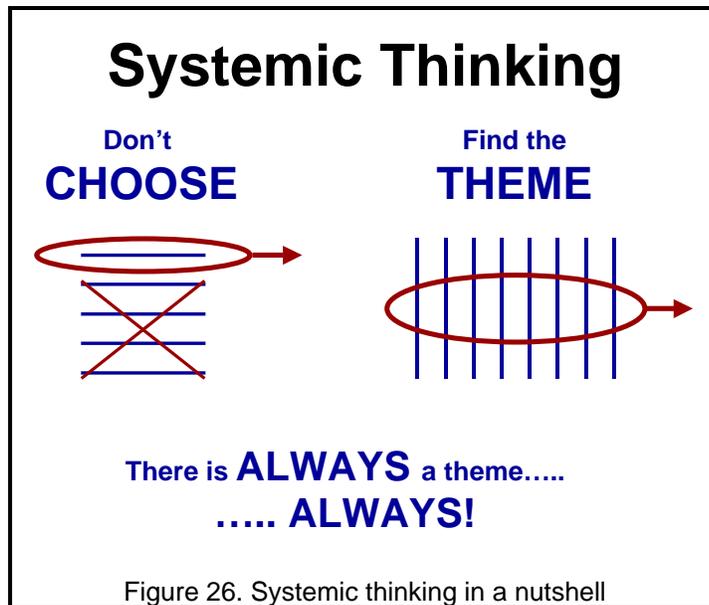


Figure 25. Report/proposal writing

SUMMARY AND CONCLUSION



Systemic thinking enables us to deal with the elements of a situation in concert rather than in isolation.

Its power lies in its simplicity and effectiveness. It offers the potential to find systemic focus in any situation. It enables us to secure the dramatic benefits promised by the systems thinking revolution.

The beauty of it is that anyone can use it to gain deeper insight about anything.

The primary barrier to overcome is the cognitive dissonance that arises from searching for something before you know what it looks like – especially when you aren't even certain it's there.

GIVE IT A TRY – WHY DON'T YOU?

THE RESULTS WILL AMAZE YOU!

Please contact the author, Gary Bartlett of Probsolv, for more information or help with finding themes at gb@probsolv.com, or join the Systemic Thinking discussion group at <http://yahogroups.com/group/systemicthinking>.

This document was created with Win2PDF available at <http://www.win2pdf.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.
This page will not be added after purchasing Win2PDF.