

Decision Making and Problem Solving

Session 2 Problem Solving
using the
Logical Approach

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From Last week

- Have a read of handout 1 on website <http://www.samuellearning.org>
- Think whether ‘you are logical or magical problem solver?’
- If you were the CEO of your organization, how would you ensure the organisation remained competitive?

The Business Environment

- The environment in which organizations operate today is becoming more and more complex, creating:
 - opportunities, and
 - problems
 - Example: globalization
- Business environment factors:
 - markets, consumer demands, technology, and societal...

Business Environment Factors

<u>FACTOR</u>	<u>DESCRIPTION</u>
Markets	Strong competition Expanding global markets Blooming electronic markets on the Internet Innovative marketing methods Opportunities for outsourcing with IT support Need for real-time, on-demand transactions
Consumer demand	Desire for customization Desire for quality, diversity of products, and speed of delivery Customers getting powerful and less loyal
Technology	More innovations, new products, and new services Increasing obsolescence rate Increasing information overload Social networking, Web 2.0 and beyond
Societal	Growing government regulations and deregulation Workforce more diversified, older, and composed of more women Prime concerns of homeland security and terrorist attacks Increasing social responsibility of companies Greater emphasis on sustainability

Organizational Responses

- Be Reactive, Anticipative, Adaptive, and Proactive
- Managers may take actions, such as
 - Employ strategic planning
 - Use new and innovative business models
 - Restructure business processes
 - Participate in business alliances
 - Improve corporate information systems
 - Improve partnership relationships
 - Encourage innovation and creativity ...cont...>

Managers actions, continued

- Improve customer service and relationships
- Move to electronic commerce (e-commerce)
- Move to make-to-order production and on-demand manufacturing and services
- Use new IT to improve communication, data access (discovery of information), and collaboration
- Respond quickly to competitors' actions (e.g., in pricing, promotions, new products and services)
- Automate many tasks of white-collar employees
- Automate certain decision processes
- Improve decision making by employing analytics

How are Decisions Made?

- Rationality
- Bounded rationality
- Intuition



Rationality

- Problem is clear and unambiguous
- Single, well defined goal is achieved
- All alternatives and consequences are known
- Preferences are clear
- Preferences are constant and stable
- No cost or time constraints exist
- Final choice will maximise payoff

Bounded Rationality

- Decision-making behaviour that is rational BUT is limited by the ability to process information
- Cannot analyse all possible information
- Result is 'satisficing' – accepting solutions that are 'good enough'
- Need to bear in mind 'escalation of commitment' – increased support for a previous decision despite evidence it is wrong

Degree of Structuredness (Simon, 1977)

- Decision are classified as
 - Highly structured (a.k.a. programmed)
 - Semi-structured
 - Highly unstructured (i.e., non-programmed)

Structured Problems and Programmed Decisions

Structured problems are straightforward, familiar and easily defined. They are solved by:

- Procedures
- Rules
- Policies
- A repetitive decision that will be used again in the future

Unstructured Problems and Non-programmed Decisions

Unstructured problems are new and unusual, with ambiguous or incomplete information. They are solved by:

- A unique decision
- Custom-made solution
- A solution that may never be required again in future

Types of Control (Anthony, 1965)

- Strategic planning (top-level, long-range)
- Management control (tactical planning)
- Operational control

A Decision Support Framework

(by Gory and Scott-Morten, 1971)

		Type of Control		
Type of Decision	Operational Control	Managerial Control	Strategic Planning	
Structured	Accounts receivable 1 Accounts payable Order entry	Budget analysis 2 Short-term forecasting Personnel reports Make-or-buy	Financial management 3 Investment portfolio Warehouse location Distribution systems	
Semistructured	Production scheduling 4 Inventory control	Credit evaluation 5 Budget preparation Plant layout Project scheduling Reward system design Inventory categorization	Building a new plant 6 Mergers & acquisitions New product planning Compensation planning Quality assurance HR policies Inventory planning	
Unstructured	Buying software 7 Approving loans Operating a help desk Selecting a cover for a magazine	Negotiating 8 Recruiting an executive Buying hardware Lobbying	R & D planning 9 New tech. development Social responsibility planning	

Logical Decision Making

Simon (1977) purported that decision making should:

1. identify all the possible alternatives;
2. determine all the possible consequences of these alternatives;
3. evaluate all the possible consequences.

- Problem solving involves processing information.
- Conceptualising problem solving in this way, Newell and Simon (1972) argued that it is a three-stage process:
 1. Recognising the task environment
 2. Transformation into the person's problem space
 3. Processing the data and moving towards the goal

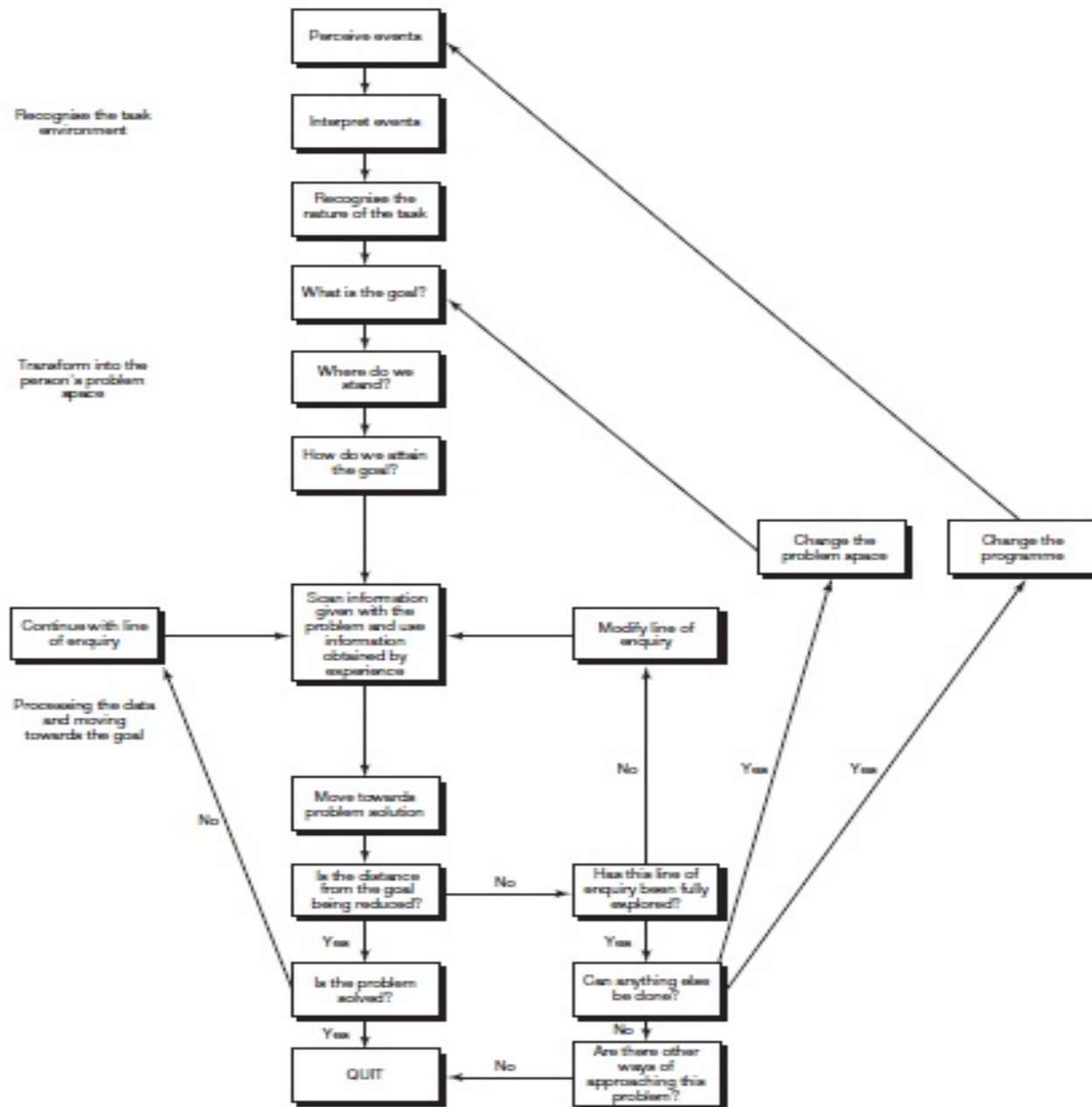
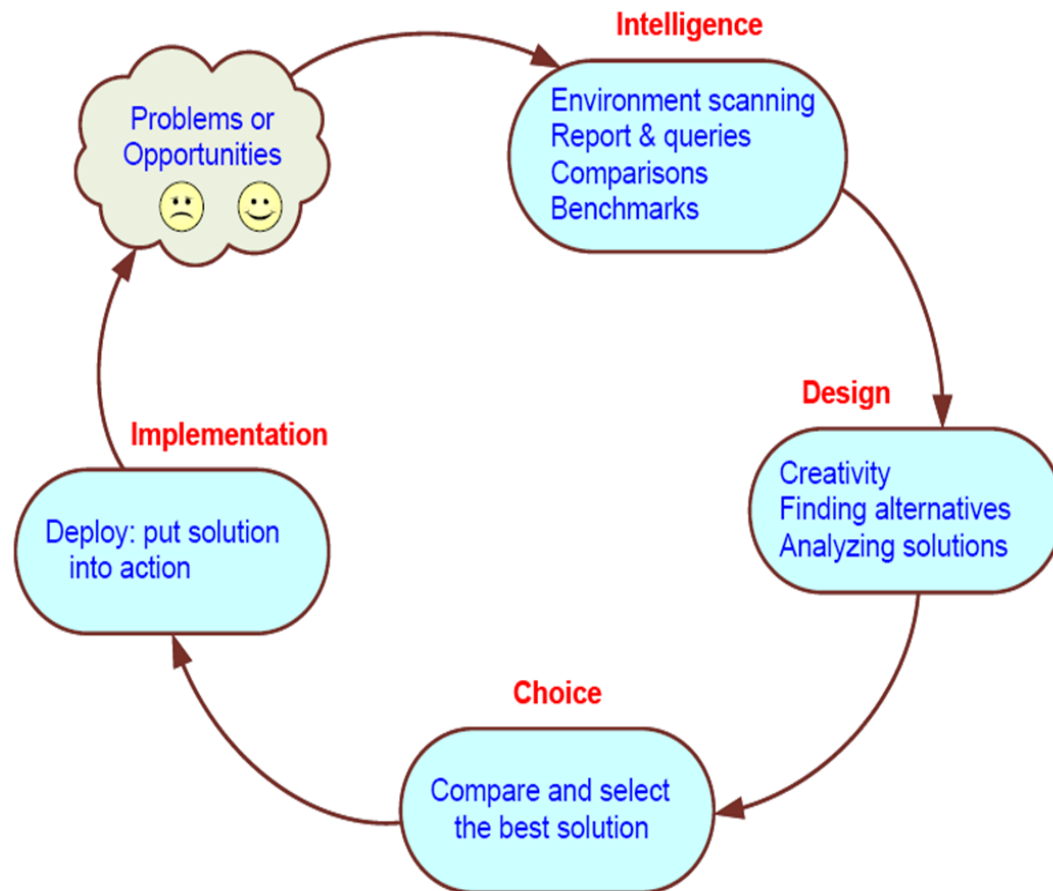


Figure 2.1 Problem solving according to Newell and Simon (1972)

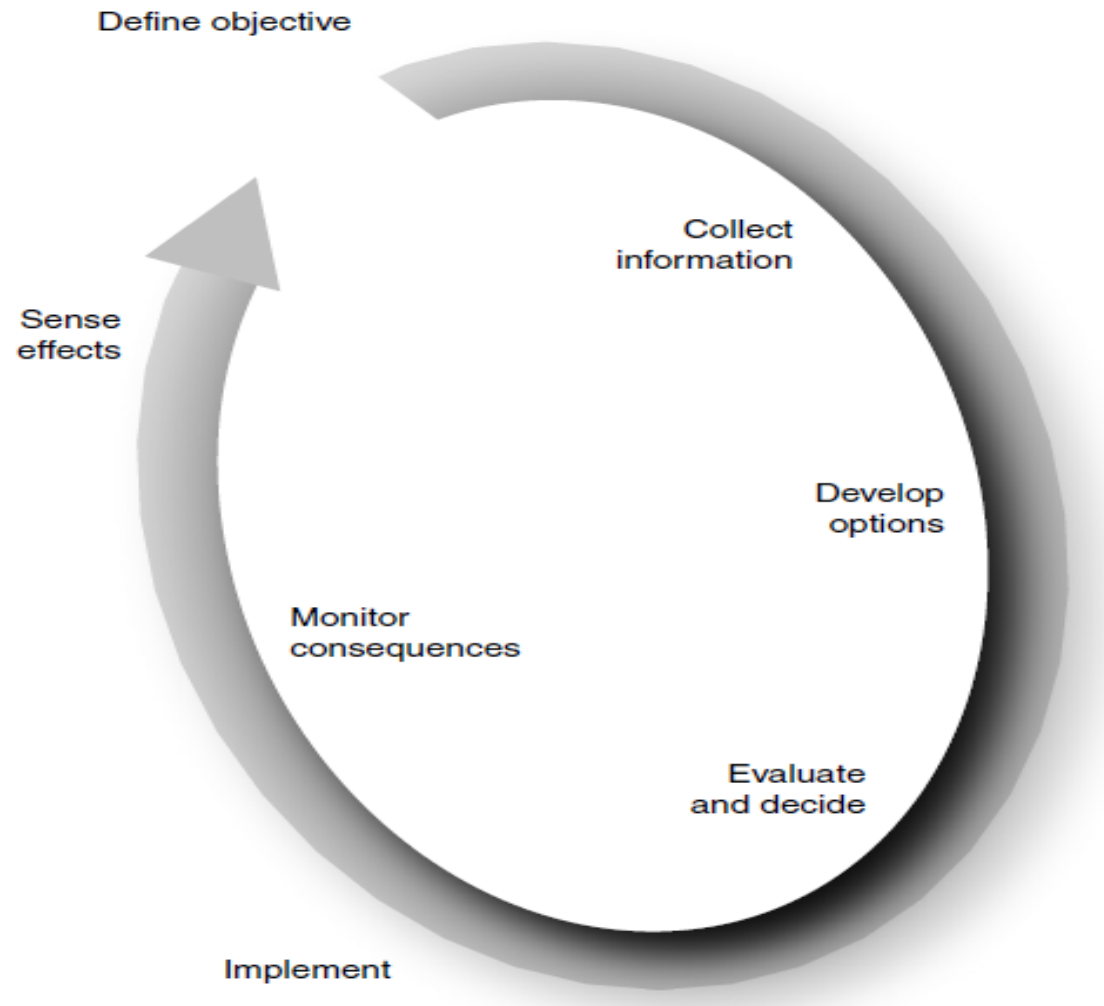
Decision Making Process



Four phases (Simon, 1977):

- intelligence
- design
- choice
- implementation

Adair (1997) *The classic approach to decision making*



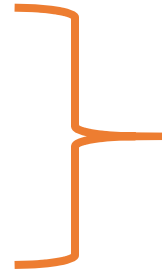
Logical Approach

- Step - by step
 - Systematic
 - Ensures each stage fully covered
 - Disaster plans
 - Expert systems
-
- Use with intelligence and care

ASK SIR L

Simon's Model

- A appreciate
- S specify
- K causes



Intelligence stage

- S solutions
 - Generate
 - Select



Design stage



Choice stage

- I implement
- R review
- L learn



Implement stage

A appreciate

- A problem exists
 - Early identification
 - Minimise consequences
 - Time to prepare / react
-
- Scan the environment - Market Analysis
 - SWOT analysis

A appreciate

- Problem may not be
 'something going wrong'
- But 'how to achieve a desired result'
- Approach is the same!

S specify

- Exactly what is the problem
- **Problem** is the difference between what people desire (or expect) and what is actually occurring
 - Symptom versus Problem
- Scale and consequences
- Is it really a problem?
- Is it 'your' problem?
- Is it soluble?

S specify

- What is / is not going wrong
- Who is affected? who isn't?
- what happens?
- Where? How? When?
- Why? Leads to next stage

S specify

- Problem Classification
 - Classification of problems according to the degree of structuredness
- Problem Decomposition
 - Often solving the simpler sub-problems may help in solving a complex problem
 - Information/data can improve the structuredness of a problem situation
- Problem Ownership

K causes

- Of these events
- Causes, not effects
- Are you sure?
- Weight for probability
- Consequences of being wrong?

K causes

- Brainstorm?
- Potential:
 - all, not just 'obvious' ones
 - how do you know?
- Possible
- Actual

S solutions

- To achieve the desired result
- Often, to return to the desired state
- Tackle the causes

- Generate
- Select

Generate

- Solutions that tackle causes
- Or effects
- Solve whole problem
- Or particular aspects
- Combination of ideas

- Lessen likelihood
- and / or consequences

Brainstorming

- Group generate ideas
- Broad / wide-ranging
- Include 'daft' ideas
- And impractical ones
- Non-critical
- Spin off each other

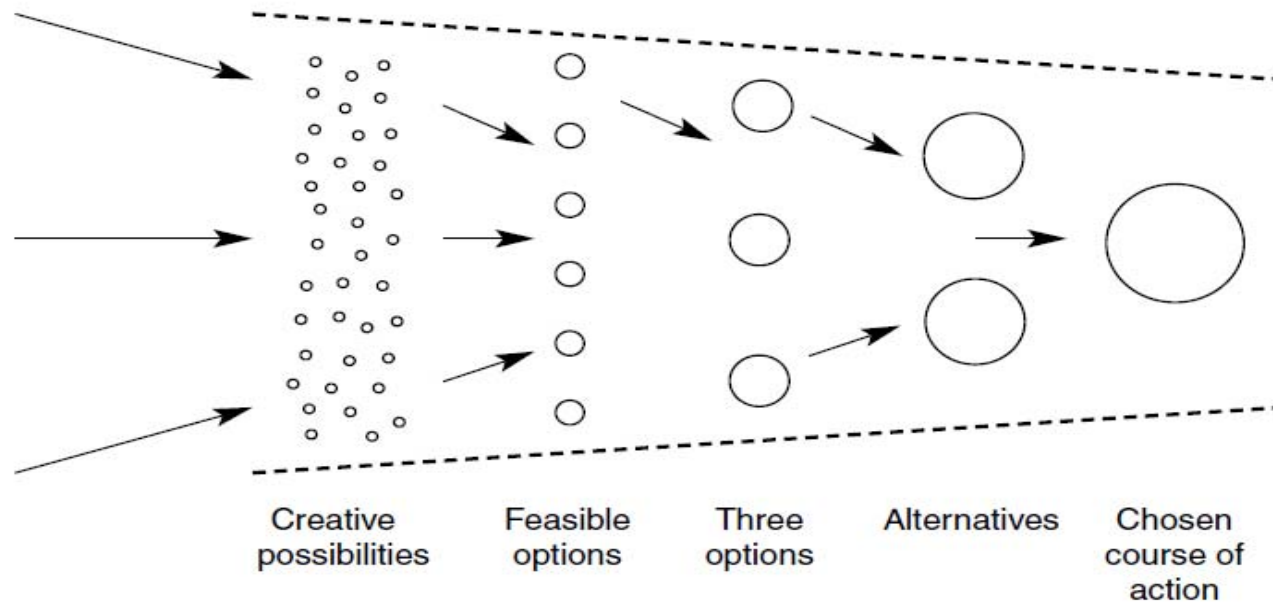
Brainstorm Exercise

- In groups of 4ish
- For 10 minutes
- Discuss 'how to achieve work-life balance'
- Present findings in 2 minutes

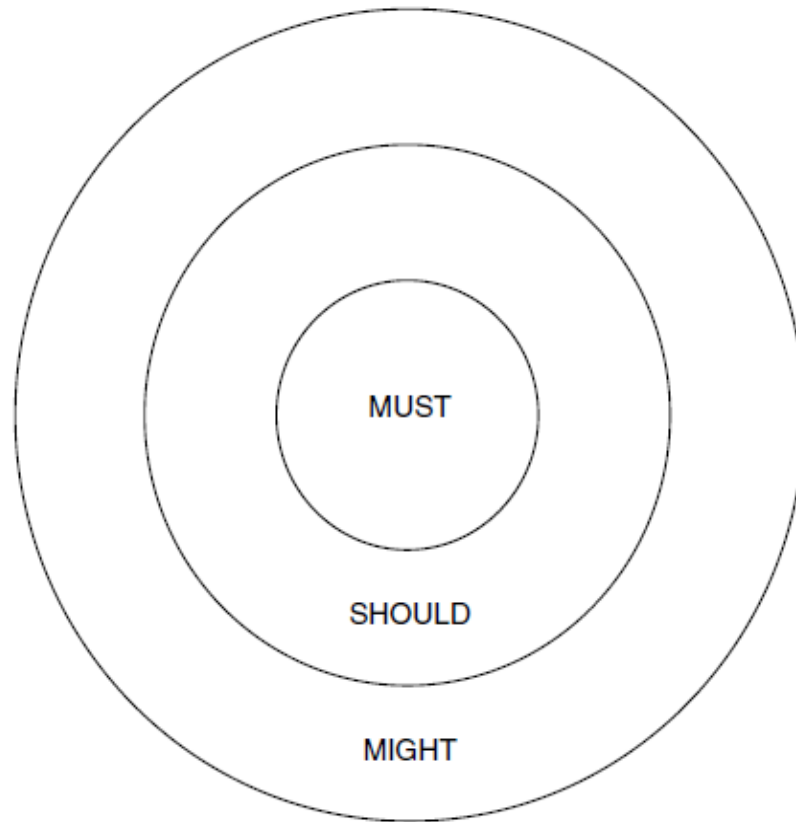
Select

- Relative merits
 - Weighted for importance
 - Will it work?
 - Test, trial, model, simulation
 - Tackle 'down side'
 - Avoid over-reaction / over kill
 - Beware hidden agendas / vested interests
- 3 key Factors:
 - 1 Suitability
 - 2 Acceptability
 - 3 Feasibility

Adair (1997) Lobster Pot Model



Adair (1997) Decision Making Criteria



I implement

- The chosen solution
- Often the hardest part
- Particularly if 'nasty'
- Plan

Project Management

- Individual in charge
- Consultants?
- Resource constraints
- E.g. time and £
- Required actions
- Specific responsibilities

Change Management

- ‘Softly, softly’
- Time to understand, accept and adjust
- Dry runs; pilot schemes

- Or ‘Big bang?’
- Over in 1 go; concentrated effort
- Less confusion

R review

- Check the solution is working
- Overall and elements
- Outcomes / objectives achieved?
- Cause and effect
- Immediacy of outcomes
- Reasons for failure
- Need to 'start again'?!

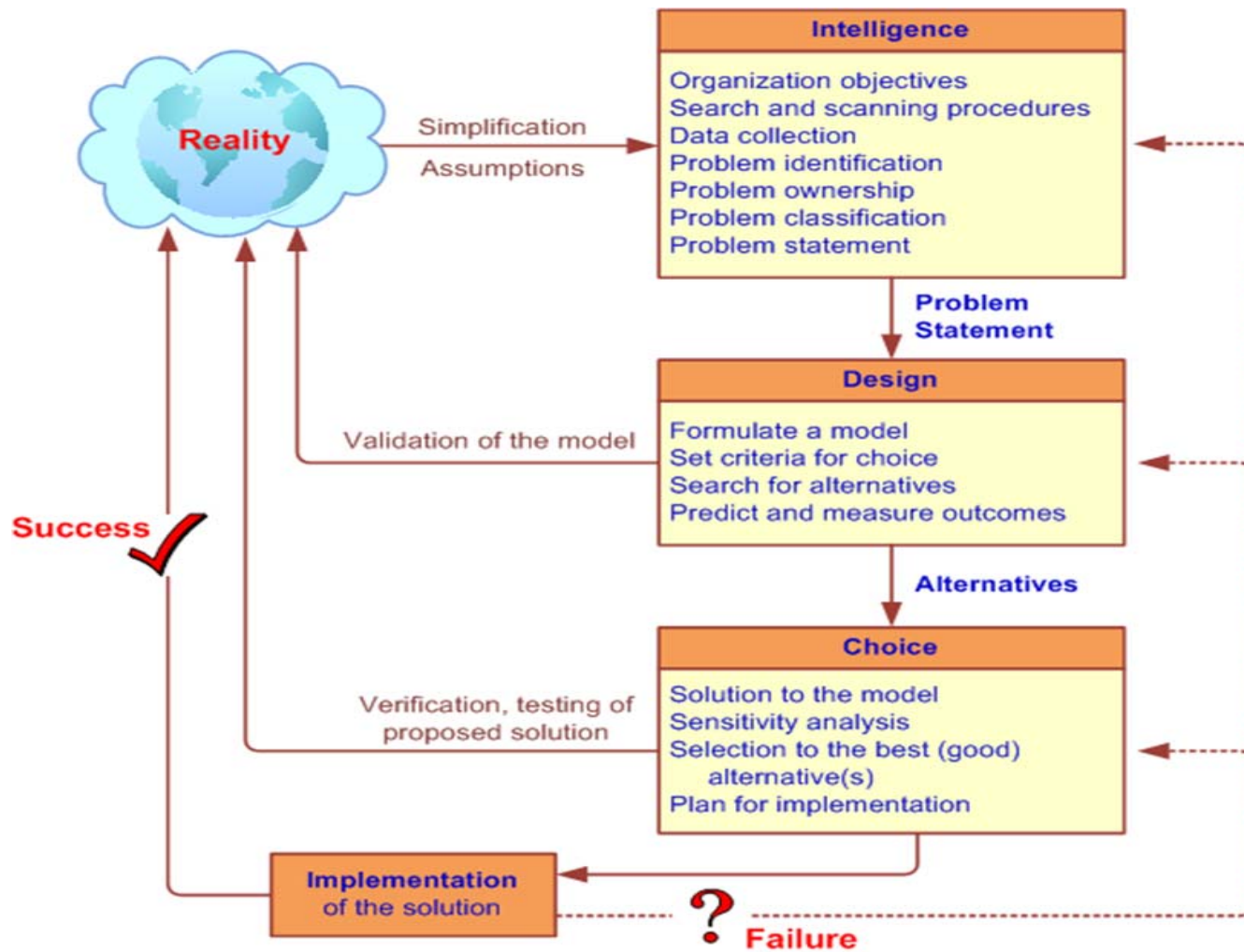
L learn

- From the experience
- Avoid repeating mistakes
- Encourage repeated success
- Improve problem solving
- Overall and elements
- Correct approach? e.g. ASK SIR L
- Done correctly?

L learn

- Spread the word
- 'Learning organisations'
- Report, inform
- Instruct, train
- Processes and procedures
- Practice
- Test

Simon's Decision-Making Process Turban et al (2011)



References

- Simon, H.A., (1977) The New Science of Management Decision (3rd revised edition; first edition 1960) Prentice-Hall, Englewood Cliffs, NJ
- Gorty, GA and Scott Morton, M.S. (1971) A Framework for Management Information Systems, Sloan Management Review, Vol. 13, no. 1, pp. 55-70,.
- Newell A. and Simon, (1972), Human Problem Solving, Prentice Hall, Englewood Cliffs, NJ.
- Anthony, RN (1965) Planning and Control Systems: A Framework for Analysis, 1st ed, Division of Research, Harvard Business School
- Adair, J. (1997) Decision Making & Problem Solving Strategies, 2nd ed, Kogan Page Limited. Reprinted in 2007