EDUCATIONAL FUTURES: RETHINKING THEORY AND PRACTICE

Higher Education Management and Operational Research

Demonstrating New Practices and Metaphors

Gary Bell, Jon Warwick and
Peter Galbraith (Eds.)

SensePublishers

Higher Education Management and Operational Research

EDUCATIONAL FUTURES
RETHINKING THEORY AND PRACTICE
Volume 54

Scope
This series maps the emergent field of educational futures. It will commission books on the futures of education in relation to the question of globalisation and knowledge economy. It seeks authors who can demonstrate their understanding of discourses of the knowledge and learning economies. It aspires to build a consistent approach to educational futures in terms of traditional methods, including scenario planning and foresight, as well as imaginative narratives, and it will examine examples of futures research in education, pedagogical experiments, new utopian thinking, and educational policy futures with a strong accent on actual policies and examples.

Higher Education Management and Operational Research

Demonstrating New Practices and Metaphors

Edited by

Gary Bell and Jon Warwick
London South Bank University, United Kingdom

Peter Galbraith
University of Queensland, Australia

SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6091-974-9 (paperback)
ISBN: 978-94-6091-975-6 (hardback)
ISBN: 978-94-6091-976-3 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
https://www.sensepublishers.com/

Printed on acid-free paper

TABLE OF CONTENTS

PART 1

INTRODUCTION

GARY BELL, JON WARWICK AND PETER GALBRAITH

1. THE NEED FOR NEW HIGHER EDUCATION MANAGEMENT PRACTICES AND METAPHORS

INTRODUCTION

UK Higher Education (HE) is currently operating within an environment of continuous change and uncertainty. Vice-Chancellors, Executive Managers, Deans, Departmental Heads and Administrative Managers are encountering an acceleration of varied and difficult managerial problems. Morgan (2006) asserts that successful managers are "open and flexible", suspending decisions whenever possible, until a better understanding of the problem is attained. He believes that modelling insights may lead to a range of informed decision scenarios that may solve the identified problem. Furthermore, Morgan goes on to suggest that less effective managers are seen to explain and interpret from a "fixed angle", and to continually hammer at persistent problems using the same old methods – which can facilitate disillusionment and conflict amongst academic, administrative and technical staff.

The aim of this book is to assist HE managers in becoming more open and flexible. To help them explore "new angles" for addressing some of the many difficult problems of HE management through the use of approaches[1] associated with the Operational Research (OR) and Systems disciplines. Furthermore, the book explores the connectivity between a selection of OR techniques and metaphorical thinking in order to strengthen the notion of "fitness for survival" (Boulding, 1981) of the HE organisation. Six objectives have been identified to help with attaining our overall aim and these are addressed both in this first chapter, and also in the various chapters that follow. The six objectives are:

- to provide an appreciation of complexity and uncertainty within a quickly evolving environment;
- to consider some important developments within the growth of the OR and Systems disciplines;
- to outline key aspects of metaphorical thinking for organisations together with the key metaphors in use;
- to consider the connectivity between OR approaches, metaphors and HE management;
- to describe the use of a selection of OR approaches to identified HE problems – which may suggest new management practices;
- to consider the idea of a toolbox of OR approaches and metaphors for HE managers.

G. Bell, J. Warwick and P. Galbraith (Eds.), Higher Education Management and Operational Research: Demonstrating New Practices and Metaphors, 3–28.

A paper by the Higher Education Funding Council for England (HEFCE) asserts "Higher Education changes lives. It is enriching and inspiring for students and it is vital to social mobility, future economic growth and our international standing" (HEFCE, 2011). This succinctly captures the need (or "the why") for Higher Education. In the past, UK HE organisations were considered to have a relatively stable and certain future (Morgan, 2006). However, HE has to evolve to meet the now rapidly changing demands of society and government. Over the last two decades employment patterns have changed significantly, and there is a need for a more highly trained and educated workforce. This workforce must continuously update its skills to meet the changing requirements of the labour market. Recognition of employment changes that affected HE initiated, in the United Kingdom, the Dearing Report (Dearing 1997) which was highly influential in shaping UK HE in the early part of this century. Subsequently, the debt crisis in various European countries has begun to impact on HE. In the UK, a new strategy is being implemented (BIS, 2010) to fund HE institutions more directly through student tuition fees and this has essentially "privatised" certain subject areas as government funding for some disciplines such as the humanities is removed. This will have a significant impact upon departmental, faculty and institution budgets, as income becomes directly related to student numbers.

In the last decade or so the Government has demanded greater university accountability for the public funds they spend, which has in turn placed an emphasis on management practices and the measurement of education quality. Trow (1994) coined the terms "hard" and "soft" managerialism which characterise the different government and university management approaches respectively. The ideas associated with managerialism are described in chapters 2 and 3 of this book which set the scene by reviewing ideas of quality and organisational culture within HE institutions and bring to the surface some of the distinctive features of HE management which limit the effectiveness of "hard" managerialist approaches. A further component of scene-setting is consideration of how the role and purpose of learning may be redefined as we move into the 21st Century (chapter 4) before we consider (in chapter 5) aspects of institutional funding in the UK. Subsequent chapters offer a variety of examples in the use of models, systems thinking and OR methods within the HE environment. They are themed broadly into two sections: the first (chapters 6 to 10) explores the management of student learning and support and these chapters emphasise the changing nature of learning and teaching and how institutions should work to engage "new learners"; the second (chapters 11 to 16) reflect on how we should perhaps manage aspects of the business of HE in a turbulent environment.

In this first introductory chapter, we briefly discuss what we consider to be two key characteristics of the HE management domain, namely complexity (Checkland, 1993; Rosenhead & Mingers, 2001), and uncertainty (Lehman, 1991; Rosenhead & Mingers, 2001) both of which are related to rapid environmental change. Developing an understanding of these key characteristics helps to guide

the selection of appropriate methodologies and models which in turn impact upon our problem solving and decision-making capabilities.

We then touch on the development of Operational Research (OR) as an established discipline that encompasses a broad range of approaches that assist in controlling and improving the management of organisations, and this theme is further expanded in chapter 16 which illustrates the changing nature of OR with a contribution within a particular domain of HE management. Further chapters in the book illustrate the application of some of these OR techniques.

Finally, we turn our attention to metaphors. Morgan (2006) asserts that theories of explanation of organisational life based on metaphors allow the understanding of the organisation in a partial but nevertheless distinctive way. Fundamentally, Morgan offers metaphorical thinking as an approach to dealing with the complexities, ambiguities and paradoxes of an organisation. Metaphorical thinking can enhance a manager's ability to deal with the different aspects of organisational life, and we briefly outline a number of metaphors and their respective strengths and weaknesses.

Throughout this first chapter we have tried to convey a sense of the current state-of-play of operational research and systems thinking as they relate to HE management. We have also tried to identify the key historical contributions of those practitioners and researchers who we consider to have been instrumental in shaping current thinking.

Taken as a whole, this book demonstrates the use of various OR approaches that are applied to identified HE problems within the context of an educational organisation. We believe that the approaches used and the findings described will help to generate "new angles" leading to informed HE management solutions or decisions. We further believe that the offered novel OR insights positively contribute to fitness for survival, and enrich organisational life leading to the consideration of the use of new OR practices to assist the management of HE organisations.

COMPLEXITY AND UNCERTAINTY

HE management must address both the problem-setting process (Schon, 1983) and the problem-solving process (Keys, 1991). Whilst we believe the former process requires greater attention, both need consideration for effective management. Schon (1983, p. 40) outlines the problem setting process:

> When we set the problem, we select what we will treat as the 'things' of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in what directions the situation needs to be changed. Problem setting is a process in which, interactively, we name the things to which we will attend and frame the context on which we will attend to them.

The problem setting process should consider issues of complexity and of uncertainty. Academics, researchers and practitioners associated with various management related disciplines such as Operational Research (Ackoff, 1979a; Checkland, 1993; Rosenhead & Mingers, 2001), Organisational Behaviour (Morgan 2006), or Project Management (Winters & Szczepanek, 2009; Winters et al., 2006) are exploring these important concepts, and three reasons are identified as to why there is a need to provide an overview of complexity and uncertainty. First, to facilitate awareness of these important notions. Second, to assist with the problem boundary setting. Third, to guide selection of appropriate OR approaches leading to informative management decision-making.

The notion of complexity is one which has generated new paradigms for decision making within the OR domain. Rosenhead and Mingers (2001) briefly address complexity suggesting that organisations and individuals operate in "densely interconnected networks" in which the ramifications of decisions should not be ignored. Moreover, they argue that there is a dichotomy of problem situations that need to be considered in the selection of decision modelling approaches. Schon (1987, p. 3) discusses the dilemma of problem solving through the swampy versus high ground metaphor:

> In the swampy lowland, messy, confusing problems defy technical solution. The irony of this situation is that the problems of the high ground tend to be relatively unimportant to individuals or society at large, however, great their technical interest may be, while in the swamp lie the problems of great human concerns. The practitioner must choose. Shall he remain on the high ground where he can solve relatively unimportant problems according to prevailing standards of rigour, or shall he descend to the swamp of important problems and non-rigorous inquiry?

Checkland considers decision making from a systems perspective and highlights the distinction between "Soft" and "Hard" systems thinking (Checkland, 1993; Checkland & Poulter 2006). Hard systems thinking is associated with methodologies and techniques that are connected with RAND[2] systems analysis and systems engineering. It assumes the world consists of systems that can be objectively modelled, there are agreed goals, and the aim is to determine the most effective and efficient way to attain the goals. Soft systems thinking, on the other hand, accepts the rich complexity of the world and systems concepts are applied to assist with structuring thinking and learning about a problematic situation. Describing problem situations highlights the tension between the objectivist stance, which considers problems as independent of an individual stakeholder's perspective, and the subjectivist stance which acknowledges the impact of a stakeholder's perspective in defining or constituting the problems.

Related to complexity is uncertainty (especially with respect to social phenomena) and Rosenhead and Mingers (2001) offer three reasons why uncertainty needs to be considered. Firstly, not knowing the impact of other decision-makers, whose choices may affect our decision choices, may seriously

undermine the efficacy of decisions made. Secondly, the dynamics of the network within an organisation may not be fully understood and can be turbulent, hence forecasting the consequences of actions becomes problematic. Thirdly, organisations are continually evolving in their mission and this can be very unsettling for staff. Hence, problem setting can be extremely fluid. Schon (1983, p. 40) states:

> In the real-world practice problems do not present themselves to the practitioners as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He (or she) must make sense of an uncertain situation that initially makes no sense.

Complexity and uncertainty are two important concepts which require consideration during the problem setting process (see figure 1).

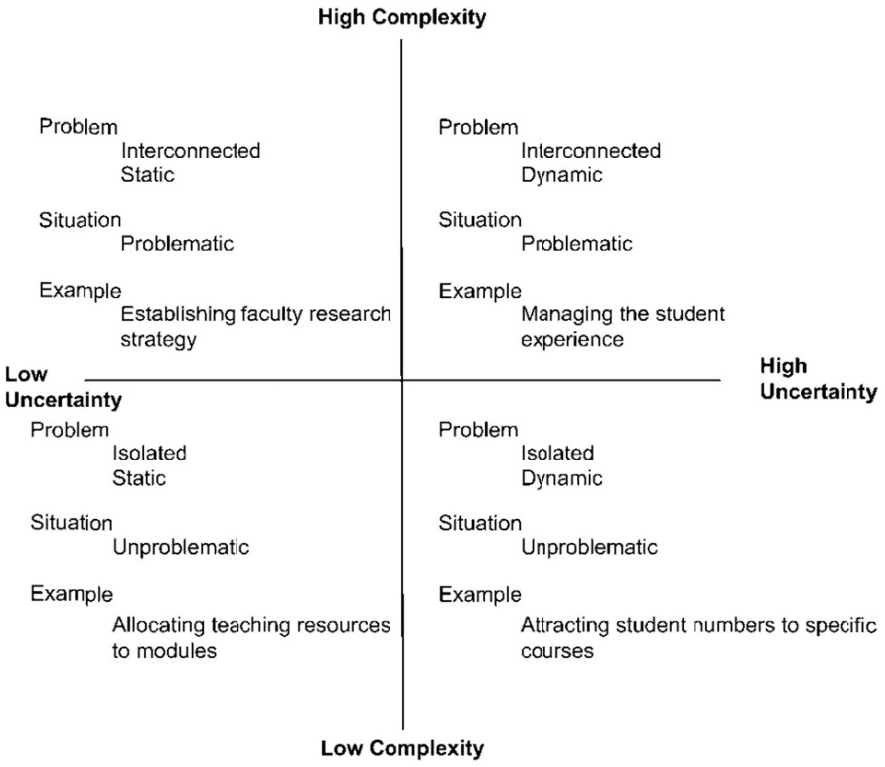

Figure 1. Identifying four distinctive problem situations using the complexity and uncertainty concepts.

Each concept can be delineated to generate high and low complexity and uncertainty. High and low complexity can be linked respectively to subjective and objective ontology. Additionally, the concepts have connectivity with the dichotomy of problems (Rosenhead & Mingers, 2001), with high and low uncertainty associated with dynamic and static situations respectively. The two concepts can generate four problem situations which have distinctive characteristics and these can assist in the problem setting process, and feed forward to assist in the selection of methodologies and techniques used in the problem solving process.

OPERATIONAL RESEARCH AND SYSTEMS

Turning now to the problem solving process puts us within the domain of OR and its related techniques. The term Operational Research was first coined in the 1930s, and associated techniques were developed, refined and applied for the purposes of military planning during the Second World War. Many of these techniques were subsequently used in UK organisations after the war when effective planning using scarce resources was still a key objective. The OR discipline aims to apply "advanced analytical methods to help make better decisions" (OR Society, 2012) which facilitates practical action. Traditional OR is considered analytic and reductionist in its approach, and is linked to positivism and the scientific method that underpins the Natural Sciences. We view traditional OR as strongly rooted in scientific management, which is underlined by the work of Frederick Taylor (1911). Significant interest in OR led Churchman, Ackoff and Ansoff (1957) to produce one of the first important OR books highlighting several industrial operational processes in which common problems were identified, which engendered the use of various techniques and the inception of new theoretical ideas. The identified common problem areas included: inventory processes, allocation processes, waiting-line processes, replacement processes and competitive processes. Techniques such as the simplex method and linear programming were applied, and theoretical developments such as game theory and queuing theory were established. This traditional OR process can be viewed as sequential and is illustrated in table 1.

The OR discipline is continuously evolving over time and this has been reflected in the development of decision making approaches that focus both on problem-solving and problem structuring to assist with management decision-making. OR currently has two distinctive intellectual "camps", namely Hard OR and Soft OR (Jackson, 1991). The former is linked with the traditional reductionist view of OR and the latter (which includes Soft Systems Thinking) with more recent developments in problem structuring and exploration methods reflecting the need to address uncertainty and complexity in organisations. We believe a third area is now emerging which has been labelled Methodological Pluralism[3] which we will return to later.

Table 1. The six phases of the traditional OR problem-solving process (Keys, 1991)

Phase	*Description of the Phase*
1	**Formulating the problem:** Identifying the decision-makers, their objective, the process involved, the alternative courses of action to be investigated, and the criteria for measuring the effect of these upon the process.
2	**Constructing a Mathematical Model:** The model expresses the measure of effectiveness as a function of the variables in the process and contains any relationship that operates between variables.
3	**Deriving a Solution From the Model:** The model is used to find the value of the measure of effectiveness given when each of the alternative actions occurs. It is assumed that each action corresponds to changes being made in the controllable variables. We must identify the action that produces the best measure of effectiveness.
4	**Testing the Model and Solution:** Actions that provide the better measures of effectiveness need to be tested for the occurrence in practice of their predicted effects. If experiments show errors between predicted and actual performance, the model may be reconsidered and new analysis undertaken.
5	**Establishing Controls over the Solution:** Establish a set of rules by which the action can be changed in response to changes in uncontrollable variables.
6	**Putting the Solution to Work:** The handing over of advice should be supported by the details of any necessary changes in existing practice by the provision of training.

In the evolution of systems thinking, concerns about dealing with issues of complexity (Checkland, 1993) have generated interest in the Systems Movement and a systems approach to problem solving which is further strengthened by consideration of Ackoff's commentary on the deficiencies of the traditional OR process (see table 2).

Systems thinking focuses upon "wholes" rather than "parts" (Ackoff, 1979a). It employs the expansionism rather than reductionism principle to understand the complex problem situation. In Ackoff's view systems approaches produce knowledge through emphasising the wider environment in which the problem situation operates rather than analysing each internal component in isolation. Checkland (1993, p. 318) defines systems thinking as:

> An epistemology which, when applied to human activity is based upon the four basic ideas: emergence, hierarchy, communication and control as characteristics of systems. When applied to natural or designed systems the crucial characteristic is the emergent properties of the whole.

The expansionist nature of systems thinking allows it to adopt a central role in the learning organisation (Senge, 1990). What Senge terms "the primacy of the whole" (Senge et al., 1994) emphasises the importance of systems thinking in providing a breadth of organisational view that allows system behaviour to be modelled endogenously. By this we mean that the problem boundaries are drawn in such a way as to allow the system to be considered as "causally closed" in terms of the

cause and effect relationships and feedback loops we describe to explain observed system behaviour (the study of such feedback processes is at the heart of system dynamics modelling – see for example Morecroft, 2007). Thus Ackoff's notion of wholeness and the modelling of system structure through the application of system dynamics allows for the exploration of system behaviour (often revealed as counterintuitive) as a manifestation of that system structure – what Checkland termed the "emergent properties of the whole".

Thus systems methods employ the notion of synthesis and expansionism in their approaches. Richardson (2011, p. 241) considered system thinking as "... the mental effort to uncover endogenous sources of system behaviour" and we too view systems thinking as interested in the explanation of the behaviour observed in complex organisational structures. Keys (1991) suggests that OR is traditionally focused upon the "world of action", whilst systems thinking is focused with the "world of ideas". He argues there is a critical distinction in purpose grounded in the theory/practice dichotomy existing between the two disciplines. However, this dichotomy can be bridged by the disciplines to ensure mutual benefit.

Table 2. Summary of traditional OR deficiencies (Ackoff, 1979a)

Deficiency	*Summary*
The need for learning and adaptation	There is a greater need for decision-making systems that can learn and adapt, than there is for optimisation systems that cannot.
The omission of aesthetics	Decision-making should account for aesthetic values – stylistic preferences and progress towards ideals – for they are relevant to quality of life.
Beyond problem solving	Problems are abstracted from systems of problems, messes; Messes require holistic treatment. They cannot be examined effectively through decomposing them analytically into individual problems to which optimal solutions are sought.
The paradigmatic dilemma of OR	OR's analytical problem-solving paradigm 'forecast and prepare' involves a dilemma and should be replaced by a synthesising planning paradigm, *i.e.* '*design a desirable future and invent ways of bringing it about.*'
The disciplinarity of OR	Effective treatment of messes requires interaction of a wide variety of disciplines.
Objectivity in OR	All those who can be affected by the output of decision-making should either be involved in it so they can bring their interests to bear on it, or their interests should be represented by researchers who serve as their advocates.

METHODOLOGICAL PLURALISM

The diversity of methodology within the OR and Systems Movement has led to the problem of knowing which approach to apply and when. There have been, for a number of years now, examples of case studies appearing in the literature which combine approaches from the Hard and Soft camps. For example, at the

International Systems Dynamics Conference in 1994 there was a significant number of papers outlining the connectivity between System Dynamics (associated with Hard OR) and Soft Systems Methodology (associated with Soft OR) implying that practice was taking the lead over theory. Mingers and Gill (1997) conceived the idea of multimethodology (rooted in the social science notion of methodological pluralism) which, in essence, is mixing methodologies from the same or different paradigms in the course of a problem-solving intervention.

Mingers and Gill offer three arguments to justify pluralism. Firstly, real-world problem situations are highly complex and multi-dimensional. Different paradigms can be likened to viewing the world through different lenses. Each lens reveals an aspect of the real-world but is blind to others. Thus in applying just one paradigm it is inevitable that a limited understanding of social situations is gained. Therefore, a methodologically pluralist approach is required to deal with the full richness of the real-world.

Secondly, an intervention is not usually a single discrete event but a process which has several phases. As the intervention unfolds it is likely that questions will be raised that require a change of emphasis from analysis to synthesis, from observation to interpretation. Thus, a combination of approaches may be required in order to provide a comprehensive outcome and produce better results.

Thirdly, consideration of philosophical and theoretical aspects of pluralist approaches is timely since practitioners are already combining methodologies for organisational interventions.

In summary, we believe problem situations within organisations are associated with different levels of complexity and uncertainty and methodological pluralism to be a broad and powerful way to facilitate organisational problem-solving. The ability to move back and forth from analysis to synthesis, from observation to interpretation seems a natural process of enquiry and this has lead to our interest in Morgan's (2006) Images of the Organisation, which utilises metaphors as a means for understanding organisations. We believe that linking OR methods and techniques to the metaphors established by Morgan provides an accessible structure or framework through which methodological pluralism can be realised by those involved in HE management and decision making.

Morgan's work has already influenced various OR academics (see, for example, the work of Jackson, 2003) and following this thread we now examine the metaphors identified by Morgan and their connectivity with OR methods and techniques, and methodological pluralism.

METAPHORICAL THINKING AND ORGANISATIONAL METAPHORS

The role of metaphor has contributed to the development of both natural and social sciences (Brown, 1977, Schon, 1963). Lakoff and Johnson (2003, p. 158) state:

> In all aspects of life ... we define our reality in terms of metaphors and then proceed to act on the basis of the metaphors. We draw inferences, set goals, make commitments, and execute plans, all on the basis of how we in part

> structure our experience, consciously and unconsciously, by means of metaphor.

The metaphor suggests "a way of thinking" and "a way of seeing" which assists in understanding our world. It is acknowledged that metaphor is inherently paradoxical. Morgan (2006, p. 5) believes it can provide "powerful insights that also become distortions, as the way of seeing created through a metaphor becomes a way of not seeing". However, metaphorical thinking offers a useful approach to inquiry and produces new ways of viewing the world. Morgan has identified several metaphors for organisational study which may lead to fresh ways of understanding and shaping organisational life. Thus, we believe the metaphor concept can be applied at university, faculty, departmental and other hierarchical levels. Eight metaphors are now briefly described together with some of their strengths and limitations. We also show links to chapters in this book that demonstrate a view of HE management through each metaphorical lens – sometimes as a strength but also sometimes as a weakness.

1. Machine Metaphor

The machine metaphor (often considered as the orthodoxy) is connected with the bureaucratic organisation, classical management theory and scientific management and table 3 highlights some of the strengths and limitations of the machine metaphor.

Table 3. Description of the machine metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	Works well under the following conditions: – When the task is clear and the environment is stable; – A need to produce exactly the same product time and again; – Precision is a premium; – People are compliant and behave as their roles intend.
Weaknesses	This organisational form has difficulty in adapting to a changing environment; Mindless and unquestioning bureaucracy; There may be unanticipated and undesirable consequences as the interest of those working in the organisation take precedence over the organization; There may be dehumanising effects upon employees.
Examples of associated OR method or technique	Mathematical programming, Linear Programming, Systems Analysis, Cost/benefit analysis and cash/flow spreadsheets.
Book chapter	2, 5, 15, 16

Scientists have developed mechanical interpretations of the natural world, philosophers and psychologists have constructed mechanical (cause/effect) theories

of the mind and behaviour, and mechanical principles are evident in many organisations. Within this metaphor, organisations are expected to operate with mechanical precision, and organisational life is routine. Staff are expected to work at a given time and perform specific activities. The organisation is designed like a machine and people are elements (linked by roles and responsibilities) of a machine. According to Morgan (2006), organisations designed as a machine are sometimes labelled bureaucracies. Scientific management (Taylor, 1911) is embodied by the principle of delineating the planning and design from its execution, i.e. splitting the brain from the hand.

2. Organism Metaphor

Organisations can be considered as a "living system" which exists in a wider environment and aims to satisfy both organisational and staff needs. Furthermore, different species of organisation can exist in very difficult environments. Some organisations work effectively in stable and protected environments, e.g. the civil service, whilst others thrive in more competitive and rapidly evolving environments, e.g. high technology and communications organisations. Many organisational theorists have shifted away from machine science to Biology as a source of new ideas, and this has contributed to the inception of systems science. Organisational theorists have developed a form of biological thought in which distinctions and relations between molecules, cells, complex organisations, species and ecology are congruent with individuals, groups, organisations, populations (species) of organisation, and their social ecology.

This metaphor emphasises the notion that individuals and groups operate more effectively when their needs are satisfied (Argyris, 1964). Therefore, coaching (or nurturing) of staff is an important concept. Hence, staff are motivated and the organisation encourages them to exercise their capabilities of creativity and innovation.

Differing schools of thought have emerged that relate to this metaphor. As we have previously described, the work of Ackoff (1999) and Senge (1990) views the organisation as seeking to satisfy and balance internal needs, and adapt to environmental circumstances.

On the other hand, the population-ecology perspective of the organisation (Freeman & Hannan, 1983) is underpinned by Darwin's theory of evolution. Organisations (like organisms) survive by finding adequate supplies of resources (inputs). However, organisations face competition from other organisations which eventually lead to a scarcity of resources – therefore only "the fittest survive".

A further view is that of organisational ecologists (Emery & Trist, 1973) who assert that organisations are not isolated entities – but exist as elements in a complex ecosystem. Some biologists conjecture that the whole ecosystem that evolves and the process of evolution can only be explained at the total ecology level (Bateson, 1972). This implies that organisms do not evolve through adaptation to environmental change, or by natural selection of the organisms that

are to survive. Instead, it suggests that evolution is a pattern of relationships with other organisms and their environments. It is the pattern, not just the separate entities comprising this pattern, that evolves (Morgan, 2006). Boulding (1981) contends evolution involves the "survival of the fitting" not just the "survival of the fittest" so that when explaining the ecology of organisations it is necessary to understand that organisations are involved in a pattern of coexistence. Some of strengths and limitations of the organism metaphor are identified in table 4.

Table 4. Description of the organism metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The understanding of relationships between organisations and their environments. Organisations are open systems and are best understood as ongoing processes rather than as collections of parts; Using the image of an organism in constant exchange with its environment so organisations need to be open and flexible.
Weaknesses	The metaphor facilitates the view that organisations and their environments are too concrete. Organisms live in a natural world with specific properties that determine the life and welfare of its inhabitants. We can see this natural world. Organizations, on the other hand, can be viewed as socially constructed phenomena, and the topology of that landscape is more difficult to observe and navigate.
Examples of associated OR method or technique	Systems Engineering, Quantitative System Dynamics, Systems Thinking, Cybernetics.
Book chapter	3, 4, 6, 7, 9, 10, 12, 14

3. Brain Metaphor

The brain metaphor aims to enhance an organisation's ability to promote flexibility and creativity. Therefore, the organisation must improve its capacities for intelligence gathering and action. The brain metaphor is strongly linked with the process of strategic management and control. The metaphor for organisational understanding is explored in two ways, namely: information processing systems that are capable of "learning to learn", and which reflect holographic principles.

Strategic managers make decisions based upon formalised and/or ad hoc processes, generating policies and plans and providing a point of reference for the information processing and decision making of others. Thus, organisations are information systems, communication systems and decision-making systems. The principle is to assist management in rational decision-making. The decision-making approach to understanding organisations was originally conceptualised by March and Simon (1958).

They argue that organisational decisions are not completely rational because of the limited information processing ability of their staff, and conclude that

individuals and organisations settle for good enough decisions based upon simple rules and limited information (so-called heuristic decisions). Hence, the theory of decision-making is fragmented, routinised and bounded in order to make the process more manageable. Since, the inception of the decision-making approach considerable research into understanding organisations from the information-process standpoint has been undertaken. Much work has focused upon dealing with complexity and uncertainty.

This metaphor also links to holography which emphasises the diffusion of information across the organisation and building patterns of rich connectivity between similar parts. This can produce systems that are both specialised and generalised, and are capable of reorganising internal structures and functions as they learn to meet environmental challenges. Table 5 highlights some of strengths and limitations of the brain metaphor.

Table 5. Description of the brain metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The metaphor contributes to the understanding of organisational learning and the organisation's capacity for self-organisation, so meeting the challenges and demands of environmental changes; The metaphor provides concrete guidelines as to how this can be achieved.
Weaknesses	This metaphor ignores the tensions between the requirements of learning and self-organisation on the one hand, and the realities of power and control on the other; A move from bureaucracy toward self-organisation has implications for the distribution of power and control within an organisation, since increasing the autonomy of self-organising units undermines the control of those in power.
Examples of associated OR method or technique	Quantitative System Dynamics, Heuristics, Cybernetics.
Book chapter	3, 4, 7, 8, 9, 12, 13, 15

4. Culture Metaphor

There is significant interest in understanding the relationship between culture and organisational life. Culture usually refers "to patterns of development reflected in a society's system of knowledge, ideology, values, laws and day-to-day rituals" (Morgan, 2006, p. 146). The cultural metaphor has considerable relevance for our understanding of the organisation – particularly with the increased globalisation and internationalisation of business.

People in a culture have different personalities but have much in common, and so with groups and organisations. This phenomenon is known as "corporate culture". Organisations are micro-societies that have their own patterns of culture and sub-cultures. One organisation may be a team that collectively work together.

Another might be fragmented, divided into groups that view the world differently. Patterns of belief (or shared meaning) fragmented or integrated, supported by various operating norms can influence the overall ability of the organisation to deal with environmental changes. Moreover, aspects of culture usually have historical explanations for the way things are done. Organisations can have different cultures which are underpinned by distinctive leadership styles.

There are links between leadership styles and corporate culture which provide insights into why organisations work in a particular manner. However leaders do not monopolise the emergence of an organisation's culture. Organisational cultures emerge through the course of social interactions and there are usually different and competing values that can generate a mosaic of organisational realities and cultures. Table 6 highlight the strengths and limitations of the cultural metaphor.

Table 6. Description of the culture metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	Organisations are shared systems of meaning, and thus shared interpretive schemes that create and recreate that meaning; The metaphor provides a new focus and avenue for the creation of organised action; The culture metaphor elevates the importance of attending to changes in corporate culture that can facilitate the required forms of organisational activity. Since organisations ultimately reside in the minds of the people involved, effective organisational change implies cultural change.
Weaknesses	When observing culture, researchers are observing an evolving form of social practice that has been influence by many complex interactions between people, events, situations, actions, and general circumstances. Culture is continuously evolving; Culture is often viewed as a set of distinct variables, such as belief, stories, norms and rituals that somehow form a cultural whole. Such a view is mechanical, giving rise to the idea that culture can be manipulated in an instrumental way.
Examples of associated OR method or technique	Soft Systems Thinking/Methodology.
Book chapter	3, 4, 7, 13, 14

5. Political Metaphor

Organisations can be viewed as systems of government which vary depending upon political principles. The political metaphor can highlight the politics of organisational life. The idea of politics is rooted in the view that divergent interests naturally occur and society should enable individuals to reconcile their differences

through negotiation. Politics can be the interplay of competing interests that creates a non-coercive form of social order.

Political science has observed several variants of political rule in organisations. Technocratic organisations (flexible and ever-changing) thrive in turbulent environments and power and accountability are linked to individual technical knowledge and expertise. By contrast in autocracies and bureaucracies the pattern of power and authority is clearly defined due to the stability of the environment. Technocracies tend to be in continuous flux as different individuals and groups rise and decline in power reflecting the value of their technical contributions.

The strengths and weaknesses of the political metaphor are identified in table 7.

Table 7. Description of the political metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The metaphor encourages the view that all organisational activity is interest-based and to evaluate all aspects of organisational functioning with this in mind; The model of interest, conflict and power is a means of understanding the relationship between politics and the organisation and emphasizes the role of power in determining political outcomes; The metaphor places knowledge of the role and use of power at the centre of organisational analysis.
Weaknesses	When organisations are analysed in terms of the political metaphor it is almost always possible to see signs of political activity. This mode of understanding often leads to an increased politicization of the organization; When we understand organisations as political systems we are more likely to behave politically in relation to what we see; We begin to see politics everywhere, and to look for hidden agendas even where there are none.
Examples of associated OR method or technique	Soft Systems Thinking/Methodology.
Book chapter	3

Organisational politics focuses upon the relationship between interests, conflict and power. Organisational politics emerge when people think and wish to act differently and ensuing tensions can be resolved through political means. This metaphor conceptualises organisations as a loose network of people with different interests that gather together for mutual benefit, e.g. making a living. Coalitions emerge when groups cooperate with respect to issues, events and ideologies. Often coalitions of two or more groups are working against a rival network. Many organisations foster the development of cliques and collaborations. From the perspective of organisational theory we can contrast the unitary, pluralist and radical frames of reference (see table 8).

Table 8. Description of unitary, pluralist and radical frames of reference (Burrell and Morgan, 1979)

	Unitary	*Pluralist*	*Radical*
Interests	Emphasis on the achievement of common aims. An organisation is viewed as being united under the umbrella of common goals and striving towards their attainment in a well-integrated team.	Emphasis on the diversity of individual and group interests. The organisation is regarded as a loose coalition which has just a passing interest in the formal goals of the organisation.	Emphasis on the oppositional nature of contradictory 'class' interests. Organisations are viewed as a battleground where rivals (e.g. unions and management), strive for incompatible ends.
Conflict	Regards conflict as a rare and transient phenomenon that can be removed through appropriate managerial action. Where it does arise it is usually attributed to the activities of deviants and troublemakers.	Regards conflict as an inherent and ineradicable characteristic of organisational affairs and stresses its potentially positive or functional aspects.	Regards organisational conflict as inevitable and as part of a wider class conflict that will eventually change the structure of society. Recognition that conflict may be suppressed and thus often exist as a latent rather than manifest characteristic of both organisations.
Power	Ignores the role of power in organisational life. Concepts such as authority, leadership, and control tend to be preferred means of describing the managerial prerogative of guiding the organisation towards the achievement of common interests.	Regards power as a crucial variable. Power is the medium through which conflicts of interest are alleviated and resolved. The organisation is viewed as a plurality of power holders drawing their power from a plurality of sources.	Regards power as a key feature of the organisation, but a phenomenon that is unequally distributed and follows class divisions. Power relations in organisations are viewed as reflections of power relations in society at large, and as closely linked to wider processes of social control.

6. Psychic Prison Metaphor

Morgan (2006) asserts that people can get trapped in their web of creation. This has led to the inception of the psychic prison metaphor for understanding organisations. Organisations might be viewed as socially constructed realities that can have constraints and these constraints can have an existence and power that exercises a measure of control over their creators. People in organisations can become trapped by their favoured way of thinking. Additionally, they can be trapped by an unconscious process which has hidden significance. Examples of these traps (from Morgan, 2006) are illustrated in table 9.

Table 9. The trap of favoured ways of thinking (Morgan, 2006)

Traps	*Description*
Trapped by success	The OPEC oil crisis of 1973: the Japanese automobile industry began to make inroads on the North American market. Caught in the mind-set of the American way of producing cars, the large US manufacturers were ill equipped to meet the Japanese challenge. They perceived their superior resources, technical competency, and skills in engineering and marketing as taken for granted. They were oriented to the large car market, ignoring the potential of small, fuel efficient cars.
Trapped by organisational slack	'Create certainty', 'build in margins for error'. These ideas have been guiding principles in the design of manufacturing organisations. The result: institutionalised inefficiency. Buffer stocks of inventory and work in progress allows systems of production to absorb uncertainties in the production process. But they can be extremely expensive, and provide leeway for people to engage in sloppy work and to hide their mistakes.
Trapped by group think	In 1961 the Kennedy administration launched an abortive invasion of Cuba. The plan was completely misguided. The plan was never seriously questioned or challenged, being carried along by the process that that psychologist Janis called 'groupthink'. A strong sense of 'assumed consensus' inhibited people from expressing their doubts.

Being trapped by group process is a good example of "groupthink" – when false assumptions, taken-for-granted beliefs and unquestioned operating rules combine together to create a self-control world-view that provides both resource and constraint upon organisational actions. Methodologies are being developed to avoid cognitive traps and groupthink by engaging in dialectical and other modes of critical thinking, and fostering the idea of learning-to-learn and of the learning organisation.

Many psychoanalysts believe the rational and taken-for-granted reality of everyday life should be explored through understanding what lies beneath conscious awareness. Thus, an understanding of "what we do and say" in going about our daily business must take into account the hidden patterns and dynamics of the human psyche. The challenge is to understand the unconsciousness in the organisation and realise trapped energy that promotes creative transformation and change, and improve relations among individuals, groups and organisations. A vision of confinement is normally accompanied with a vision of freedom. This metaphor offers an understanding of organisations as distinctive human phenomena. It recognises that people can feel trapped in problems that are of their own making. The metaphor assists in understanding ways out of these self-created traps.

The strengths and limitations of this metaphor are identified in table 10.

Table 10. Description of the psychic prison metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The metaphor presents a set of perspectives for exploring the hidden meaning of our taken-for-granted worlds; It encourages digging below the surface to uncover the unconscious process and related patterns of control that trap people in unsatisfactory modes of existence.
Weaknesses	The metaphor places an emphasis on understanding unconscious patterns of behaviour and control and people are often locked into cognitive traps because it is in the interest of certain individuals and groups to sustain one pattern of belief rather than another; The psychic prison metaphor embraces ideological processes which create and sustain meaning.
Examples of associated OR method or technique	Cognitive Mapping, Qualitative System Dynamics, Soft Systems Methodology.
Book chapter	8, 11

7. Flux and Transformation Metaphor

The orthodox systems approach to organisational theory is underpinned by the idea that change originates from the environment. An organisation is conceptualised as an open system in constant interaction within its environment, transforming inputs into outputs as a way of developing conditions required for survival. Manturana and Varela (1980) challenge the orthodox systems theory.

They see the organization as part of the environment, rather than as distinct from it. So instead of viewing the organization as a separate system that adapts to the environment, this metaphor allows us to look at organizations as simply part of the ebb and flow of the whole environment, with a capacity to self-organize, change and self-renew in line with a desire to have a certain identity. This view implies that managers can nudge and shape progress, but cannot ever be in control of change. Morgan states (2006, p. 262), “In complex systems no one is ever in a position to control or design system operations in a comprehensive way. Form emerges. It cannot be imposed”.

The key beliefs are: order naturally emerges out of chaos; organizations have a natural capacity to self-renew; organizational life is not governed by the rules of cause and effect; key tensions are important in the emergence of new ways of doing things; the formal organizational structure (teams, hierarchies) only represents one of many dimensions of organizational life. This leads to the following assumptions about organizational change: change cannot be managed. It emerges; managers are not outside the systems they manage but are part of the whole environment; tensions and conflicts are an important feature of emerging change; managers act as enablers for exchanges of views and focus on

significant differences. The strengths and limitations of the flux metaphor are identified in table 11.

Table 11. Description of the flux and transformation metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The metaphor attempts to understand the nature and source of change, so we can understand the logic; If there is an inner logic to the changes that shape our world, it becomes possible to understand and manage change at a new and higher level of thought and action.
Weaknesses	The approaches generated by this kind of thinking are far too idealistic. For example, any problem solution that requires a reframing of the logic of a social system is likely to encounter the resistance of the system.
Examples of associated OR method or technique	Cognitive Mapping, Interactive Planning, Qualitative System Dynamics, Soft Systems Methodology, Strategic, Options Development and Analysis.
Book chapter	8, 9, 10, 11, 16

8. Instruments of Domination Metaphor

It is important to understand organisations as instruments of domination – hence the inception of the instruments of domination metaphor. Organisations are considered as rational enterprises pursuing goals and aspiring to meet the needs of all. They can be viewed as an ideology rather than a reality. Organisations are often used as instruments of domination that satisfy the interests of a few at the expense of others. Moreover, there is an element of domination in all organisations. Some organisational theorist believe a combination of achievement and exploitation is a feature of most organisations. Hence, organisations can be understood as a process of domination, and instruments that reflect variations in the mode of domination employed.

The instrument of domination metaphor can be viewed as the dysfunctional or unintended consequences of an otherwise rational system of activity. The negative effect of organisations upon employees or the environment are not necessarily the intended impacts. Morgan (2006) asserts they are usually consequences of rational actions through which a group of individuals attempt to advance a particular set of aims e.g. increase profits or corporate growth. Actions that are rational for increasing profitability may impact upon employees' health. What is rational from one organisational perspective may have a negative effect upon another. Viewing organisations as a mode of domination which advances particular interests at the expense of others highlights an aspect of organisational reality which is that in discussing the rationality of decision making the question must be addressed – rationality for whom? Table 12 identifies the strengths and limitations of the instruments of domination metaphor.

Table 12. Description of the instruments of domination metaphor (Morgan, 2006)

Metaphor Attributes	*Description*
Strengths	The metaphor draws attention to the double-edged nature of rational action, illustrating that when we talk about rationality we are always talking from a partial point of view. Actions that are rational for increasing profitability may have a damaging effect on employees' health.
Weaknesses	The domination metaphor may lead us to focus on the negative aspects of the organisation in an extreme way thus unbalancing the managerial perspective.
Examples of associated OR method or technique	Systems thinking, Heuristic Thinking, System Dynamics.
Book chapter	3, 11

Other Metaphor Descriptions

We have presented here a brief outline of eight classical metaphor descriptions which resonate with views of the organisation. There is a rich literature describing the evolution of Morgan's ideas that extends metaphorical thinking in at least three directions.

Firstly, additional metaphors have been suggested that reflect the changing terrain of organisational behaviour and systems thinking. Such an example would be that of chaotic systems in which the results of research into chaos theory form the basis of new conceptions of organisational behaviour (Sloan, 2011). In this case there are strong links with systems thinking and system dynamics since from even relatively simple non-linear systems apparently chaotic behaviour may emerge (Galbraith, 2004).

Secondly, managers have been encouraged to be creative and to explore the use of their own metaphors. Morgan himself encouraged managers to move beyond the metaphors he described and to develop their own organisational images – what is important is that the metaphor used has some meaning for the individual within a particular problem context (Morgan, 1993).

Thirdly, authors have explored the use of multiple metaphors in situations where, for example, the design and implementation of a new information system requires a rich understanding of the organisational context, stakeholder views, requirements etc. so that systems developers can better "read" the social context in which the system development will occur (Oates & Fitzgerald, 2007).

In this chapter we have only considered Morgan's eight original organisational metaphors as we consider these to have stood the test of time, be well represented in the literature and well understood by practitioners. Other metaphors will, no doubt, continue to emerge over time and may in due course become part of the orthodoxy of metaphorical thinking. For the time being, however, we consider that the eight described, along with the links made in the next section to OR paradigms and methods, provide a sufficiently rich vocabulary for the description both of the

issues faced by HE organisations and their management teams and of the potential resolution of the issues. Consistent with this viewpoint that reflects the significance of considered priorities, we leave the consideration of other preferences (for example, post modern perspectives), to those who find such approaches correspondingly helpful.

CONNECTING OR PARADIGMS, APPROACHES AND METAPHORS

We now look at the connectivity between paradigms, metaphors and OR approaches as we believe that such connectivity will promote approaches to the understanding of problem situations which will lead to more informed problem solving solutions. The term paradigm denotes a view of reality in which various schools of thought offer approaches to exploring situations. These different schools of thought can be linked with a suitable metaphor and we further connect the metaphors to a relevant OR approach (see figure 2).

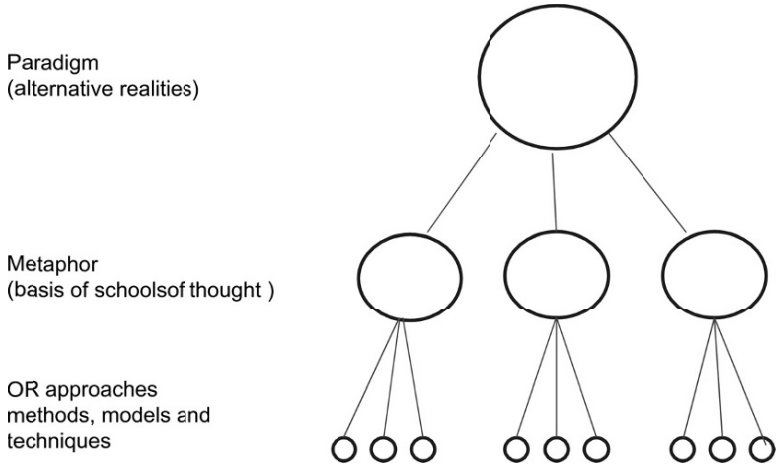

Figure 2. Connectivity between paradigms, metaphors and OR approaches for problem-solving (based on Morgan, 1980).

Tables 3 to 12 described above link the metaphors with various OR approaches and techniques and in table 13 below we summarise how the various authors of each chapter of this book feel that their work reflects, or is rooted within, the various metaphor descriptions given above. It should be noted that many chapters span more than one metaphor type. We also suggest in table 13 how the metaphors might be considered as representative of the Hard and Soft OR paradigms.