The art of solving problems

Structured approaches to finding solutions

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Introduction

Problem solving in one form or another is at the heart of what most people in business actually do.

Improving our ability to solve problems for people will help our reputation and we then become the “go to” person.

Enhancing our reputation usually brings better business.

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Attacking a problem

- Information gathering
- Reverse engineering
  - Structure
  - Interactions
- Constraints
- Explanation
- Resolution – success!

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Structure your thinking

- Your brain is your primary tool - keep it in good shape
- Work with other people
- Have a process that you can follow
- Record your decisions, especially ideas you rejected
- Most decisions require good judgement
- Usually you have to make assumptions to get started

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Problem solving concepts - TRIZ

	Before	Now	After
Environment			
System			
Component			

See www.triz.co.uk (and several others) for a lot more information!

“теория решения изобретательских задач”
Teoriya Resheniya Izobretatelskikh Zadach”
“Theory of inventive problem solving”

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The design process

- Understand the requirements and scenarios
- Start with the “ideal design”
- Understand any constraints you have to deal with
- Think ahead to minimise work later
- Build the whole system “on paper”
- Have a well-structured overall architecture
- Understand the details, complexities and interactions
- Plot a way (or several ways) through the maze
- Remain flexible and adapt to change

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Systems engineering - Design

- All design decisions are compromises and require you to exercise judgement
  - Big decisions which have long-term implications and constraints
  - Small decisions which seem big at the time
  - There will be requirements and constraints you don't yet understand or know about

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Trouble-shooting

- Don’t over-prepare
- Don’t look to confirm your initial assumptions
- Have someone else to work with
- Understand what the system was trying to achieve
- Work out how you’d design and implement it
- Scan the whole field in front of you
- Look for areas where there’s a mismatch
- Where’s there’s a good match, move on
- Where there isn’t, probe further
- Refine your understanding until it’s a good match

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Summary

- Understand the whole thing, not just pieces of it
- Understand the context
- Understand what's possible - discard the impossible
- Don't jump to conclusions
- Have good evidence for your opinions
- You may well be very wrong, so never work alone
- Remember "Occam's Razor"
- Be practical
- Explain the problem and possible solutions clearly
- Communicate effectively along the way

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Key points

- Build your knowledge base
- Increase your depth of understanding
- Gain insights into your fields of expertise
- Improve how you communicate your ideas

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Simplicity, practicality and innovation

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