



UNIVERSITY OF LEEDS

# **Creativity and organisational learning as means to foster Sustainability**

Dr. Rodrigo Lozano

Email: [R.Lozano@leeds.ac.uk](mailto:R.Lozano@leeds.ac.uk)



# Dominant mental models

- For centuries, universities have **created and broken paradigms**, and educated decision-makers, scholars, entrepreneurs, and leaders (Cortese 2003; Elton 2003; Lozano-Ros 2003; Lozano 2006)
- Universities have remained **traditional** (Elton 2003) where modern education has relied on **Newtonian and Cartesian mental models**, based on mechanistic interpretation and reductionist thinking (Nonaka and Takeuchi 2001; Lovelock 2007)
- This has led to the conquest of nature through competition (Cortese 2003), industrialisation (WCED 1987; Orr 1992; Reid 1995; Carley and Christie 2000), overspecialisation and disciplinary isolation (Costanza 1991; Cortese 2003)

# Creativity

- The ability to solve problems that one has not previously learned to solve (Mayer, 1989). However, this does not consider external *stimuli*
- The ability to produce work that is novel and appropriate (Sternberg and Lubart, 1999)
- Involving a change in memes (Csikszentmihaly, 2001)
- The creation of a valuable, useful new product, service, process, or idea by individuals working together in a complex social system (Woodman et al., 1993)

# Individual creativity (traits, processes & models)

- Traditionally creativity has been associated with mystical beliefs (Sternberg and Lubart, 1999)
- Intrinsic motivational orientation is a key element in creativity, in addition to contextual social influences, and antecedent conditions (Woodman, et al., 1993)
- Creativity follows four stages: immersion, incubation, illumination, explication; and creative synthesis (McNally, 1982)
- Woodman, et al.'s (1993) and McNally's (1982) provide frameworks where cognitive and non-cognitive traits come together to create 'Eureka' moments, i.e. when the **individual's rationality and the emotional psyche connect** to create a new product or mental model

# Group and organisational creativity

- Creativity is not adopted unless they are **sanctioned** by some **group** (Csikszentmihaly, 2001)
- Group creativity is a function of individual creativity, individuals' interaction, group characteristics, group processes, and contextual influences. It is **not the simple** aggregate of all group members' creativity (Woodman et al., 1993)
- Organisational creativity is a function of the creative outputs of its component groups and contextual influences (Woodman, et al. 1993)
- Organisations create **new knowledge** and information from the **inside out**, and not simply process external information (Nonaka & Takeuchi, 2001)

# Meme institutionalisation

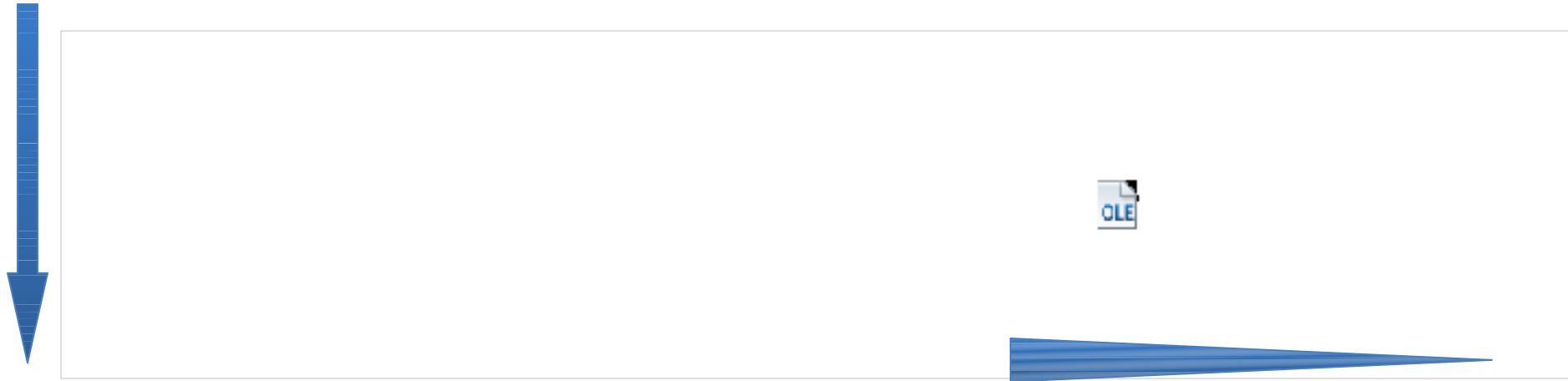
- Creativity, once accepted by groups, organisations, and finally society, leads to the development of **new mental models**. Once the transition to the new paradigm is complete (Kuhn 1970), then the new paradigm can be said to have been **institutionalised** (Rogers 1995; Sherry 2003; Lozano 2006)
- When a new paradigm is created, the older schools gradually disappear, in part due to the new generation adopting it and in part some

# Organisational Learning

- In any organisation learning takes place in the **units**
- **Individual** learning includes managing mental models by passing exposing assumptions, examining them and developing new models (Argyris 1977; Rosner 1995; Senge 1999)
- In **group** learning the combined intelligence of the team exceeds the sum of the intelligence of its composing individuals (Basadur, Graen et al. 1986; Woodman, Sawyer et al. 1993; Senge 1999)
- **Organisations** learn through individuals (Senge, 1999)
- Individual learning can facilitate group learning, which in turn facilitates organisational learning. Organisational learning, in turn, facilitates group learning, and this in turn individual



# Learning typologies



Based on loops from Argyris (1977) and Processes from Doppelt (2003)

# Learning to help change mental models and behaviour

- Lower types of learning (e.g. **passive learning**) tend to increase bureaucracy and complacency, and curtail response to internal and external stimuli.
- **Apprehensive and inquisitive learning** can play important roles in fostering organisational **metanoia**, e.g. including more realistic classroom experiences when teaching SD (Davis, et al. 2003)
- Although learning is an important part of any

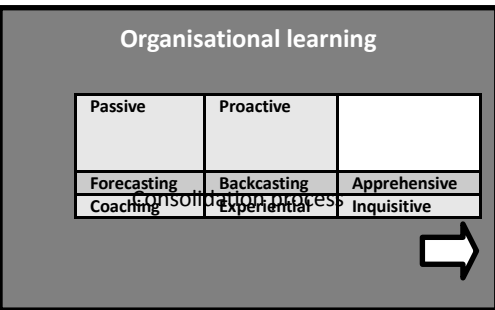
# Knowledge continuum

Know  
ledge  
barri  
er

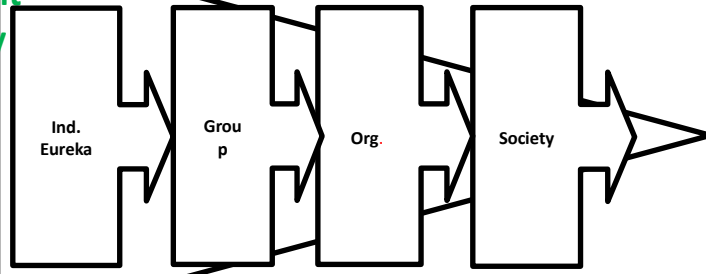
Know  
ledge  
barri  
er

**Current unsustainable  
mental models**

**New (more) sustainable  
mental models**



Cr  
est  
ivi  
ty



Institutionalisation



Metanoia

Knowledge consolidation

Creativity

Creativity

# 'Gaia'

- Gaia proposes that the Earth has **self-regulating systems** of climate and chemistry
- Lovelock started the immersion process of 'Gaia' theory in the 1960s, but the '**Eureka**' moment did not appear until about 1970
- From the beginning the ideas of self-regulation were **unpopular** with Earth and life scientists
- Gaia theory took decades before it was partially accepted, because evidence had to appear to confirm it (Lovelock 2007)
- In a Scholar Google search the term 'Gaia Theory' yielded over 24,000 hits. This could be considered to be the **group sanctioning**

# 'Gaia' institutionalisation

- How could Gaia Theory, and in turn the sustainability meme and its mental models, be further propagated, and thus foster metanoia?
- When a theory, or mental model, is first developed, such as Gaia, its learning would have to be through passive learning, for example the teaching of Gaia Theory in high-schools in Brazil (see Do Carmo, Nunes-Nieto et al. 2009)
- Then a process of questioning the theory through double loop learning would take place, for example the reflective learning of Gaia theory (Haigh 2001), or its questioning through thermodynamics (Karnanin and Annila 2009)
- Both positions could be considered as Proactive learning

# Conclusions (1)

- Newtonian and Cartesian mental models have resulted in unsustainable education and practices.
- **'Unlearning'** old models and providing new ones are part of the solution in moving towards more sustainable societies (Rosner, 1995)
- **Creativity** can be a powerful force to **foster metanoia** for sustainability
- When individual 'Eureka' is accepted by a group, then by an organisation, and finally by society, then the new mental models are created. Then the **consolidation** process through organisational learning begins

# Conclusions (2)

- Once the new mental models have been **institutionalised** then these become the norm, and then the process would start again
- Changes in mental models and lifestyles would help to move towards education that is **systems oriented, holistic, collaborative, long-term oriented, and interconnected**
- Individual learning and creativity for sustainability will fall into the knowledge abyss, if they cannot be transferred to groups, organisations, and finally to society
- Therefore, individuals who are working on sustainable development must **share** their knowledge, and **engage in collaboration** with different sectors of society



UNIVERSITY OF LEEDS

**Thank you!**  
**Vielen dank!**

Dr. Rodrigo Lozano

Email: [R.Lozano@leeds.ac.uk](mailto:R.Lozano@leeds.ac.uk)