

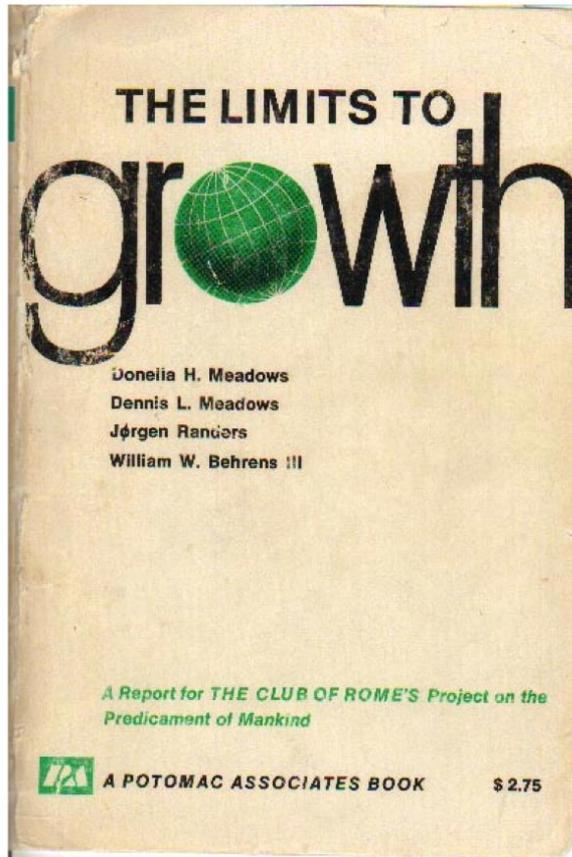
# UCL ENERGY INSTITUTE

## Critical reflection on participatory modelling for policy

Modelling on the Move 5: Participatory Modelling  
Birmingham University, 20<sup>th</sup> November, 2013

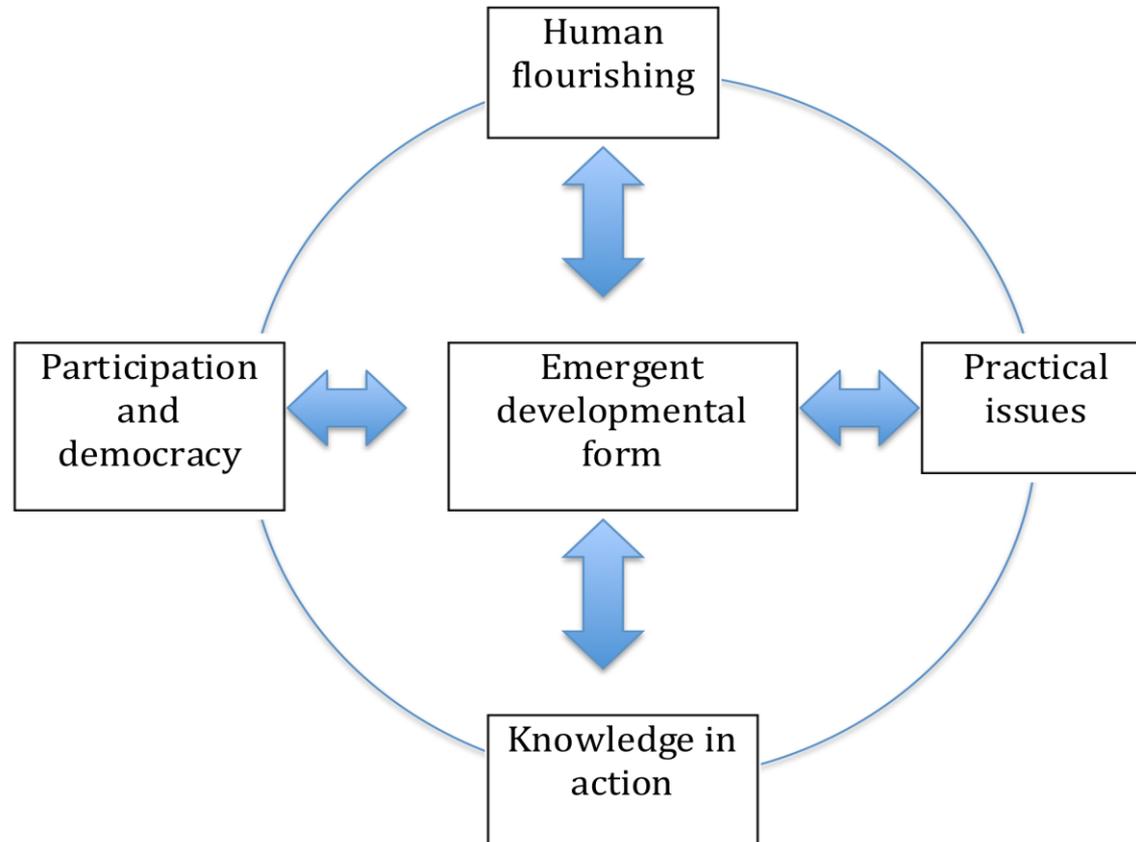
Lai Fong Chiu  
UCL Energy,  
University College  
London

# System modelling – What for?



“The power and utility of system dynamics is best achieved by going beyond a model to implications and generalizations that can be drawn from the process of modeling. System dynamics papers too often stop with the description of a model. But models should become part of a more persuasive communications process that interacts with people's mental models, creates new insights, and unifies knowledge.”

# Participatory Research characteristics



# Critical reflection and knowledge creation

- Reflection as a necessary component of knowledge production through experience (Pettegrew, 2000)
- Reflection-in-action and Reflection-on-action (Schön, 1996)
- In practice little writing could be found about 'reflection'.
- Many dichotomies e.g. 'oppressors vs oppressed' 'popular/lay vs expert knowledge' were unchallenged (Dei & Sheth, 1997)
- Central tenets of PR i.e. participatory process, analysis of power dynamic, researcher reflexivity, relationship between theory and practice and critical awareness of personal political dialectic were seldom addressed (Chiu, 2006)

## Some issues needs to be considered in PPM

- Modelling as knowledge creation or discovery?
- Who is it for and for what purposes? (theoretical, empirical and practical purposes of modelling)
- Process and practice of participation involved in creating the model and using it with stakeholders
- How do the above affect research design, and internal and external validation of participatory modelling?
  - (qual) data analysis and (quan + qual) integration

# Modeling policy with stakeholders

- What kind of policy? Economic, social, environmental, energy, health, etc.
- Are we aware of the policy context?
  - Modelling for change or for maintaining the status quo
- Complexity of social (people) and physical (environment, building, material etc) systems – e.g. Macmillian et al., 2013
- To what extent can social behaviours and physical systems be separately encoded and modelled?
  - e.g. Forrester & Taylor 2012
- What are the challenges of linking systems and sub-systems?

# Participatory PM – ‘bottom up’ approach

- Can social science data (e.g. cognitive mapping) and physical data (e.g. U values) be prepared and treated in the same way in modelling?
- Do your outputs reflect people’s conceptions of the systems?
- How do you reconcile the tension between KISS ‘Keep it simple, Stupid’ (simple enough to model mathematically) and KID ‘Keep it (richly) descriptive’?

# Research design

- What methods do you use to generate your qualitative data e.g. interviewing, focus groups, social network mapping, Q-sorts etc. ?
- How did you analyse and interpret these data?
- What are the challenges modellers face when dealing with data derived from different epistemological backgrounds?
- How do you construct effective and defensible tests of validity of the model?

# Participatory design

- Stakeholders (participants) - who are they?
  - Expert or lay in reference to the domains
    - What are your hypotheses about their involvement in their domain? e.g. risk communication
  - Multi-sectoral or representing only one sector
- How are your stakeholders recruited?
  - Opportunistic sampling
  - Theoretical sampling
  - Pragmatic sampling
  - Maximum variation sampling

## Methods of involvement require different skills (social science)

- Surveys – questionnaires (construction and validation)
- Interviews – (construction of interview schedules and interviewing skills)
- Focus groups – (qualitative research and group facilitation skills)
- Workshops – (facilitation and processing skills)
- Q-sorts – (construction of statement of concourse, carrying out Q-sort interviews, analysing and interpreting Q-data- Qual+Quan)
- Social network analysis – (Qual + Quan)
- A combination of any of the above in the life of the project moving from ABM to other modelling methods to incorporate the physical system e.g. fabric/heating/ventilation and occupants' behaviours in energy consumption.

When constructing the model has the research team considered:

- Stakeholder analysis e.g. issues of power and capacity building?
- Their world views (value orientations and cognitive maps)?
- Ways to make their assumptions explicit (through interviews and group processes)?
- What theories have been brought to bear upon your interpretation? (e.g. Habermas' individual's "lifeworld" vs external viewpoint of system)
- Whether there was a shared understanding of the system of interest? If not,
- Has a shared understanding developed and how?
- Have you documented and analysed the process of this development?

In producing outputs for modelling, did the RT consider...

- The coherence of involvement methods and the soundness of participatory practice?
- Coherence between research design and involvement - when to involve individuals and when to involve groups and from which sector (experts on physical systems, policy makers, community groups...) ?
- Soundness of participatory practice - the impact of group process and facilitation and methods of data collection, process, analysis and interpretation?

Is there any evidence for:

- Co-learning- amongst participants, between participants and RT, and RT itself)?
- Co-construction- participation in construction of the model(s)?
- Shifts in participants' understanding from non-systemic to systemic thinking?
- Generation of practical outcomes?

## Researchers' reflexivity (not to be exhaustive, just some pointers)

- Have we made the purposes of our modelling clear?
- Are we aware that boundaries of systems are determined by the perspectives of those who participate in formulating them (systems of interest)?
- Are we aware that the modelling exercise is context and process bound?
- How we frame the issue is vital - modelling is there to provide cognitive shortcuts for efficiently processing information, especially for participants who are not familiar with some of the issues...
- Have we communicated the above adequately to our participants?

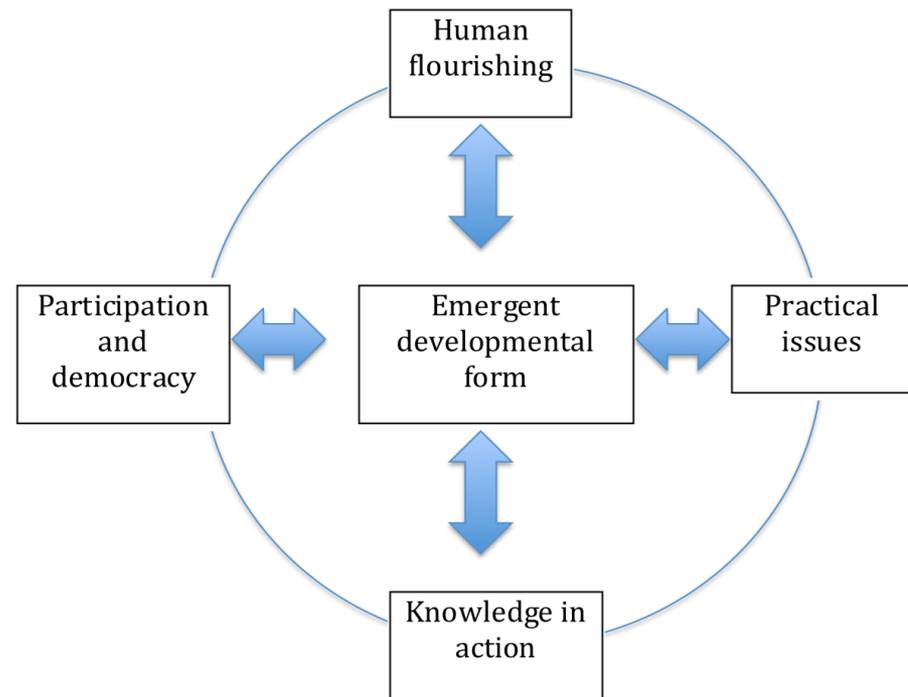
# How to integrate the ‘hard’ and ‘soft’ systems thinking?

The hard systems tradition	The soft systems tradition
Oriented to goal seeking	Oriented to learning
Assumes the world contains systems that can be engineered	Assumes the world is problematical but can be explored by using system models
Assume system models to be models of the world (ontologies)	Assumes system models to be intellectual constructs (epistemologies)
Talks the language of ‘problem’ and ‘solution’	Talks the language of ‘issues’ and ‘accommodation’
<b>Advantages</b>	<b>Advantages</b>
Allows the use of powerful techniques	Is available to all stakeholders including professional practitioners; keeps in touch with the human content of problem situations
<b>Disadvantages</b>	<b>Disadvantages</b>
May lose touch with aspects beyond the logic of the problem situation	Does not produce the final answers; accepts that inquiry is never-ending

# What PPM is about?

Is it merely a methodological issue?

Or, is it a question of paradigm?



“Perhaps by devoting more and more of our already abused cropland to fuel production we will at last cure ourselves of obesity and become fashionably skeletal, hungry but —thank God!—still driving”



“In keeping with our unrestrained consumptiveness the commonly accepted basis of our economy is the supposed possibility of limitless growth, limitless wants, limitless wealth, limitless natural resources, limitless energy, and limitless debt.”

Berry, W. Faustian Economics: Hell hath no limits.  
[Archive.harpers.org/2008/05/pdf/HarpersMagazine-2008-05-0082022.pdf](http://Archive.harpers.org/2008/05/pdf/HarpersMagazine-2008-05-0082022.pdf)

Berry, W. (2008). Faustian Economics: Hell hath no limits. Access <http://Archive.harpers.org/2008/05/pdf/HarpersMagazine-2008-05-0082022.pdf>. 17.11.13

Checkland, P.B. (1985). 'From optimizing to learning: a development of systems thinking for the 1990's', *Journal of the Operational Research Society*, 36: 757-67.

Chiu, L.F., (2006). Critical reflection: More than nuts and bolts. *Action Research*, Vol. 4 No.2 183-203.

Dei, G. & Sheth, A. (1997). Limiting the Academics of Possibilities. In P. Freire et al (Eds). *Mentoring and mentor: A critical dialogue with Paulo Freire*, (pp143-173). New York: Peter Lang.

Forrester, J. & Taylor, R. (2012). A transdisciplinary approach to modelling complex social-ecological problems in coastal ecosystems. A discussion paper submitted to the Complexity Science & Social Science workshop: at the interface to the real world. Chicheley Hall, 24<sup>th</sup> and 25<sup>th</sup> Sept., 2012. CPM-13-19. Access <http://cfpm.org/papers/css12/Forresterdraft.pdf>. 17.11.13.

Macmillian, A., Davis, M., Trutnevyte, E., Shrubsole, C., May, N. Chiu, L.F., Bobrova, Y., Chalab, Z (2013). Integrated decision-making about housing, energy and wellbeing. Abstract submitted to symposium Modelling Sustainable Urban Transition Dynamics, EPSRC funded project: Retrofit 2050. Cardiff, 3-4 July.

Meadows D.H., Meadows, D.L. Randers, J. Behrens, W.W., (1974). *The limits to growth: A report for the Club of Rome's project on the predicament of mankind*. 2<sup>nd</sup> Edition, Pan Books: London and Sydney.

Pettegrew, J. (2000). *A Pragmatist's Progres? Richard Rorty and American intellectual history*. Lanham: Rowman & Littlefield.

Reason, P. & Bradbury, H. Editors, (2008). *The SAGE Handbook of Action Research: Participatory inquiry and practice*. SAGE Publications: London & New York. p.5

Schön, D.A. (1996). *Educating the reflective practitioner: Towards a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass. Inc.