



THE AUSTRALIAN NATIONAL UNIVERSITY

## Integration and Implementation Sciences: New Methodology for Tackling Complex Problems

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# Why do we need it?

- Recognised urgency to tackle complex problems
- Learning by doing
- No cross-fertilisation (fragmentation)
- Reinventing of the wheel
- Lack of quality control
- No formal methodology or training (statistics analogy)

Need clear and systematic way for building integration and implementation into research projects

# Example...1

## World Commission on Dams 1998-2000



**Assess development effectiveness and alternatives**

**Develop international guidelines and standards**

# Example...2

## World Commission on Dams 1998-2000



Assess development effectiveness and alternatives

Develop international guidelines and standards

Dam performance  
Ecosystem disruption  
Social impact

Government agencies  
Investors  
People's movements  
Construction industry  
Non-governmental organisations  
International development community

# A new discipline?

A clear and systematic way for building integration  
and implementation into research projects

Integration and Implementation Sciences?

# Seminar overview

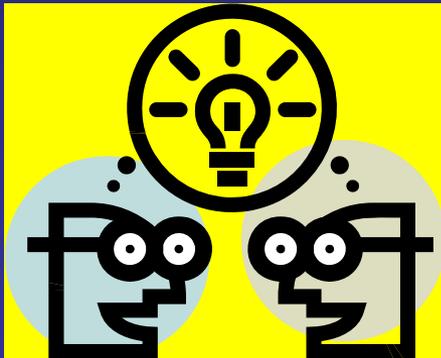


- What is Integration and Implementation Sciences?
- Why do we need it?
- Building integration into research projects
  - adequate description
  - methods
  - key concepts
- Big picture issues

# What is Integration and Implementation Sciences?...1

Concepts and methods to improve:

- the generation of knowledge spanning disciplines and practice,



# What is Integration and Implementation Sciences?...2

Concepts and methods to improve:

- Knowledge generation,
- the application of that knowledge in decision making  
in policy, business, professional practice and community activism,



# What is Integration and Implementation Sciences?...3

Concepts and methods to improve:

- knowledge generation,
- decision making, and
- the implementation of those decisions to bring about effective change and social improvement.



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# Why do we need it?...2

Examples of application:

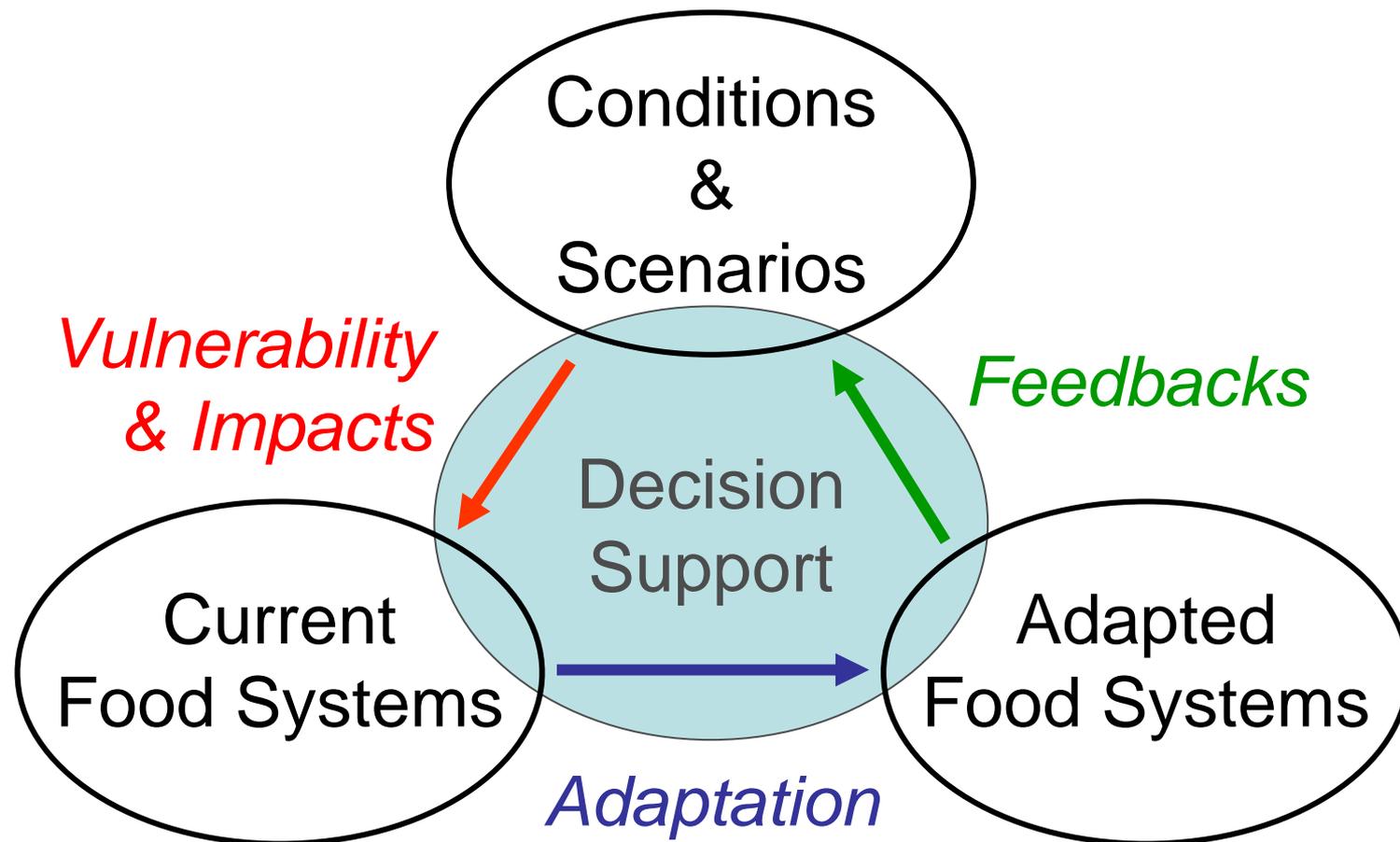
1. Drug Policy Modelling Project: what's the best mix of prevention, treatment, and law enforcement?



## Examples of application:

### 2. Global Environmental Change and Food Systems in the Indo-Gangetic Plains Region

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# Why do we need it?...4

Examples of application:

3. Improved security in Australia and the region



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# Building integration into research projects...Adequate description

Framework of six key questions:

1. For what and for whom?
2. Of what?
3. By whom?
4. How?
5. Context?
6. Impact?

# For what and for whom?

What are the aims of the integration and who is intended to benefit?

Differentiate integration aims from project aims and big picture aims

# 'Heroin trial' example...1

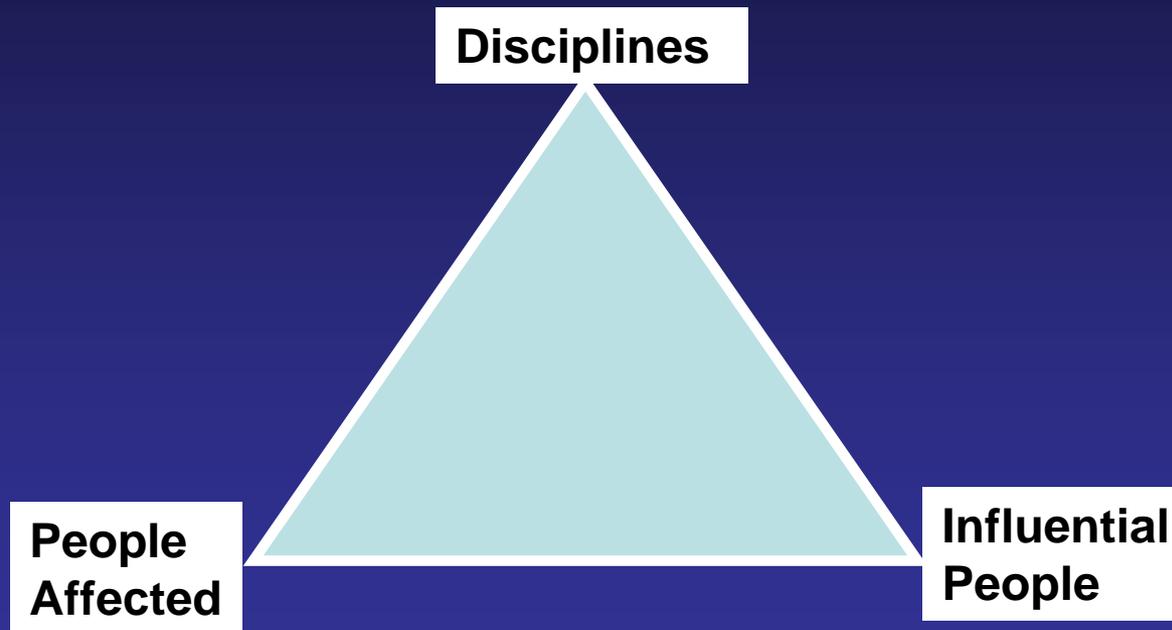
## 1. For what and for whom?

Project aims: to answer the question - is it feasible to run a trial of heroin prescription

Integration aims: Genuine exploration of all points of view, especially opposition. Not pseudo-legalisation.

Big picture aims: New treatment option for users; Reduced crime and social nuisance for society; (Reduced black market and corruption)

# Integration of what?



# 'Heroin trial' example...2

## 2. Of what?

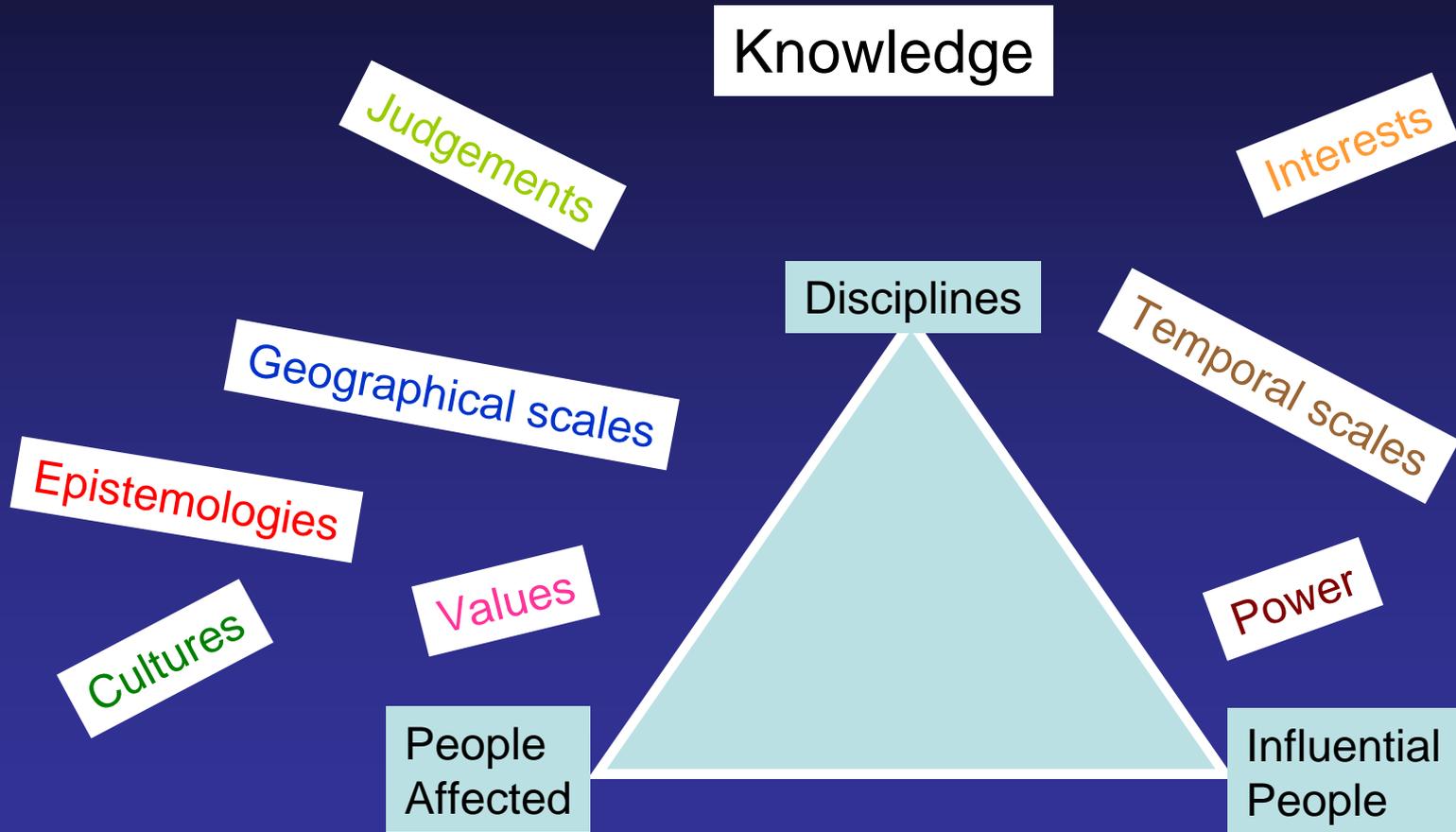
Disciplines (14: anthropology, clinical science, criminology, demography, economics, epidemiology, law, medicine, philosophy, political science, pharmacology, psychology, sociology, statistics)

People affected: Drug users, ex-users, community

Influential people: Policy makers, police, treatment and other service providers

All up – several hundred people

# Integration of what – more detail



# 'Heroin trial' example...2a

2. Of what?

Particular focus on interests

# Integration by whom?



Whole group



Subgroup



Individual



Integration 'specialist'

# 'Heroin trial' example...3

## 3. By whom?



**Study Director**

Plus advice



**Two Centre Directors**

**Advisory Committee**

# How?

No existing toolkit

**Models**

**Dialogue**

**Common metric**

**Product**

**'Vision'**



# 'Heroin trial' example...4

## 4. How?

Common metric: Crude cost-benefit analysis

Particularly looked at risks

Dialogue: especially Principled Negotiation for Interests

# Context?

Relevant political context, history of the problem,  
institutions involved, etc

Anything that might affect the integration approach

# 'Heroin trial' example...5

## 5. Context?

Polarisation between legalisers and prohibitionists

Not on government agenda at beginning

International oversight of national drug policies

Huge media interest

Powerful interests

No new treatment since 1960s, high overdose deaths, unsolved social issue

# Impact?

Success of the integration processes?

Did the integration contribute to the project success?

# 'Heroin trial' example...6

## 6. Impact?

### Integration was successful:

- support from all major groups (Police, AMA, churches etc)
- able to overcome polarisation (but not forever)
- process praised

### Project 'success':

Trial approved by Ministerial Council on Drug Strategy; unprecedented overturning by Prime Minister and Cabinet

New expenditure of \$500 million in drugs area

Underpinned successful trials in Switzerland and the Netherlands

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# Building Implementation into Research projects.... Adequate description...1

Integration to improve understanding

Implementation for decision support

- policy
- product
- practice



Implementation for change

# Building Implementation into Research projects.... Adequate description...2

Implementation for decision support ... in policy

Bring together

- Theories of policy making
- What we know about research-policy interaction
- What sort of research is useful
- Assessment of capacity
- Evaluation of effectiveness

# Building Implementation into Research projects.... Adequate description...3

Integration to improve understanding

Implementation to for decision support

- policy
- product
- practice

Implementation for change



# Building Implementation into Research projects.... Adequate description...4

Effective change – what can we learn from

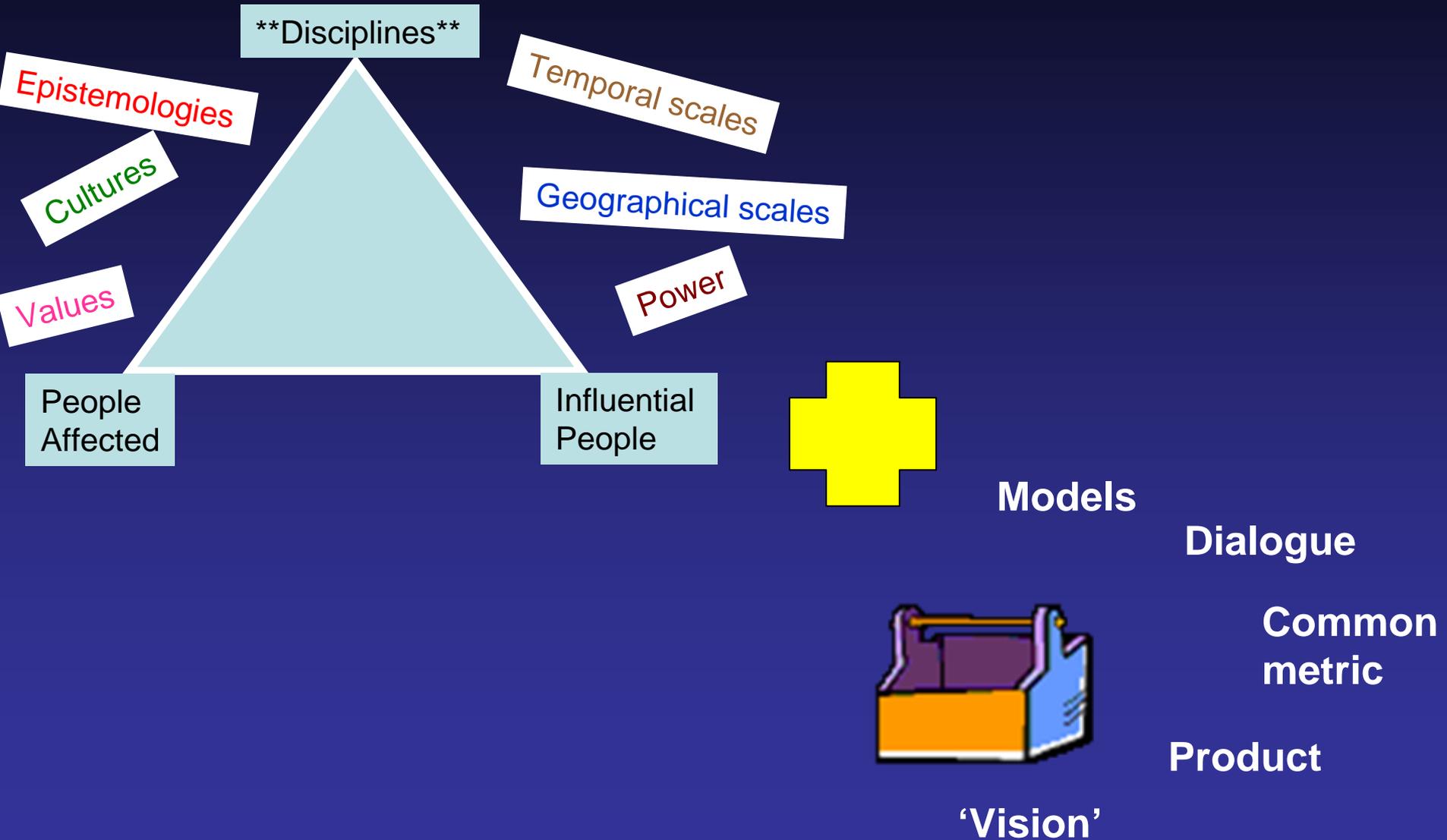
- Advertising
- Organisational change
- Agricultural extension
- Health promotion
- Counselling
- Diffusion of innovation
- Social entrepreneurship
- Community organising

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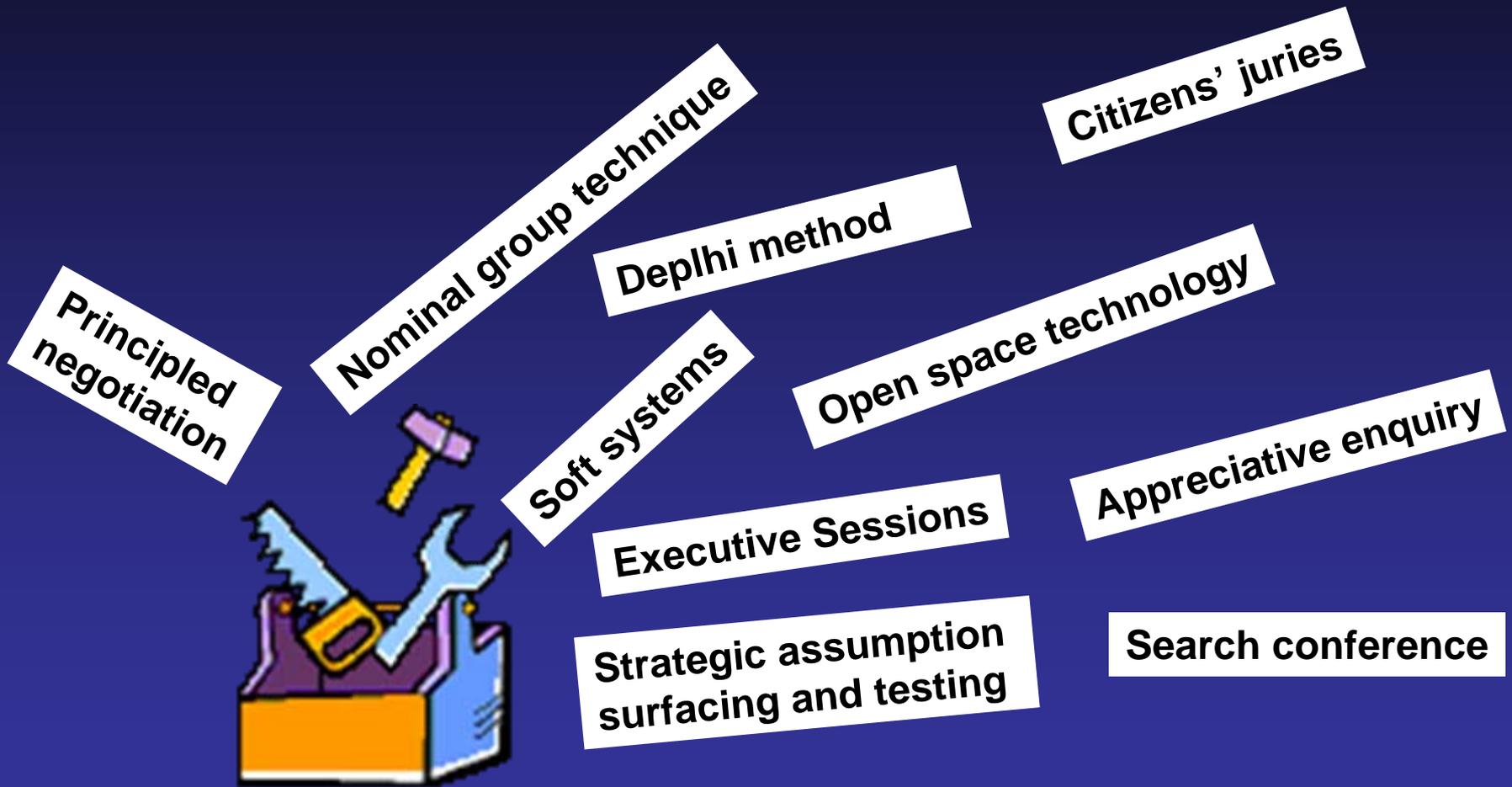


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# Toolkit especially for matching 'of what' and 'how'



# Dialogue tools



# Other integration tools

Modelling

Common metric

Product

'Vision'



Ecological footprint

DALYs and QALYs  
(Disability/Quality Adjusted Life Years)

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# Key concepts

- Systems-based thinking
- Problem framing and boundary setting
- Values definition
- Ignorance and uncertainty
- Collaboration

# Systems based thinking...1

- Systems thinking and complexity science
- Core concepts for integration

# Systems based thinking...2

Checkland:

- emergence and hierarchy, and
- communication and control.

# Systems based thinking...3

Higginbotham et al:

- Emergent order
- Adaptive, evolutionary, self-organization
- Non-linear dynamics
- Dissipative structures
- Disturbance or perturbation and attractors

# Problem framing and boundary setting

- Importance of framing
- Attention to what is included, excluded and marginalised

Strong link with values

Methods include:

Scoping methods

Ulrich's Critical system heuristics

# Values definition...1

- Setting a normative framework
- Including, managing and integrating diverse stakeholder values
- Different epistemological approaches
- Managing own values
  
- Working within values framework of practitioners

# Values definition...2

World Commission on Dams – setting a normative framework

**Universal Declaration of Human Rights**

**The Right to Development**

**Rio Declaration on Environment and Development**



# Ignorance and uncertainty...1

- Understanding is comparatively unsophisticated
- Problems include multiple types of ignorance and uncertainty
- Decisions require strong appreciation of ignorance and uncertainty
- Nobody's mandate to pull different approaches together

# Ignorance and uncertainty...2

**STATISTICS** - probability theory

Music – essential for creativity

History – moral dimension

Intelligence – gaps or overload

Art – certainty and uncertainty are a continuum, not opposites

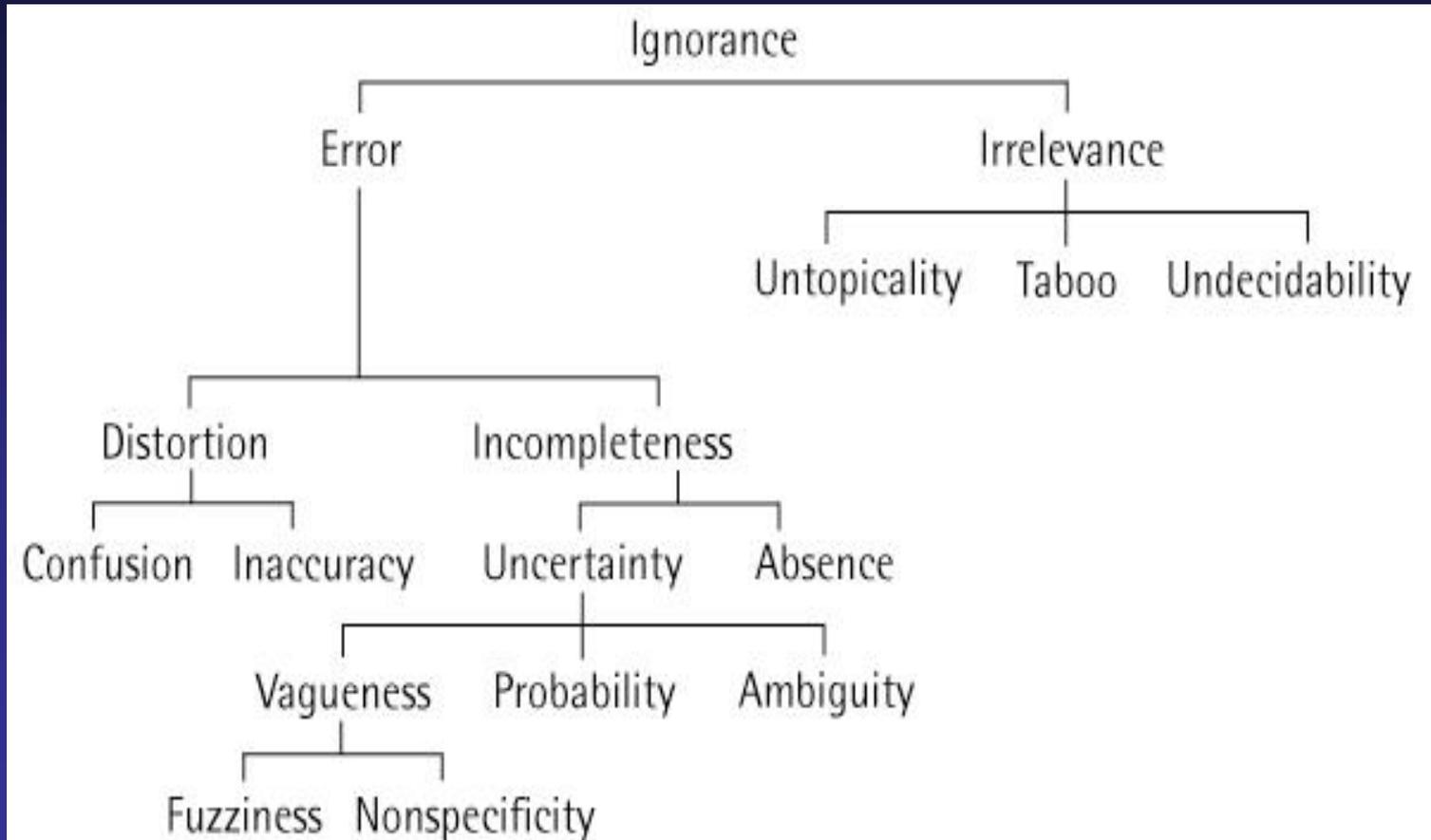
Complexity - irreducible

Futures – unknown unknowns

Religion – desirable vs fundamentalism

# Ignorance and uncertainty...3

## Typologies eg Smithson, 1989



## Principles of collaboration:

- effective harnessing of differences  
*maximise benefits of diversity, minimise costs*
- setting defensible boundaries  
*match boundaries to objectives*
- gaining legitimate authorization  
*but minimise loss of research independence*

# Take-home points

1. Use a systematic approach to research integration and implementation
2. Differentiate between  
Integration to improve understanding  
Implementation for decision support
  - policy
  - product
  - practiceImplementation for change
3. Need a toolkit of methods
4. Need to incorporate key concepts



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# Big picture issues...1

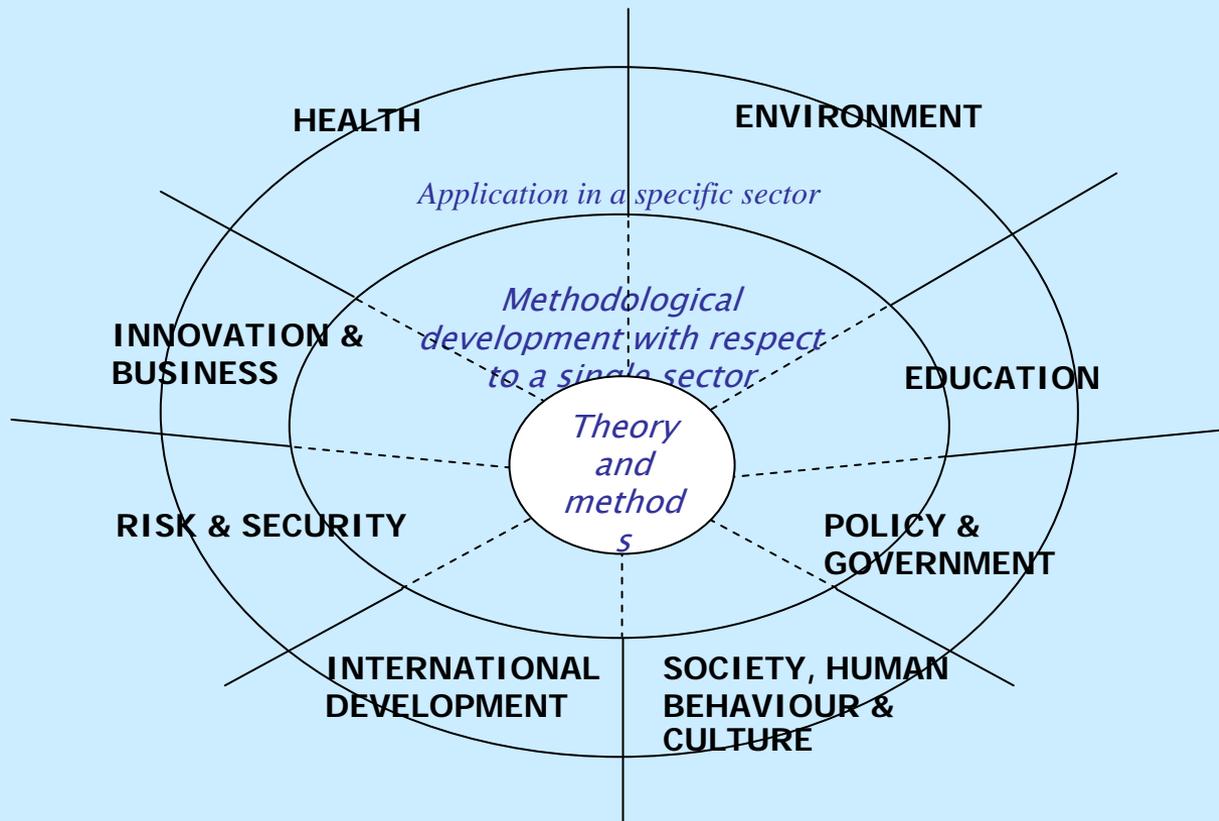
## New cross-cutting specialisation

- Integration and Implementation Sciences
- analogy with statistics
- importance of a college of peers (peer review)

## New sister cross-cutting specialisations

- Information Science
- Management Science
- Evaluation Science

# Cross-cutting specialisation



# Big picture issues...3

## Institutional support for integration and implementation

- essential
- develop methods and capacity
- where should it sit?

# Conclusions

If serious about integration, cannot continue piecemeal approach, but needs organised systematic methodology

Outline of framework and skills presented

Case for a new specialisation – Integration and Implementation Sciences

What do you think?

Would this help you in your work?

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