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Thesis title: SYSTEMIC EVALUATION METHODOLOGY FOR TECHNOLOGY SUPPORTED LEARNING

Qualification: PhD

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**SYSTEMIC EVALUATION METHODOLOGY FOR
TECHNOLOGY SUPPORTED LEARNING**

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SUBMITTED FOR THE AWARD OF Ph.D.

**THE UNIVERSITY OF SHEFFIELD
MANAGEMENT SCHOOL**

JULY 2010

Acknowledgements

Completion of this thesis would not have been possible without the continuing support and guidance of my two supervisors in the Management School, Dr John Kawalek and Dr Stuart Maguire. In the first instance, John selected me as his research assistant for an EU funded project which provided the first case study in which some of the initial research was undertaken. Without this funded opportunity to undertake research it would have been impossible for me to think about embarking on a Ph.D, having just funded myself through a postgraduate Masters course. John also introduced me to critical systems thinking – and for that I will be eternally grateful, as this helped me to think about my world differently.

I must also thank those project leaders with whom I collaborated in evaluating projects that form the case studies of this thesis. Although they gave their consent for their projects to be used for my research, I have not used their names to maintain their anonymity. If you are reading this thesis - you know who you are.

Another valuable source of support for my research came from colleagues in Learning and Teaching Services at the University of Sheffield, who were able to recognise the value in the relationship between my research and day-to-day responsibilities in evaluating learning and teaching initiatives, and the role this might play in progressing the aims of improving change management in learning and teaching. Particular thanks go to Dr. Adrian Powell, Gabi Diercks-O'brien and Dr. Luke Desforges for discussions which helped to challenge my thinking, and for giving me the encouragement, time and space to complete my research.

Last, but certainly not least, my thanks go to my many family members and friends for their unconditional support and patience over the last few years, as this research has taken priority over so many other activities that I would have liked to have shared with them. Its completion means that I hope I can now make up for some of that lost time, and return the favour with interest.

Abstract

Developments in information and communication technologies have opened up new possibilities for organising and supporting learning activity. Appropriate evaluation methodology is required to help practitioners understand how and why their implemented learning designs work, so that they can improve their practice. It is argued that progress in learning about good practice in this domain has been slow because of inadequate methodology for inquiry into the complexity of organised learning activity. Methodology is needed to develop a better understanding of the social factors that influence learning and its outcomes, and the role of technology in this process.

This research has investigated the use of systems thinking in evaluation methodology. It is argued that using systems thinking to underpin evaluation practice provides a theoretically robust evaluation methodology. The research principally draws from critical systems theory to rationalise an approach to integrating ideas from different systems models, frameworks and methodologies, in particular those from social systems theory (Churchman 1971), Soft Systems Methodology (Checkland 1981), cybernetic systems from a human-centred perspective (Beer 1972, 1979, 1982, 1985) and Critical Systems Heuristics (Ulrich 1983). The central contribution is evaluation methodology that has been found to work in practice and has been rigorously tested through an action research approach across multiple cases. It is argued that the methodology helps to further clarify the complexity associated with evaluating organised human activity, for example associated with the roles, relationships and activity of multiple stakeholders with an interest in the activity being evaluated and the evaluation activity, and the relationship between strategies at different levels of organisation such as projects, programs, and the wider society in which they are situated. This leads to improvement in the relevancy of information generated by evaluation for answering different questions of interest to these multiple stakeholders.

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Chapter 1. Introduction

The central contribution of this thesis is evaluation methodology for technology supported learning. This contribution is made through using critical systems thinking in the conceptual stages of an action research approach, theorising the experiences of multiple case studies in which technology was a key component in supporting learning activities. These learning activities, and their evaluation, are conceptualised using systemic constructs. It is argued that using systems theory to underpin evaluation practice provides a theoretically robust evaluation methodology. There are few empirical studies into the use of systems thinking for evaluating technology supported learning, and few empirical studies that aim to build evaluation theory through action research across multiple cases. The research illustrates how methodology underpinned by systems principles helps to clarify further some of the complexity associated with evaluating organised human activity, for example associated with the roles, relationships and activity of multiple stakeholders involved in the activity being evaluated and the evaluation activity, and the relationship between strategies at different levels of organised human activity such as projects, programmes, and the wider society in which these are situated. This thesis integrates several strands of systems theory to develop this evaluation methodology, in particular theory about cybernetic systems from a human-centred perspective, and critical systems heuristics.

1.1.Aim of the research

The original aim of the research was to develop systemic evaluation methodology to help those responsible for technology supported learning. At the outset, the rationale was that evaluation of learning has been too limited, e.g. by standardised feedback questionnaires given to learners.

It was felt that the investments in, and the potential of the growth of technology supported learning environments, required a more robust and systemic approach. This was seen to be particularly important in learning contexts in which changed behaviour or action was a specific intended outcome of the learning. It was considered that existing evaluation methods often placed too much emphasis on the individual learner in the learning activity, at the expense of considering their relationship with the wider group involved in the learning and the wider context in which their learning was to be applied. It was assumed that methodological improvement was needed to lead to improved understanding of the complexity of organised learning activity and how it is constructed through social processes, as well as how it contributes to wider and longer-term change in both learners and in their consequent change actions.

The intended contribution to theory and practice was methodology transferable beyond the single case. It is argued that improving methodology for this purpose will lead to improved knowledge of effective learning designs and how to implement them. This is considered important because of the contribution organised learning activity makes to organisational learning and change and to developing the capability of individuals to participate in or manage organisational change.

The aim was to explore the use of systems thinking for improving evaluation methodology. This is an approach to organising thinking about complexity that is more traditionally associated with the information systems discipline and information systems development (Checkland 1999, Churchman 1971, Beer 1972). Until now, there have been few examples of its application specifically to the evaluation of technology supported learning activity, despite on-going recognition about its potential, e.g. "*the systems and evaluation fields [...] share many experiences, concepts, goals, even attitudes, yet know very little about each other*" (Imam *et al* 2007, p3).

1.2. Key concepts

As can be seen, this thesis is broad in its scope. This means that the discussion and arguments are framed by wide range of key concepts and principles. This section outlines some of the concepts used later in the thesis, and is included to provide clarity about their meaning. More detailed explanation can be found in the theoretical rationale for the research developed in Chapters 2-4.

1.2.1. Change management

Checkland (1999) has described management as being:

"concerned with deciding to do or not to do something, with planning, with considering alternatives, with monitoring performance, with collaborating with other people or achieving ends through others; it is the process of taking decisions in social systems in the face of problems that may not be self-generated" (Checkland 1999, p72).

Management is also associated with 'organisations'. These are referred to as 'social systems' by Checkland, and involve group of individuals that come together to undertake some co-ordinated, collective, and purposeful endeavour. Individuals involved in them may have their own motivations and objectives, or interpretations of their purpose. But to be considered in the collective as an organisation, there must at least be some espoused reason for the collective action.

The key assumptions about management practice that can be interpreted to be underpinning Checkland's description are:

- (i) A need for change is prompted by the perception of a problem or opportunity in relation to the organisation's existing purpose or how it is organised for achieving this purpose.
- (ii) This problem or opportunity may originate from either within or outside the organisation.
- (iii) Intervention to bring about change has intended outcomes in relation to this problem.
- (iv) Intervention is preceded by a decision to take one course of action instead of other potential actions.
- (v) This decision is informed by consideration of the likely outcomes of different interventions.
- (vi) Judgments about the likely outcomes of intervention are informed by appropriate inquiry.

This leads to the proposition that the primary concern for managers is change.

Another common perspective is that the term 'management' refers to a number of activities aimed at controlling human activities and the resources needed to achieve an organisation's objectives effectively and efficiently (Drucker 1955). Research that has explored what managers do (Mintzberg 1973, Stewart 1967) highlights that although it may be possible to identify different roles common to management generally, each individual manager's role "*involves their own kinds of specialized behavior*" (Mintzberg 1973, p.94, see also Stewart 1967). There is therefore a requirement to strike a balance between different management activities that will help them to achieve objectives in a specific context. These include activities such as planning, organising, motivating, directing, and controlling (see Mintzberg 1973). Therefore, managers need to be flexible in being able to construct their own roles to fit the circumstances in which they find themselves, and the particular constraints or opportunities they face (Stewart 1982). This description of management could also be applied to all non-routine jobs implying that "*anyone in a position to direct actions that affect the economic, political, or physical conditions of others is in some sense a manager*" (Winograd and Flores 1986, p143). Change management practice is not straightforward, because of the complexity of the organisation being managed and the environment in which it is operating. This complexity is due to internal and external conditions being dependent on human activity, which is influenced by their subjective motivations and interpretations about the purpose of this activity and how this could be achieved. This human behaviour is therefore not predictable in the same way as biological or physical phenomena (see also Vickers 1983). This presents particular problems for inquiry that aims to develop

understanding about the likely outcomes of intervention to change. This is one of the key problems that this research attempted to address, in the particular context of technology supported learning.

1.2.2. Organised learning activity

Organised learning activity is assumed to be a collection of individuals whose purpose or joint endeavour is learning, and whose activities therefore need organising in some way for this purpose. Examples are groups brought together in the formal educational context in order to achieve some espoused learning objectives, or those formally convened within an organisational context with a particular remit to improve organisational performance in some way through their learning. Alternatively, practitioners may informally or formally come together to learn in order to continually improve their practice.

The use of technology adds a further level of complexity in organised learning activity. This complexity is due in part to the diversity of the learning intended, the learning activity which the technology supports, the pedagogical assumptions underpinning activity, and how the technology is being used to support it. Complexity is also due to the subjective interpretation of those involved in the learning activity about the role of technology in it. Examples of technology include film, graphics or hypertext distributed in DVD or CD-ROM format which can be accessed using free-standing personal computers. Another level of complexity is that information and communication technology may be used to connect users via the internet. Examples of the roles of technology are:

- (i) bringing people together to communicate quickly and easily, despite geographical and temporal constraints;
- (ii) enabling data and information to be stored, processed and accessed more efficiently by potentially large numbers of users at any time, from any location;
- (iii) being able to record or simulate aspects of 'real world' experience.

1.2.3. Learning design

'Learning design' is a term often used in an educational context to describe the planning and organisation of learning activity. This will include consideration of issues such as what learners should learn and why this is important, who else will be involved and their roles, how activity can be organised to help learning, and what resources will be needed to undertake this activity.

1.2.4. Evaluation

Evaluation has been summarised as “*judging the value, merit or worth of something*” (Clarke and Dawson 1999, p1, after Scriven 1996a). Evaluative judgments about organisations can be used to inform different management decisions, for example about whether the investment of resources has been worthwhile, how to invest future resources, or how to improve the effectiveness of activity with resources available. These decisions are usually informed by inquiry involving “*the systematic collection of information about the activities, characteristics, and outcomes of programs for use by specific people*” (Patton 1986, p14). The term *systematic* is used here to convey a sense of planning, organising and ordering. This is distinct from *systemic*, the meaning of which is explored in depth in Chapter 3, but which is concerned with exploring connectivity between components, ‘wholes’, and their wider environment, where the ‘whole’ is a focus of interest. In the context of this thesis the evaluative judgment is directed at technology supported learning. The position taken here is that the evaluation is complex because organised human activity and inquiry about it involves many individuals who could potentially have a subjective perspective of what ‘value, merit, or worth’ means in this context. The evaluation inquiry is also complex because of the different people involved, their interests, motivations and interpretations etc. Further discussion about the complexity of this inquiry in the context of organised learning activity forms a significant contribution to Chapter 2 of the thesis.

1.2.5. Methodology

The term ‘methodology’ is often confused by practitioners with ‘method’. In my own experience as an evaluation practitioner I have heard others use these terms interchangeably many times. It is therefore important to the reading of this thesis to understand how it is being used in this context and why lack of methodology for evaluating organised learning activity is problematic.

Here the term ‘methods’ is aligned with Bryman’s (2008) definition as “*the techniques that researchers employ for practising their craft*” (Ibid, p160), although by giving examples of ‘methods’ as

“*instruments of data collection like questionnaires, interviews or observation, [...] tools for analysing data, which might be statistical techniques or extracting themes from unstructured data; or [...] aspects of the research process like sampling*” (Bryman 2008, p160)

he too shows some confusion about the difference between these research techniques, and their application in specific contexts through the use of tools and instruments.

Checkland (1999) describes methodology as a set of general *principles of method* which guide the specific choice of method appropriate to a unique situation. He saw this as intermediate in status between a philosophy and a technique, where he considers a philosophy to be a “*broad non-specific guideline for action*” (Checkland 1999, p162) and a technique to be “*a precise specific programme of action that will produce a standard result*” (Ibid, p162). Thus

“a methodology will lack the precision of a technique but will be a firmer guide to action than a philosophy. Where a technique tells you ‘how’ and a philosophy tells you ‘what’, a methodology will contain elements of both ‘what’ and ‘how’” (Ibid, p162).

Jayaratna (1994) is somewhat critical of this definition. He argues that ‘philosophy’ should be concerned with the question ‘why?’ not ‘what?’ It therefore neglects to take into consideration that methodology is purposeful. The thinking of those designing and/or using it about *what* change is desirable and *how* this can be achieved is influenced by their needs, motivations and prior knowledge.

“A methodology must show ‘what’ steps to take, ‘how’ those steps are to be performed and most importantly the reasons ‘why’ the methodology user must follow those steps and in the suggested order”(Jayaratna 1994, p. 43).

Bryman (2008) describes this more succinctly as “*concerned with uncovering the practices and assumptions of those who use methods of different kinds*” (Ibid, p160). It therefore describes a rationale and strategy for the choice and application of specific action i.e. method. This action may be either the undertaking of some form of inquiry or operational activity.

Although this definition may seem somewhat simplistic in relation to the concept of methodology developed through this thesis, it did provide a useful starting point for thinking about methodology as a strategy for action that is informed and rationalised by theory. The concept of theory is also explained later in this section.

Where this action is ‘research’ then it is informed and rationalised by a theoretical perspective that is described as “*an approach to understanding and explaining society and the human world*” (Crotty 1998, p3). For example, this thesis develops an argument about the value of using critical systems thinking as a theoretical framework for understanding organised learning activity, the role of technology in this, and the management of change and improvement of this activity. This theoretical perspective is likewise embedded in an underlying philosophical perspective about the nature of the world and how we can make sense of it.

This underpinning philosophy is generally described in terms of ontology and epistemology, where:

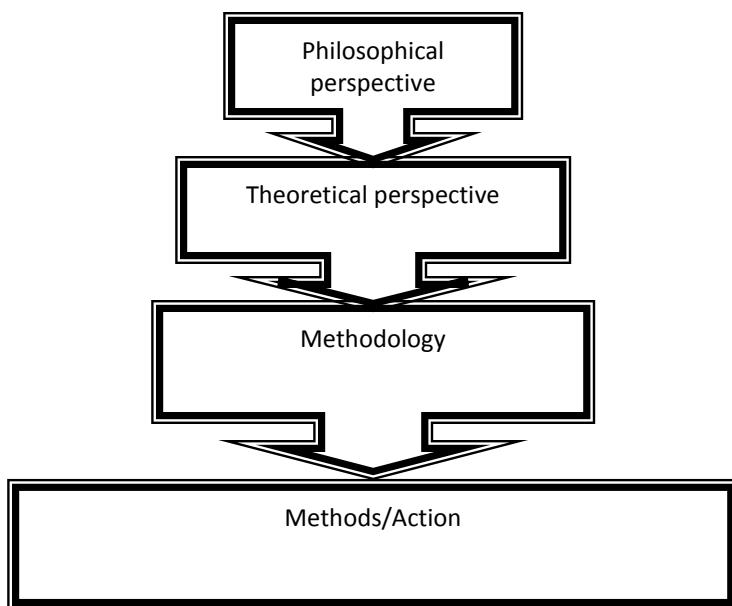
- (i) *Ontology* is concerned with the nature of our world. At one end of the spectrum of perspectives about ontology is the objective or realist position. This assumes that there is a ‘real’ world and ‘things’ in it that are independent of our own consciousness of them. At the opposite end of this spectrum is the subjective position that assumes that there is no real structure to the world that is independent of our consciousness of it.
- (ii) *Epistemology* is concerned with how we make sense of our world. The extreme objective position assumes that we can objectively learn, or make discoveries about the world in which we live, independently of our subjective perceptions of it. The extreme subjective position accepts that we all experience and interpret the world differently. What we believe we know is dependent on our subjective interpretations, which are framed by our previous learning and experiences.

Figure 1.1 shows the relationship between the more abstract thinking or philosophical and theoretical perspective, and their connection with concrete action through methodology.

In summary

“the term methodology means a structured set of guidelines for activities to undertake to improve the effectiveness of an intervention” [] “methodologies are based, implicitly or explicitly, on particular philosophical assumptions concerning the nature of the organizational world and the appropriateness of various forms of action. These sets of assumptions form a particular view of the world that is sometimes called a paradigm” (Mingers 1997, p1).

Figure 1.1 Methodology in context with theory and action (adapted from Crotty 1998, p4)



1.2.6. Theory

In science the term 'theory' refers to explanations that help us to understand the relationships and patterns we observe in our world, often with the aim of predicting or controlling some element of it to address problems or opportunities we perceive in our lives. Scientific theories are expressed as generalisable relationships or universal laws about cause-effect relationships. In the physical and biological sciences these are traditionally understood through **deductive** scientific inquiry. This relies on reducing the phenomena under investigation into smaller components to enable the isolation of variables so that theories about their relationships can be tested through experimental methods.

However, this scientific approach has not been so successful in helping theory to be developed about social phenomena such as the organised learning activity that is the focus of this research. Variables that will influence the outcome of social activity are not easily isolated so that their relationships can be tested in this way. This is because they depend on the actions of individuals, who are influenced by subjective motivations and interpretations, which are in turn shaped by their unique histories of learning and experience. Each situation is unique due to the mix of people involved and its relationship with the wider environment at the time of the intervention.

This limits the extent to which the outcomes of change or intervention can be predicted or controlled.

Inductive inquiry has provided an alternative approach to understanding social activity. Methodology is based on interpretive principles, seeking to develop insight and understanding of how communication, interaction and interpretation have an influence on change. The aim is not to predict or control, but to reduce uncertainty about the consequences of change. Methods used attempt to explore participants' underlying rationales for their action and experiences, and the connections they make between activity and the outcomes that they observe or experience. Theory about the likely consequences of action is strengthened when it is observed that the same rationales and connections are being repeatedly made by different individuals.

However, this type of interpretive research is often criticised for leading to descriptive frameworks that are limited in their value for informing practice. The concept of 'framework' differs from that of 'methodology', in the sense that while the latter is intended as a dynamic model to guide time dependent thinking and actions stages, the former is a static model "*through which a range of concepts, models, techniques, methodologies can either be clarified, compared, categorized, evaluated and/or integrated*" (Jayaratna 1994, p.43). Their focus is on providing models of successful or unsuccessful change initiatives in terms of their relationship between activities and outcomes in the contexts in which they are applied. This is problematic for practitioners because it assumes that the information provided is sufficiently detailed and inclusive of the range of diversity that they could face in their own situations, that they will be able to choose which models apply, and that this will help them make decisions about action needed. They do not provide guidance on specific implementation action that will help bring about the desired change in their own situations.

Prescriptive frameworks tend to originate from practice, and are sometimes called 'theories in use' (Argyris and Schön 1978). These describe approaches that have been found to work in particular contexts, but without any basis on which to judge the rationale for their transferability to other contexts. Examples are frameworks that recommend specific action such as to 'identify', 'acquire', 'develop', 'share', 'use' and 'retain' knowledge assets (Probst *et al* 2000). The difficulty here is that they assume that the user of the advice will be able to make judgments about specific action that is appropriate for achieving intended outcomes in their own particular context. In practice, the lack of rationale for the action in terms of why it might work in these circumstances makes it difficult for practitioners to decide whether and how it is appropriate for them.

This disconnection between prescriptive and descriptive theory has been described as a ‘relevance gap’ which needs to be addressed by more appropriate management research methodology (Gibbons *et al* 1994, cited in Starkey and Madan 2001).

1.2.7. Systems thinking and systems practice

In management research, systems theory developed as a reaction to the limitations of ‘scientific’ method for developing understanding about the complex problems and issues that managers face in their organisations. The concept of ‘system’ is used to describe *organised complexity*, meaning relationships between components are strongly interactive (i.e. cannot be straightforwardly isolated) and non-linear. Hence bringing together parts provides new effects, not just a sum of the individual outcomes. The concept is summarised as “*a set of elements connected together which form a whole, this showing properties which are properties of the whole, rather than properties of the component parts*” (Checkland 1999, p3). Organised complexity is therefore associated with levels of hierarchy “*each more complex than the one below*” and “*characterised by emergent properties which do not exist at the lower level*” (Checkland 1999, p78).

The use of systems concepts to make sense of ‘the world outside ourselves’ has been called *systems thinking*, with the application of this thinking to guiding concrete action often referred to as *systems practice* (Checkland 1981, 1999)

1.3. Relevance of this research to management theory and practice

This section addresses the question of why learning is important for individuals and organisations, and why improvement in evaluation methodology is important in the context of technology supported learning.

Knowledge about an organisation and its relationship with its wider environment is considered essential in change management initiatives that aim to improve organisational performance and competitiveness (e.g. Prahalad and Hamel 1990, Sanchez *et al* 1996, Sanchez and Heene 1997). Understanding the process of learning at the organisational level, and attempting to improve it, has become even more important in the rapidly changing global economy as commercial organisations need to be able learn faster than competitors. It is important for non-commercial organisations to be able to adapt to the challenges they face in meeting the needs and expectations of a diverse range of stakeholders in an ever changing global environment. Recent examples of such changes have been the crisis in the banking sector and the swine flu pandemic, which will have created different kinds of challenges for different types of organisations. Since

organisations are a collection of individuals working together, it is important that they are able to contribute to learning useful for informing decisions about change, be this change in their own practice or some other change activity.

Formal education, particularly higher education, is considered to have an important role in developing the capability and confidence of individuals to adapt to change and make a positive contribution to the organisations in which they work, particularly at managerial level (Leitch 2006). It is also considered to be an important factor in improving society more generally in terms of its prosperity and fairness (*Ibid*). This applies to learners of all disciplines, not just those who have undertaken some formal management education, since it is likely, and in many cases expected, that graduates will be developed into management roles in organisations. This has led to increasing interest in students of higher education developing knowledge and skills beyond the scope of their academic discipline and that are transferable to other dimensions of their lives, their future employment and their broader contribution to society. In this discourse about the need for 'lifelong learning', learning is not perceived as confined to the classroom, but considered "*a central lifelong task essential for personal development and career success*" (Kolb 1984, p3).

In today's 'information society' (Castells 1996) there has been significant interest and investment in developing and improving technology and its use for helping learning. For example, virtual learning environments and managed learning environments (see Definition Box 1.1 overleaf) are now commonly viewed as an important part of strategy for higher education institutions in helping them to meet student expectations and to manage learning activity. This is driven by issues such as student and staff expectations of the role available technology will play in their learning and teaching experiences, particularly in an environment of increasing student numbers and staff to student ratios, and rapid technological change. Most large organisations are using information and communication technologies to help employees share information and their experiences as part of change management initiatives in which learning is encouraged to inform improvement in policy, strategy and practice. It is therefore important that practitioners have methodologies that enable them to assess and improve the value these new technologies bring to learning activity, to ensure a return on the investment being made in them.

Definition Box 1.1

Virtual learning environment

Software that integrates together a number of tools that can be used to support learning and teaching and that can be accessed across the internet. Tools allow for the presentation of course materials in various file formats, the communication between learners and those teaching or managing the course, and other activities associated with learning and assessment such as the submission of coursework, completion of quizzes, recording of grades, and tracking of student activity. The environment tends to be restricted to registered users.

Managed learning environment

This is a virtual learning environment that is integrated with information systems that support the management of the institution more widely. For example, registered users of a VLE and the courses they can access are automatically updated from data held within other databases of course, student and staff records.

1.4. Background to the research

In the management discipline there is now an extensive body of theory about organisational learning and knowledge management, and the rationale for them (see for example Argyris and Schön 1996, Boisot 1998, Brown and Duguid 1991, Davenport and Prusak 1998, Nonaka 1994). The complexity of this theory is explored more fully in Chapter 2. However, in short, both are concerned with learning that is useful for informing decisions about organisational change.

Organisational learning is a metaphorical term which “*enables the exploration of an organization as though it were a subject that learns, processes information, reflects on experiences, and possesses a stock of knowledge, skills, and expertise*” (Gherardi and Nicolini 2001, p47).

Knowledge management is a sub-discipline that has emerged in the last decade of the 20th century as new developments in technology have focused interest on how it can be used to effectively support learning in organisations.

Knowledge management initiatives have historically not had a good reputation for success. It was once reported that close to 70% of new knowledge management initiatives “*don’t accomplish what they set out to do*” (Morehead ¹, quoted by Ambrosio 2000). A criticism has been that existing theory intended to guide management action has either been too prescriptive or

¹ At the time of the report Daniel Morehead was Director of Organizational Research at British Telecommunications plc in the USA.

descriptive and does not “*consider the entire knowledge management process: purpose of the organization, knowledge, technology, learning and people/culture*” (Rubenstein-Montano *et al* 2001, p.7/8). This makes it difficult for managers to make the connection between theory and its relevance for informing their own action in the design and implementation of initiatives for their very specific practice situations. Methodology is therefore needed with both prescriptive and descriptive components, i.e. a *prescriptive* guide for action underpinned by a *descriptive* theoretical rationale that explains why and in what circumstances the action is likely to lead to particular outcomes.

The organisational context of this research is that of higher education. Here there has also been poor understanding of how e-learning (see Definition Box 1.2) initiatives can be implemented to enhance learning. The UK e-University was an institution reliant on its virtual learning environment to support its learners, but this was dramatically pronounced a failure in 2004 (House of Commons 2005).

Definition Box 1.2

E-learning: formal and structured learning activity in the educational sector and in the work place that is facilitated and supported through the use of technology.

Networked learning: a type of e-learning in which members of the learning activity are connected via the internet with each other and tools and resources needed to mediate the learning process.

Blended learning: learning activity that involves a combination of face-to-face learning activity and e-learning activity.

There has been criticism (e.g. Harvey 2005) that during the last 20 years of the 20th century, too much emphasis was being placed on driving improvement in UK higher education institutions through quality assurance activity at the expense of quality enhancement. The primary purpose of this quality assurance was to provide accountability for government funding allocated through higher education funding councils. Approaches included measuring institutional achievement against benchmarked criteria and standards for each academic discipline. Enhancement activity was largely left to the internal management processes of institutions.

This culture has been recently changing, and the external quality monitoring process now places increased emphasis on scrutinising institutions’ processes for improving learning and learners’

experiences of their learning (Quality Assurance Agency 2006). This change in emphasis is reflected in investment in educational development work, which receives some earmarked funding to provide incentive for its prioritisation (Higher Education Funding Council for England 1999, 2002, 2006a). It is argued that the key function of educational development in higher education is “*to create an environment in which debate can flourish about what constitutes good practice and how that may vary across different contexts and for different students*” (Gosling 2001, p75). It should therefore not be too narrowly concerned with “*effective teaching techniques which enhance students learning*” (D’andrea and Gosling 2001, p65), but should more broadly be conceptualised as a coherent approach to educational change, for example linking relevant institutional policies, strategies, structures and practices towards achieving the institution’s overall educational aims, as well as constantly questioning these aims and those of higher education more broadly (D’andrea and Gosling 2001, Gosling 2001). Although Gosling (2001) emphasised that not all of the following activities are undertaken in all universities, those that are now considered to fall within the broad scope of educational development are:

1. *“Improvement of teaching and assessment practices, curriculum design, and learning support – including the place of information technology in learning and teaching.*
2. *Professional development of academic staff, or staff development.*
3. *Organizational and policy development within the context of higher education.*
4. *Learning development of students – supporting and improving effective student learning.*
5. *Informed debate about learning, teaching assessment, curriculum design, and the goals of higher education.*
6. *Promotion of the scholarship of teaching and learning and research into higher education goals and practices”.*

(Summarised by Gosling 2001)

Many funded educational development initiatives have therefore involved experimentation with how new technology can be used to lead to improvement. Despite evidence of increasing educational development activity in universities (Gosling 2001, 2004, Gibbs 2003), there has been little progress in providing evidence of the impact of such investment on students’ experiences of learning (Gosling 2004). Where there is data to suggest improvement in outcomes (e.g. student satisfaction or achievement) it has been difficult to establish a connection between these and the enhancement activity that has been undertaken with these incentive funds. More recently, attention has been turning to the role of evaluation in developing understanding of the impact of

change strategies, and the importance of developing appropriate impact evaluation methodology for the context of higher education (Centre for Higher Education Research and Information 2005, Higher Education Funding Council for England 2006b).

A common approach to educational development work is the ‘reflective practitioner’ model, founded on experiential learning models (Lewin 1946, Schön 1983, Kolb 1984). In these models it is assumed that action is informed by learning from previous activity. At the individual level, this learning involves critically reflecting on our observations and experiences of our activity and how these compared to our expectations. In this way we cumulatively develop understanding of the relationship between our activity and its effects, our ‘theories of action’, and hence build knowledge of what constitutes good practice (see section 2.2 for more detailed explanation). Kember (2002) has proposed that applying this model of inquiry more systematically through action research is effective in changing practice at the local level and in building capacity for change management in education.

However, Trowler *et al* (2005) have argued that this approach to inquiry is often being applied too simplistically to educational development work. It assumes change to be unidirectional and driven by practitioners’ action as their concept of good practice changes and they ‘transmit’ or ‘transfer’ what they have learnt to others who will adopt it. This accepts a certain level of complexity in conducting inquiry into the unclear, unstructured, problematic situations faced by practitioners by recognising that our understanding of these situations is subjectively framed by our prior learning and experiences. However, it ignores the more complex social and political dimension of learning and change processes, whereby the meaning of any observed or experienced phenomena for a collective endeavour is negotiated by those involved in it or with a vested interest in it. A further layer of complexity is that these processes are also often operating at different levels. For example activity may be being undertaken by academic staff and their students in the context of a single unit of study whilst simultaneous change initiatives are being implemented that are intended to have institution-wide impact.

D’andrea and Gosling (2001) note that although there is generally broad agreement from within the UK higher education sector about the aims of educational development, i.e. enhancement of student experiences and learning, there is no common understanding or agreement of what counts as enhancement, or indicators of enhancement. The main omission from the change management model for learning and teaching activity is *methodology* that develops understanding of the complexity of the role of social and political processes in the change.

1.5. Research objectives

Having argued that there is a need for improvement in evaluation methodology that can help to develop understanding of the complexity of technology supported learning as human activity ‘systems’, the main question being addressed by this research is how systems thinking can be *applied* to improving evaluation methodology in this context. In order to answer this question, the research objectives formulated to guide the research design were:

- To explore relevant theory to inform the design of appropriate evaluation methodology for technology supported learning. ‘Relevancy’ here was taken to be theory in the field of knowledge and learning, organisational learning and knowledge management, evaluation, and systems thinking and practice.
- To use this theory to design practical steps managers would need to take in using systems thinking to undertake inquiry into organised learning activity.
- To test the designed evaluation methodology in real cases to develop understanding about their value in informing practitioners’ decisions and actions.
- To test the transferability of the methodology across multiple cases, in doing so developing understanding of how and why methodology works (or not) to contribute to wider theory about evaluation methodology.

1.6. Methodology overview

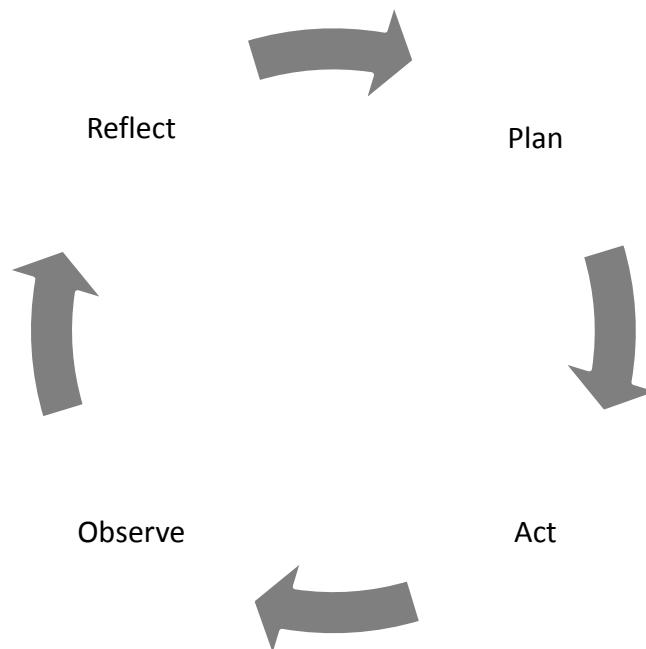
The definitions of methodology used earlier in this chapter described it as method (or action) rationalised by theory. Because methodology fundamentally involves action, it has been argued that action research is the only valid research approach for developing or changing methodology (Baskerville and Wood-Harper 1996). The origins of action research have been attributed to Kurt Lewin (1946 as cited in Kemmis and McTaggart 1981, and Baskerville and Wood-Harper 1996). Its philosophy is one of a commitment to improvement of the context of research in collaboration with the practitioners that work in it as “*people are more likely to accept and act on research findings if they help to design the research and participate in the gathering and analysis of data*” (Argyris and Schön 1996, p44). Argyris and Schön’s (1996) interpretation was therefore of a process whereby the researcher works with practitioner(s) in designing inquiry into the effectiveness of their theories in use and their alignment with espoused theories, as well as

helping them to question the continued appropriateness of these theories by challenging their underpinning assumptions.

In the research process, an individual or a group of individuals may have both roles of researcher(s) *and* participant practitioner(s), or collaborate closely with non-research practitioners, in order to influence change in some elements of practice. This may be done through iteration of the action-reflection cycle of:-

- (i) planning intervention(s) intended to bring about desired change;
- (ii) making feasible intervention intended to lead to desired change;
- (iii) observing the consequences of this intervention in the context of change;
- (iv) reflecting on the effects of the intervention and the implications for the planning of future action.

Figure 1.2: Action research cycle



Tsang (1997) has argued that action research provides a means of testing the relationship between prescriptive and descriptive theory. Each iteration of these stages should result in theory formation about *what* appears to be working or not working (the prescriptive component) and *why* this is the case for the different people involved (the descriptive component). This improved theory then informs choices about future strategy.

1.7. Scope of the research

In developing evaluation methodology the emphasis has been on inquiry that informs the planning, decisions and actions of managers responsible for technology supported learning activity. The research has been undertaken in case studies in the context of higher education. These cases were similar by virtue of being change initiatives that concerned the integration of technology into organised learning activity with the intention of supporting the learning in some way. This enabled connections to be made between the cases about how the evaluation methodology helps managers to develop understanding of change and informs the planning of further improvement. Diversity in the cases includes the participants in the learning activity, the specific knowledge and skills being developed, the pedagogical assumptions on which the activity is based, the technology used and its supporting role in the learning activity. This diversity was important for allowing opportunity for new learning to emerge about the use of methodology in different contextual circumstances and to test its transferability beyond the single case.

A substantial empirical study of a single case is presented in Chapter 5 of the thesis. Additional case studies in which some of the development work was undertaken are also included in Appendices 1 and 2. A summary of all the cases that were used to inform the research and improvement in methodology is given in Appendix 4.

1.8. Structure of the thesis

The more detailed argument of this thesis is presented through the following chapters.

Chapter 2 – Theoretical background

A critique is undertaken of some of the background literature that was considered relevant for informing the research. This chapter explores how learning, and the role of technology in learning, are theoretically conceptualised, and discusses the relevancy of these concepts for the management of organised learning activity. The argument for why this learning activity should be

more appropriately conceptualised as constructed by social and political processes is developed in more detail. Some existing theoretical frameworks about knowledge management and the use of technology in learning are discussed. Many are understood to be based on inappropriate philosophical assumptions, including how the technology is considered to support the process. Even those that are based on appropriate assumptions can be considered either too prescriptive or descriptive to help practitioners in their own specific contexts of practice. It is argued that change management in organised learning activity needs to be informed by inquiry that helps managers understand the social and political process of change. This inquiry involves iteratively evaluating how and why their ‘theories of change’ work in practice. These theories may be informed by previous experience as well as theoretical frameworks, but their effectiveness and impact needs to be understood in context.

This leads to a review of existing evaluation approaches for their relevance to the research problem, and concludes that they are limited in their handling of the complexity of organised human activity. This brings into focus not only the complexity of the organised activity being evaluated, but also that of its relationship with the evaluation activity and wider contextual environment. It is suggested that systems theory may provide appropriate theoretical constructs to help model the complexity of theories of change for integrating technology into organised learning activity, and that there has been very little research in this area to date.

Chapter 3 – Systems theory and its role in change management practice

This chapter explains the assumptions and principles of systems thinking, and discusses the relevancy of different approaches for helping to understand the complexity of organised learning activity and the role of technology in it. It is concluded that critical systems thinking (Flood and Jackson 1991, Jackson 2006, Midgley 2000, Ulrich 1983, 1987), may provide a way forward for addressing the limitations of some of the evaluation approaches reviewed. The work of Churchman (1971) and Ulrich (1983) provides useful constructs for modelling activity systemically and for guiding critical inquiry into the impact of different perspectives on the activity, and hence its outcomes. However, Beer’s Viable Systems Model (1972, 1979, 1981, 1985) provides some additional concepts that are argued would also be useful for conceptualising in more detail the interaction between different roles in the activity, its functionality and the relationship between different levels of strategy. It is argued that these could be useful in the conceptual stages of an action research approach to evaluation.

Chapter 4 – Research methodology

This chapter takes further the argument for an action research approach to developing new evaluation methodology. For the methodology to be transferable, experiential knowledge must be developed across a range of cases that are sufficiently similar to be relevant to developing knowledge about the issue being investigated, but sufficiently different for new knowledge to emerge. The choice of case studies used is outlined and rationalised. The stages of action and thinking involved in the iterative inquiry into each of the case studies are described. It is noted that action research is often criticised for lack of rigour, and the criteria which distinguish it from reflective practice are discussed. One of the difficulties is that the processes of reflexion and reflection in the research are important, but there is often too little guidance on how to do this. It is proposed that, in addition to modelling organised learning activity, critical systems thinking can equally be applied to the modelling and critique of the evaluation activity and its relationship to the organised learning activity being evaluated. It therefore has potential value in providing a framework that brings rigour to the processes of critical reflection *and* reflexion.

Chapter 5- Implementation of the evaluation methodology

This chapter provides the rich description of the action research in a single case. It illustrates how systems thinking was used to systemically model a theory of change for organised learning activity, to guide the development of data generation strategies, and to synthesise and critically reflect on the meaning of data.

The case involved the evaluation of an educational development project, and was chosen for its illustrative capacity because of its complexity in terms of the multiplicity of stakeholders.

Chapter 6 – Discussion

This chapter provides the discussion and critique of what was learnt from the research across the multiple case studies. It is framed by a systemic representation of my own theory of change for the research, which guided critical reflection on the progress with respect to the intended research objectives, and how the research activity helped to make this progress. The discussion therefore centres on how the designed methodology, which draws on critical systems thinking, helped to develop clarity in the evaluation. This clarity is in relation to issues such as: roles and relationships of different stakeholders in the evaluation and the learning activity being evaluated; their evaluation questions; issues of relevancy to explore in the inquiry; the choice of methods to help to answer these questions.

Chapter 7- Conclusion

The conclusion summarises the key contributions made to existing theory and practice by this research. It is argued that the core contribution, although contextualised to the evaluation of technology supported learning, is in developing understanding about how critical systems thinking can be operationalised in evaluation to bring rigour to the conceptual stages of inquiry modelled on an action research approach. This adds to a limited number of empirical studies across multiple cases, argued to be necessary to improve theory about evaluation practice. It has therefore helped to answer questions about ‘what’, ‘how’ and ‘why’ the evaluation methodology works in practice, in order to inform judgement about its transferability to evaluating organised human activity.

Chapter 8 – Reflection on the limitations of the research and implications for further work

Reflection here focuses on the limitations of the research with respect to learning that is transferable beyond the context of the specific case studies used for the research, and the further research that would be needed in order to address these limitations.

1.9. Summary

This chapter has provided the rationale and background for the research and outlined some of the key concepts and approach to undertaking the research and presenting it. A more detailed articulation of the theoretical rationale for the empirical work undertaken follows in chapters 2-4.

Chapter 2. Theoretical background

2.1.Introduction

In Chapter 1 it was argued that there is still lack of clarity about effective learning designs for technology supported learning, and that this may be because of a lack of appropriate evaluation methodology in change management practice. In particular the concern is for methodology to develop understanding of the complexity of organised learning activity associated with its social and political dimensions and the subjectivity of what success means and how this is achieved.

This chapter presents in more detail the theoretical rationale and assumptions underpinning the research, for example about the complexity of managing technology supported learning, and why and how this could be improved by using appropriate evaluation methodology. This is framed by relevant theory about learning, e-learning and knowledge management. A critique of existing evaluation theory is undertaken to explore its relevance for inquiry into organised learning activity. This leads to the conclusions about gaps in existing theory and the potential for the research to contribute to existing theory and practice about evaluation. It is argued that little research has been undertaken to address these gaps in the context of technology supported learning.

2.2.Learning theory

This section reviews existing theory about learning to explain the assumption made in this research, that organised learning activity should be considered a socially constructed human activity system. In order to understand why this assumption is appropriate, it was necessary to evaluate some of the alternative perspectives about learning. These perspectives vary as a consequence of their different underpinning ontological and epistemological assumptions.

Behavioural or ***associative*** perspectives on learning are underpinned by an objective ontological and epistemological perspective which assumes that learners can learn ‘correct’ behaviour for a situation. This learning relies on consistent feedback on the effects of learners’ specific behaviour so that they begin to make associations between a chain of events (stimuli, behaviour, feedback). Although this theory accepts that people may have subjective interpretations and perceptions influenced by feedback from their different previous experiences, these are seen to be a result of misunderstanding or partial understanding of phenomena. Learning is considered a process of ‘discovery’ of ‘truth’ which attempts to eliminate subjective and possibly ‘incorrect’ interpretations.

Cognitive theories of learning were developed in an attempt to address a perceived deficiency in behaviourist theories, in that they do not explain how individuals are able to rationally choose between different courses of action for achieving a desired outcome. Cognitive theories take a subjective epistemological position in attempting to explain how we make sense of complexity. They consider that a learner's behavioural response to an external stimulus from their environment is not just conditioned towards a correct response through feedback, but is also informed by their own individual mental models. Learners observe and reflect on the effects of their interaction with their environment and develop a range of mental models that inform a repertoire of possible responses to different stimuli. This enables them to make choices about what to do in a complex situation.

From this perspective it is considered impossible to escape the paradox of what has become known as the *hermeneutical circle*. The argument here is that inquiry and learning rely on our existing knowledge and experience to frame and explain phenomena, i.e. "*what we understand is based on what we already know, and what we already know comes from being able to understand*" (Winograd and Flores 1986, p30). This can be illustrated using the simple example of inquiry into the meaning of a word in a dictionary. The definition presumes our understanding of the vocabulary used, and our understanding depends on how we make sense of this vocabulary. It is impossible to explain or understand any concept without some use of prior knowledge, including the language used.

The cognitive perspective on learning is also associated with theories about differences between learners. The premise is that learners have inherent characteristics with regard to their learning capability and capacity, and their approaches to and preferences for learning, and that this is due to their genetic make-up and physical development. The way they make sense of experience into their subjective view of the world is therefore shaped by this. Hence cognitive theories based on a *subjective epistemological perspective* can still be influenced by ideas from an *objective ontological perspective*.

Examples can be seen in the work of Piaget (summarised by Kitchener 1986), who is well known for his work on child development, and his identification of their different learning abilities at different stages of maturity. One of the key ideas of his theory was that individuals are capable of abstraction at two levels:

- (i) *empirical abstraction*, the ability of learners to discover essential characteristics of objects such as colour and weight;
- (ii) *reflective abstraction*, the ability of the learner to abstract properties of an object based on their actions on it.

These both assume an objective ontology, in that objects have essential characteristics awaiting discovery by the learner, and the learner has essential characteristics that affect their ability to discover and abstract these characteristics.

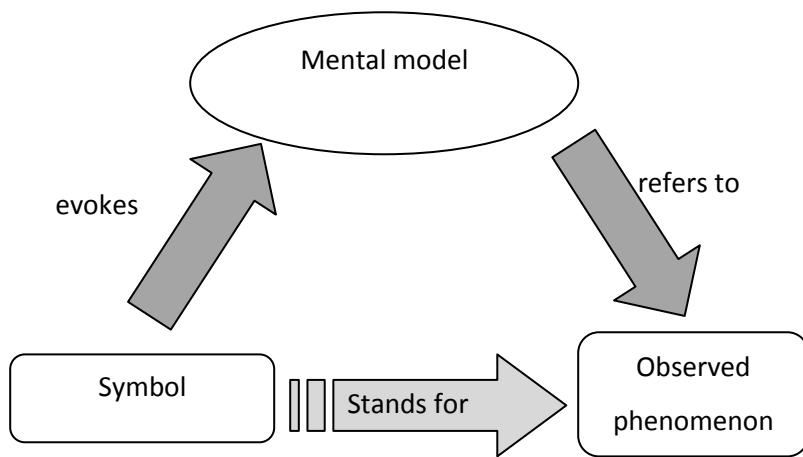
Another example can be seen in the work of Polanyi (1961, 1964, 1966, 1967), who envisaged learning to be a dynamic process which depends on our interactions with our social and physical environment. This leads to ‘personal knowing’, where what we understand is inseparable from our ‘being’ in the world. He considered that we make sense of an object of our attention by using two interdependent processes of *analysis* and *integration*. This involves iteratively shifting our attention between the detail of the entity, and how this comprises the whole. Hence analysis “proceeds from a recognition of a whole towards identification of its particulars” and integration “proceeds from the recognition of a group of presumed particulars towards the grasping of their relation as a whole” (Polanyi 1961, p125). However, from Polanyi’s perspective what comprises the ‘whole’ is taken as read, reflecting his objective ontological perspective. Subjective perspectives would consider that what comprises the ‘whole’ is decided by the observer. This concept is discussed in more detail in the context of subjective perspectives in systems theory in Chapter 3.

In summary, cognitive theories start to introduce ideas about how choosing between different potential courses of action involves thinking about phenomena in the more abstract, in order to make sense of them and consider the possible effects of action in the future. This depends on our ability to make connections as a consequences of our previous experiences, which involves being able to set them in context and understand the ‘wider picture’. Our understanding often becomes tacit in such a way that we are not always able to convey the sense we make of our experiences to others explicitly, and that “*while tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is either tacit or rooted in tacit knowledge*” (Polanyi 1966, p144).

In the management literature, Polanyi’s work is often referenced in connection with raising questions about how change can be effected when the knowledge that might inform this is largely

rooted in tacit knowing, that is our ability to ‘know more than we can tell’. The challenge this presents can be explained by reference to the ‘meaning triangle’ in figure 2.1. In order to develop knowledge that has wider value to a group of individuals, organisation, or society as a whole we have to be able to make explicit our mental models of phenomena we observe in the world using symbols. Developing a common understanding of what the symbols represent amongst any human collective (as in language used in a societal group) involves a social process of negotiation (see **social constructivist** perspective).

Figure 2.1: The ‘meaning triangle’



Constructivist theories about learning start to introduce ideas about the relationship between learning and intentional action to bring about change. It was suggested earlier that this latter is a key management function. A dialectic relationship is envisaged between the learner and their learning environment, which considers them proactive in influencing the future, rather than just reactive to events as they happen. Not only is their environment considered to evoke mental models that influence their learning and development, but it is their own action which shapes this environment, and this is influenced by their mental models and learning. Knowing is therefore considered inseparable from and interdependent with action in a situation. Learning can be conceptualised as being undertaken in iterative cycles of reflection *and* action (Kolb 1984, Schön 1983, 1987). Despite this dynamic, process, view of learning, the emphasis is still on learning as an individual activity, although the environment in which the individual is learning may be a social context.

From the ***social constructivist*** perspective the learning environment is perceived to be inherently social, and learning necessarily a social process. How we make sense of our uniquely different set of experiences, and how this influences our future action, becomes dependent on social interaction. Through this we share our cognitive mental models and develop shared understandings of concepts that we construct to describe and explain the world. An example of theory based on this perspective is Vygotsky's (1978) *activity theory*, which considers that language and speech are fundamental tools and signs for organising thinking and integrating thinking with action. Learning is perceived to be dependent on the use of signs and tools available to us in our cultural context, although these may be used differently. The use of language signs enables the reflection on and articulation of experience. Speech enables preparation for future activity through its use in planning, developing order, and attempting to guide one's own behaviour and that of others. These activities were also discussed in section 1.2.1 as being necessary components of management activity. From this perspective technology can be considered a tool that we use in the social activity of learning.

Social constructionist theories move learning theory on a stage further by arguing that not only is learning inherently social, but the process leads to a shared context of meaning for the interacting participants, which is also an influence on future learning. Therefore the experiences that shape our mental models are undertaken in different social, cultural, environmental, and political contexts of meaning. A stimulus such as a gesture, word, phrase, *may* have the same meaning and elicit a similar response for a group of individuals but this will depend on the similarity of their context of learning. Our ability to take collective action to shape our environment is therefore highly dependent on this shared context of meaning.

The theory is clarified using Maturana's (1978) concept of a '*consensual domain*' (explained in Winograd and Flores 1986). This is formed between two interacting entities who attempt to minimise the disturbance their interaction causes in their mutual environment. The term 'coupling' is also used here to describe the extent to which these entities are responsive to change in each other. Dynamic coupling and mutual interaction in the consensual domain result in (i) the human ability to express experience as language and (ii) language development in communities. Where there is already a high degree of coupling, then the language used in the communication process will result in high correspondence between the intended concept that one party in the interaction is attempting to communicate, and how this is interpreted by another party. Communication does not describe or explain an external reality of things with characteristics and

properties independent of our perceptions of them, but is a social discourse in the consensual domain of those involved in the interaction. From this extreme subjective ontological and epistemological position, not only is it impossible for there to be any objective knowledge of an external reality, but it is also impossible for there to be any ‘knowing’ at the individual level. ‘Knowing’ becomes a discourse in this consensual domain which “*exists for social community*” (Winograd and Flores 1986, p51).

This theory has become important in the management literature in helping to explain how organisational members can work and learn together towards some form of joint enterprise. It is exemplified by Lave and Wenger’s (1991) *situated learning theory*, which argues that learning involves participation in social communities engaged in meaningful practice. Community members negotiate what they will do together and mutually recognise what constitutes membership. The process of negotiating meaning requires making concepts explicit for the interpretation of others. This involves ‘reification’, or treating abstract concepts (e.g. marriage, culture, religion) as if they were physical. Participation is necessary to maintain realignment of interpretations and to ensure the continuity of meaning of socially constructed concepts. This is not the same as meaning becoming static, but that the potential for mutual understanding is maximised. The emphasis of ‘knowing’ moves towards understanding how to engage in a social learning process.

This latter theory takes on particular relevance for managers of organised learning activity. This is not to suggest that individual learning within the group could not be conceptualised to be aligned with any of the other theories, depending on what is being learned at different stages of learning. But the focus of management activity is the organisation of collective action towards a common learning purpose, including the negotiation of the meaning of this purpose and how its achievement is organised for both the collective and the individual.

An issue that is neglected in the social constructionist theory is that if learning is considered as a social process undertaken in groups or communities, then it could be influenced by power differentials and conflict. This raises questions about how learning activity can be organised to serve the interests of the broader population rather than progressing the vested interests of the more powerful. In attempting to overcome these difficulties, practitioners need to develop not only the ability to think critically about their actions in the day-to-day situations in which they find themselves, but also the learning process itself (Schön 1983), which “*involves a process of reflection upon the adequacy and value of conventional wisdom and methods of learning*” (Willmott 1997, p162). Freire (1972, 1973) believed that education needs to develop in learners

what he called ‘critical consciousness’ in order to achieve a more emancipatory transformation of society. Learners need to be encouraged to *question* the underlying assumptions of the learning process, and this critical questioning is stimulated through dialogue and reflection. He believed that knowledge and values should not be imposed on learners, but that the role of educators is to engage students in critical thinking in collaborative partnership with them. Taking a critical perspective on the political dimensions of organised learning activity and how this can be managed can help the process to be more inclusive, but also help participants develop for themselves critical inquiry skills that will equip them for improving their own practice.

2.3. Organisational learning, knowledge management and e-learning

So far the chapter has used some of the existing theory about learning and inquiry to explain how organised learning activity might be more appropriately conceptualised as socially constructed. It therefore follows that management action to improve learning activity might be better informed by inquiry that is designed to critically explore the social and political processes involved.

The aim of this section is to review the literature that currently informs the management of organised learning activity and the use of technology in it, in particular in the academic disciplines of organisational learning, knowledge management, and e-learning. The purpose is to illustrate that existing theoretical frameworks are based on inappropriate assumptions and do not provide appropriate methodological guidance.

2.3.1. Management of organised learning activity

In both commercial and non-commercial organisations, strategies for managing learning that aim to develop knowledge about the organisation and its relationship with its wider environment are often underpinned by objective assumptions about ontology and epistemology. For example, they are often concerned with:

(i) the control of individuals within the organisation through, for example:

- development or training of individuals in competences, skills, and capabilities to undertake the appropriate conversions between their internalised (tacit) knowledge and the external and explicit representation of this knowledge in the form of the organisation’s policy and procedural documents (Prahalad and Hamel 1990);

- recruitment and retention of people with desired knowledge, or that have developed valued competences, skills and capabilities, through appropriate reward systems and career structures (Prahalad and Hamel 1990, Tampoe 1993).
- (ii) information management, by storing explicit knowledge artefacts in a searchable information system. People are then trained to use this to make their own knowledge explicit and accessible by themselves and others;
- (iii) development of conditions assumed to “*facilitate effective knowledge use within its value-adding processes*” (Comité Européen de Normalisation 2004, p15) e.g. through articulating an ethos that encourages an information sharing culture.

These strategies reify knowledge as something which can be discovered and separated from the learning process and straightforwardly transferred between people, from expert to novice. Evidence that an individual has understood and internalised information is shown in their subsequent actions (Boisot 1998). The focus becomes the management of activities and social processes involved in conversions between tacit and explicit knowledge (Nonaka 1994), and the management of the context in which these are undertaken (Boisot 1998) and which enable knowledge to be exchanged. This leads to there being an emphasis on designing and improving the efficiency and effectiveness of activities which attempt to ‘identify’, ‘acquire’, ‘develop’, ‘share’, ‘use’ and ‘retain’ knowledge assets (Probst *et al* 2000), and the business environment that supports them. Knowledge is considered to have attributes such as being more ‘fluid’ or ‘leaky’ the more readily it diffuses both within the organisation and across organisational boundaries (Szulanski 1996). This will be affected by the extent to which it can be made explicit and codified and the motivation of workers to share it. Encouraging conditions for organisational learning is perceived to require understanding about what motivates workers to share knowledge in different circumstances in order to provide appropriate incentives and rewards for doing so (e.g. Tampoe 1993, Osterloh and Frey 2000). This has led to consideration of the implications for integrating human resource management policy and practice with that of knowledge management or organisational learning (Carter and Scarborough 2001).

The equivalent of this approach in the educational context is didactic teaching often referred to as the ‘banking’ concept of learning and teaching whereby “*the students are the depositories and the teacher the depositor*” (Freire 1972, p45). This assumes that change in the individual learner is stimulated by the influence of the teacher and their instruction. Whether the learning has been

successfully achieved by the learner is demonstrated by their performance in assessment. This often focuses on learners being able to show their grasp of skills or knowledge, for example by explicitly explaining concepts that have been covered in the instruction, or by integrating these concepts into coherent argument, or by applying these and skills to clearly defined problems. Management of this kind of learning model depends on designing appropriate stimuli for the intended learning, such as information conveyed by the instructor or provided through resources used or recommended for reference by them (handouts, visual aids, books, films, objects etc). Learners are only admitted to the process if they have undertaken the requisite prior learning to be able to make sense of these stimuli in the way intended (see e.g. Gagné *et al* 1988). Techniques used by the teacher are:

- focusing learners' attention on what is to be learnt;
- helping learners to make connections between new learning and what has already been learnt;
- helping learners to interpret information and commit it to memory;
- checking learners interpret information in the way intended, by eliciting some behaviour from them that demonstrates this;
- giving feedback intended to reinforce or correct interpretation or behaviour, depending on how this is aligned with what is intended by the teacher;
- providing opportunities for practising the application of knowledge and skills to consolidate learning.

This 'knowledge transfer' model of learning is represented in training or teaching approaches that assume that an already established body of knowledge and skills can be straightforwardly transferred from one individual who has already acquired it to others. It also assumes that the knowledge being transferred is needed by its receiver *and* that the knowledge receiver is able to interpret and apply this knowledge in the way intended by the sender. This approach to managing organised learning activity may be helpful in the following circumstances:

- where the intended recipients are likely to face a limited number and similar alternative choices for action;

- where the information they are likely to need to help them make these choices is already well known and can be made explicit;
- when it is known that they have the requisite prior knowledge to interpret and apply information in the way intended.

It may also be appropriate to help learners understand some basic principles or raise their awareness of different debates or perspectives to enable them to subsequently engage in social learning activity which will lead to the creation of new knowledge. New knowledge in this sense is a new, shared understanding that emerges from the social process, not the internalisation of explicit information by an individual. This model is less useful for developing individuals capable of evaluating and choosing a course of action from a complex range of possible courses of action in a highly contextual situation, as in the cases of professional or managerial roles.

Management of organised learning activity that is influenced by subjective epistemological assumptions about learning consider there to be a more complex dialectic relationship between the learner and their environment. This environment includes other participants with different roles in it, as well as elements such as learning resources, including technology. The perception of learning as a social activity has led to the level of analysis shifting from the individual to the organisation such that the term ‘organisational learning’ has been considered as “*a metaphor which enables the exploration of an organization as though it were a subject that learns, processes information, reflects on experiences, and possesses a stock of knowledge, skills, and expertise*” (Gherardi and Nicolini 2001, p47).

Learning is therefore perceived as a “*a process which changes the state of knowledge of an individual or organization*” (Sanchez and Heene 1997, p26). From this perspective it is still possible to maintain an objective ontological perspective of learning as ‘truth-seeking’ or discovery of ‘best practice’ about what works in the organisational context, leading to the reification of knowledge as “*inputs, outputs and moderating factors of the knowledge creating process*” (Nonaka *et al* 2000, p20). The emphasis in the process is on the subjective and dynamic nature of learning generated through social interaction (e.g. Nonaka 1994, Nonaka and Takeuchi 1995, Nonaka *et al* 2000), and the interdependency of theory and action (Argyris and Schön 1996). But its outcome can still be perceived as knowledge, which once developed can be straightforwardly separated from the practice in which it is developed and “*held in the minds of individual members*” (Argyris and Schön 1996, p12) of the organisation or held in some other form of organisational memory (databases,

documents) – albeit that these may be subject to constant updating and revision. Management becomes less focused on controlling *what* is learnt through the facilitation and control of information transfer between people, to considering the effective integration of a whole range of factors that may influence learning. This involves developing a deeper understanding of the *social processes* leading to the development of *new* knowledge in organisations and designing and facilitating these social processes (e.g. Senge 1990).

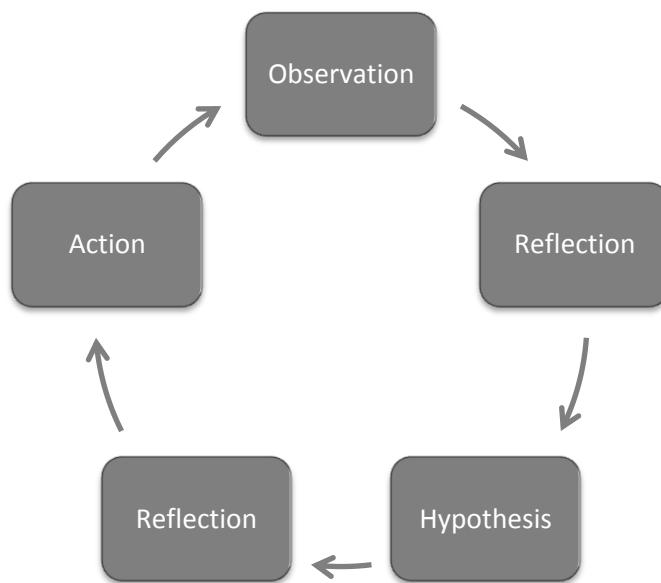
In the educational context this perspective is exemplified by a ‘learning by doing’ model of learning. The focus shifts from the teacher’s role in stimulating learning by using information and artifacts, to the learner’s own activity and experience. The assumption is that for learners to be able to understand and apply theory (as perhaps embodied in those knowledge artifacts used by teachers), theory needs to be integrated into some form of meaningful activity in order for students to be able to make sense of it (Biggs 1999). The teacher becomes a facilitator of learning rather than an expert transmitter of knowledge, i.e. more of a “*guide on the side*” than a “*sage on the stage*” (Reigeluth 1999, p19). Management is described as “*setting the stage so that good learning may occur*” (Biggs 1999, p23). These learner-centred perspectives on education have also led to concern with how individual learning styles or preferred learning approaches of learners can be addressed in pedagogical design (Honey and Mumford 1992), whilst others consider that it is more important that learners develop a repertoire of different strategies for learning (Laurillard 1993).

Perspectives that adopt this subjective epistemological perspective on learning and its management accept that we all interpret information and our experiences differently based on our previous learning and experience. These approaches to managing learning activity can be helpful for developing learners able to evaluate a range of information and experiences for their relevancy and usefulness for informing their own future action in situations where there is a diverse range of potential courses of action. Learners or novices are provided with opportunities to develop understanding of existing theory, policies or procedures first hand, through experimentation or creativity. The intention is to help them to develop strategies for handling more unstructured, unpredictable, and complex situations that they will face in their future.

One particularly noteworthy pedagogical model that has been designed to address the problem of relevancy in management education and to help managers be prepared for and deal with the ill-structured problems they often face in practice is that of action learning. It is based on the original ideas of Kurt Lewin (1946), and is aligned with experiential learning theory (Kolb 1984, Schön

1987), which describes learning as a process that links education, work and practice. Action learning was first used by Reg Revans (1971) and has since been developed by others (e.g. Kember 2000). It is based on the assumption that knowledge cannot be separated from the human experience that generates it. The process attempts to support individuals in their analysis of their current situation, diagnosis of potential improvement action, followed by implementation and testing of the effectiveness of this action in context. These activities are reflected on with a 'learning set' consisting of a group of learners who are each faced with a need to make change in their individual practice situations. The members can challenge the assumptions of each other, and offer mutual constructive advice and support. A learning set advisor supports the process. The learning approach and outcomes are therefore contingent on the learning environment and the participants. Figure 2.2 depicts the cycle of activities involved.

Figure 2.2: The action learning cycle (taken from Pedler 1983, p26)



In this situation the knowledge being developed will be new to each individual, but the process does not necessarily lead to improvement in existing theory, policy, or procedure that has already been negotiated and agreed at the collective level. It may be useful in contexts where an individual wishes to improve their own practice. However, it is perceived (Trowler *et al* 2005) more problematic to assume this action learning or reflective practice model of learning at the individual level can influence change in organisations. Other people in the organisation, possibly

resistant to change or with different ideas about change, will also have an influence. People and conditions in this environment will also influence the reflections and actions of each other.

Models based on social constructionist principles of learning, for example situated learning theory (Lave and Wenger 1991, Wenger 1998a), provide a more satisfactory explanation for organisational change. These assume the purpose of the learning must be negotiated between participants in the process and others that have an interest in the context in which the learning is to be applied. This means that there is more likelihood of agreement about the purpose guiding collective action, and hence driving the direction of change. This learning is envisaged as being undertaken in communities of practice. Here the meaning of 'community' is understood to be:

"an activity system about which participants share understanding concerning what they are doing and what that means in their lives and for their community. Thus they are united in both action and in the meaning that action has, both for themselves, and for the larger collective." (Lave and Wenger 1991, p98).

For the purposes of this discussion the meaning of 'practice' is broadly accepted as "*undertaking or engaging fully in a task, job or profession*" (Brown and Duguid 2001, p203).

Hence Wenger's (1998a) concept of a community of practice encompasses three necessary dimensions not always present in other kinds of groups and networks, (i) purposeful activity of the community as a whole, (ii) mutual engagement between members and (iii) a shared context of meaning for this activity.

Because the situated perspective assumes that learning depends on the negotiation of meaning and identity in a context of practice, it is argued that "*learning cannot be designed: it can only be designed for- that is, facilitated or frustrated*" (Wenger 1998a, p229). This is because although processes can be designed to support the required negotiation, the meaning itself cannot be pre-defined, but emerges from the negotiation process. Even the design of these processes is considered to have limitations as community members will decide what they want to learn, and effective process will emerge from their collective action. The development of communities of practice is therefore dependent to some extent on an 'action learning momentum'. This can be viewed as a facilitated evolutionary process that tests multiple approaches and builds on experience over time. Effective design is learnt through iterative action reflection cycles, hence the motto "*design a little, implement a lot*" (Wenger *et al* 2002, p191). Communities are conceptualised as "*fundamentally self-organizing systems*" (Wenger 1998b). Discourse about the role of the manager in communities of practice has shifted from concern with 'command and

control' to the role of 'system builder' (Swan *et al* 2002) where efforts are more aligned with the metaphor of 'cultivation' (Wenger *et al* 2002), and involve tasks such as facilitation, translation and making connections or knowledge brokering across 'system boundaries'.

From a more critical perspective it is argued (Blackler 1995) that understanding the cultural context of change and how learning activity might be managed is only partially illuminated by the situated perspective on learning and theory about communities of practice. This is because this theory is weak in its analysis of the influence of power and conflict. Concern has been expressed about this oversight and that in the literature generally there is little debate about "*whose purposes are being served*" in organisational learning activity and its management (Easterby-Smith *et al* 1998, p262). Initiatives imposed by managers are often considered insufficiently emancipatory for participants, since they are often not the intended beneficiaries of the process (Fenwick 2003). In the educational context, traditional management education is perceived as routinely privileging approaches underpinned by objective principles. Conventional textbooks that allow this perspective to dominate are treated as "*storehouses of received wisdom*" (Alvesson and Willmot 1996, p29). Traditional action learning which focuses on the individual problem setting and solving process is perceived as failing to adequately recognise the social context in which the individual is enabled or constrained in their learning. Learning in learning sets can be inhibited when its members are "*positioned unequally, in and by groups as a consequence of social constructions and their identity*" (Vince 1996, p124, cited in Willmott 1997, p170). A more critical approach to action learning has been proposed (Willmott 1997) which takes into consideration the social context of learning. It has also been cautioned (Gregory and Romm 2001) that the role of facilitator of group learning activity should not be considered to be value free, and that in order to help group members achieve mutual understanding facilitators should be 'open to discourse'. This requires a willingness to be reflexive about their role in the process and to have their assumptions challenged as part of the process.

This critical perspective highlights how considering organised learning activity as socially constructed is problematic when it comes to considering how its change and improvement might be managed. This is due to the diversity of learners in terms of a range of social and political factors, some influenced by their prior learning and experience. These include their social, cultural, or educational background or their position or status within the organisation. Interpretive inquiry approaches might help develop insight into the power dynamics of a particular learning activity and how this is influencing its operation and effectiveness, but they do not necessarily help to

overcome them. This was an important issue identified as needing to be addressed by the evaluation methodology developed by this research.

2.3.2. The role of technology in organised learning activity

The use of technology in organised learning activity adds a further level of complexity to improving it. Technology is often used in organisational learning activity for one or more of the following reasons:

- to improve the effectiveness and efficiency of access to knowledge artefacts that are the product of a previous human cognitive process and intended as a stimulus for a future human cognitive process. These might be used by the same or different people involved in producing the artefact. From the manager's perspective, electronic solutions may use less resource per learner or employee than alternative solutions such as books or manual filing systems. For example, the latter consume natural resources required to produce paper, and require more physical storage space and more human resource to facilitate access. From the perspective of the learner or employee, retrieval may be undertaken much more quickly and consistently than manual processes, and may also be more convenient and less costly for them than non-technological solutions. It may also provide greater convenience and flexibility in overcoming temporal, physical and geographical constraints to accessing resources or communicating with other learners.
- to replicate some of the cognitive processes of problem solving and decision making. An example is the use of data processing and modelling tools.
- to provide interactive tools to help learners to self-evaluate their understanding of concepts presented in artefacts or by an instructor. These provide opportunities for learners to practise applying concepts or skills and give automated feedback on these efforts.
- to provide multi-sensory representations which can help in the explanation of difficult concepts, and therefore potentially improve a learner's engagement with and understanding of them.

The design of approaches often assumes a behaviourist stimulus-response model of learning. There is also an assumption that technology provides a means of representing information or some other stimulus for learning in the way intended by its provider, and that the learner will interpret this in the way intended. This assumption may be appropriate in situations where

information can straightforwardly be made unambiguously explicit and informs only a limited number of choices, *and* where the receiver has the required prior knowledge to interpret the information and make these choices. However, a review of studies into the use of management information systems (Mintzberg 1975) concluded that managers who faced greater complexity in their decision making did not find management information being collected and stored in this way helpful because:

- (i) it was not always relevant to improving their future action;
- (ii) it was often unreliable or too general to be meaningful for informing decision or action in a specific context, and was not always available when needed;
- (iii) they did not have time to thoroughly interpret the information themselves and often relied on other's informal reports of *their* interpretations;
- (iv) there was a limit to how much data they could make sense of at any one time. How they responded to it depended how it was framed in relation to their values and prior knowledge.

Partly because of these difficulties, it was also being reported that managers often used information for different purposes than originally intended by those that had made it available. Design of these systems had therefore neglected how the available choices are constructed and chosen, and by whom, and the social process involved in making sense of information.

The constructivist perspective on learning design and the use of technology in this design attempts to incorporate ideas from Vygotsky's (1978) activity theory. From this position technology is a contemporary tool which can facilitate learning by supporting the exchange of signs through online communication, or by including learning activities which structure and facilitate interaction among participants. Initial guidance can be provided by an 'expert', but the control of learning activity eventually passes to competent learners. Learning design uses technology to support conversational style learning dialogue (Laurillard1993) between learners and teachers. This allows for negotiation of and reflection on learning activity, its purpose and outcomes and their meaning, through using communication tools. These include email, chat tools, bulletin boards, electronic whiteboards, blogs, and wikis (see Definition Box 2.1).

Definition Box 2.1

Email: Electronic process of exchanging messages between computers connected on the same computer network or via the internet. These computers must have software applications that enable messages to be encoded, transferred and interpreted by users. Messages can be exchanged *asynchronously*, i.e. users do not have to be connected to the network at the same time in order to exchange messages. The sent message is stored on a computer in such a way that the intended receiver can access it at their convenience. The same messages can be sent simultaneously to one person or many people.

Chat tools: These are email tools that require those parties involved in the communication to be connected *at the same time* to the network across which messages will be transferred. They therefore allow *synchronous* or *real time* communication between two or more people.

Bulletin board: Another software application that uses internet protocols to enable users connected across the same computer network or internet to access it. Any particular bulletin board will have a group of users that are authorised to access it. Messages are posted by topics or ‘threads’ and can be accessed and read by all other authorised users. Replies are posted in the same way, so that they too are visible to all authorised users. These are also called internet discussion forums, or email discussion forums.

Electronic whiteboard: A software tool which uses the metaphor of the blackboard or whiteboard for the way that it is used. User access to it is across a computer network or internet facilitated by internet protocols. It allows one or more users to write or draw whilst other connected users watch. Any particular connection can be made secure to authorised users. They can be embedded into environments such as virtual learning environments so that they can operate alongside chat tools that allow users to also have a dialogue, with the whiteboard being used to illustrate concepts that are being discussed.

Blog: Contraction of the term ‘web log’, which is a web page to which users can add relevant content (text, images, links etc). This may be regularly posted updates, ideas or reflections made by different individuals about a specific topic that is the focus of the blog, or it may be constructed by a single individual in the form of a web diary. A key feature is that the chronological order of posting is maintained, and they are designed to be more publicly accessible.

Wiki: This describes one or more web pages to which users can contribute content, and where they can search for content. A wiki tends to be publicly accessible to view across the internet, but it is possible to restrict contribution to authorised users.

Facilitation is also concerned with helping participants to become comfortable with the technology, to be motivated to engage with others, and to trust their fellow learners (Salmon 2002).

In social constructionist designs these same electronic communication tools provide a means through which social networking can be conducted in a global business and society, where the membership is geographically and temporally distributed. Particular issues that have been found to be problematic in this kind of 'virtual' community of practice are:

- (i) motivating participants to contribute (Wellman and Gulia 1999, Kollock 1999, McClure Wasko and Faraj 2000). Members may be reluctant to contribute if they do not know all participants, and/or they are unconfident about their expertise in relation to the rest of the community, or if they feel they are being asked "*to do someone else's work for them*" (McClure Wasko and Faraj 2000, p168). Questions are also raised about why advice should be given freely when in other contexts there may be charge for this kind of consultancy (Kollock 1999). The problem is not straightforwardly addressed by extrinsic reward mechanisms, since these may result in participants acting only in self-interest rather than contributing towards the purpose of the community as a whole (McClure Wasko and Faraj 2000).
- (ii) developing the trust needed for open and honest discussion that results in learning (Smith and Kollock 1999). There is a lack visual cues which could either help or hinder communication. Some find it helpful to have a degree of anonymity in the exchange, particularly if they are worried about appearing unknowledgeable. The lack of visual cues about identity may also be helpful in eliminating any tendency to bias because of preconceptions of a person's potential contributions (e.g. based on gender, race, age). However, masking identity can also be undertaken for more sinister reasons and can engender suspicion.

Another important consideration for social constructionist designs for organised learning activity is that if it is accepted that meaning is socially constructed in the learning environment, then the role of technology will also be constructed by negotiation. The manager will have their own motivations and values behind its inclusion in a learning design and will implement it according to these values and depending on the constraints and demands upon them. Learners may or may not

find the technology useful in supporting their learning. It may be used, but not necessarily in the way intended in the design (see the earlier reference to the work of Mintzberg 1975).

The extent to which technology is considered likely to succeed in supporting learning is perceived to be related to the extent to which its implementation allows meaning to be shared, the extent to which knowing can be made explicit, and the extent to which there is trust and a willingness to share knowledge and experience (Hislop 2002). Managers may need to provide incentives and develop communication protocols to encourage mutual trust and respect in the learning environment so that appropriate learning dialogue can be initiated and maintained. This complexity also presents additional challenges for evaluating organised learning activity. This is because the meaning of what constitutes 'success' for the learning also needs to be considered as something that is measured according to the values of the different participants, and must therefore be negotiated.

From a more critical perspective the use of technology could be perceived as serving managerialist interests, by better enabling managers to undertake surveillance or control of employee or learner activity . In the organisational context this may lead to a tendency not to share what is known. This may be a result of fear about exposing a lack of knowledge or misinterpretation (Hayes and Walsham 2000), or desire to make oneself more valuable an asset to an organisation (Currie and Kerrin 2004). This suggests that evaluation of learning activity also needs to question whose interests the technology is serving. An example of learning design that engenders the trust required for open, reflexive learning dialogue is thought to be through the availability of 'safe enclaves', where individuals can exchange experiences, opinions, or ideas without potential scrutiny by their supervisors (Hayes and Walsham 2000).

2.4. Implications for the evaluation of technology supported learning

The main argument for this research is that, in order for the use of technology in organised learning activity to be improved, appropriate evaluation methodology is needed to help practitioners understand about how and why particular learning designs work or do not work. This follows from the discussion about change management in 1.2.1, where it is suggested that a manager can be conceptualised as a learner in the organisation which they are managing. Here they are undertaking action intended to influence change in some way (e.g. motivating, directing, controlling), but these actions are informed by thinking (planning, organisation) influenced by reflection on change brought about by previous action (evaluation). Effective management therefore depends on the effective integration of thinking and action through a suitable inquiry

process that aims to understand the relationship between activity and change in the specific context of this activity.

The earlier sections of this chapter have outlined the complexity that presents challenges for the evaluation of technology supported learning. This complexity is due to the variety in intended purpose of the learning, the underpinning assumptions about the meaning of learning and knowledge for these different purposes, and the diversity of motivations, previous knowledge and experience, and values and relationships of participants.

Much of the theory currently available to guide the management of technology supported learning that is described earlier in the chapter is in the form of frameworks. Whilst these frameworks might be useful in helping to represent and compare successful models and to relate them to the theory that underpins them, they are of limited value to practitioners looking for guidance on how to design and implement an initiative in a specific practice context. In short, there is not a good connection between existing theory and practice.

In the knowledge management field, a suggested explanation for this has been that existing theoretical frameworks are either too prescriptive or descriptive and do not take a holistic perspective (Rubenstein-Montano *et al* 2001). A European Standards initiative (Comité Européen de Normalisation 2004) has attempted to address this dichotomy by bringing together some of the key concepts from the descriptive and prescriptive theories. But this still provides practitioners with little guidance on how to interpret, integrate and implement these frameworks in the very specific context of their own practice.

The Joint Information Services Committee² (JISC) is an organisation responsible for advising higher education institutions in the UK about the innovative use of information and communication technologies for education and research. It has also advised (2004) on the need for developing a common framework to describe and model learning. It concluded that defining a range of practice models would enable practitioners to compare them and make choices about what could be applied in their own situations. Beetham (2004) reports that practitioners commonly request that practice models used as exemplars should be informed by appropriate theory. In this context a practice model is an *approach* to learning and teaching. Theoretical models are those more general principles that guide the approach in a specific context. The theoretical model then

² <http://www.jisc.ac.uk/>

provides the framework (or rationale) against which the practice model can be evaluated. Making the connection between the theory and practice therefore depends on some form of evaluation, but there is no discussion about how this evaluation might feasibly be undertaken.

Becta³ is another national organisation working with UK government and a number of partners to improve the use of technology for the benefit of learners. Some of its research (Becta 2005) also concluded that whilst most employers were keen to develop understanding of the use of technology to support work-based learning in some way, there was a lack of understanding amongst them about what was effective. The research attributed this to a lack of knowledge about appropriate approaches to monitoring and evaluating implemented models of e-learning.

Oliver and Conole (2003) have also suggested that the lack of understanding about effective models for e-learning is because the evaluation processes for them are not appropriately designed. They criticise current research for being too reliant on self reporting in the form of single case action research. This is often just descriptive and does not lead to knowledge transferable beyond the local context of interest. They argue that approaches based on traditional scientific principles that are commonly used to build evidence-bases that inform practitioners in other disciplines are inappropriate for evaluating learning activity, if the underpinning philosophy of e-learning is understood as a socially constructed practice. They identify a need for an alternative research approach which takes into consideration different viewpoints, beliefs and interests of the various stakeholders in the process.

2.5. Evaluation theory

So far it has been argued that there is a need to improve evaluation methodology for technology supported learning activity, particularly how this is socially constructed. Designing such improvement needs to be informed by existing theory about evaluation methodology and its strengths and limitations for application in this context. The aim of this section of the literature review is to therefore to summarise and critically evaluate existing evaluation theory for its relevancy to the research aims.

The purpose of **evaluation theory** has been considered to be “*to specify feasible practices that evaluators can use to construct knowledge of the value of social programs that can be used to ameliorate the social problems to which programs are relevant.*” (Shadish *et al* 1991, p36). In

³ <http://www.becta.org.uk/>

Chapter 1 ‘theory’ was described as the explanation of relationships and patterns we observe in our world. Theories are developed to try and improve our understanding of the world so that we can take action to make it better. For social phenomena, we tend to consider theory to be concerned with the relationship between human behaviour and its outcomes. Implicit in Shadish *et al’s* (1991) definition is that there are two levels of theory we need to be concerned with:

- (i) Theory about how evaluation inquiry should be undertaken to develop understanding of the relevant patterns and relationships that will inform intervention to improve society. In this thesis this is referred to as *evaluation theory*.
- (ii) Theory about relevant patterns and relationships in the social context of the inquiry, or *theory of change*. This is aligned with Argyris and Schön’s (1978) concept of practitioners’ *theories of action* for their practice contexts.

Both of these theories concern people undertaking some form of action in a social context, since inquiry is a form of action. However, as also discussed in Chapter 1, this is complex because of the unpredictability of human behaviour that is influenced by their subjective interpretations and motivations. This will inevitably be influenced by perceptions of who is intended to benefit from the intervention and the evaluation of it.

One of the difficulties for this research is highlighted by Scriven (1996a), who considered that the “*concepts and the procedures for their investigation*” (Scriven 1996a, p401) associated with an ‘extensive’ discipline of evaluation has resulted only in “*low level theory*” or broad agreement about its purpose and what is involved. He defined evaluation as “*the study of the merit, worth, or significance of various entities*” (p401) where “*merit is close to quality or effectiveness, and worth to value, cost-effectiveness or efficiency*” (Scriven, 1996a, p401). Upon engaging with the field of academic literature about this discipline, it becomes clearer why Scriven considered there to be only reasonable agreement and ‘low level’ theory. Although there appears to be agreement that it is concerned with ‘inquiry’ and ‘judgement’, there is diverse opinion about how this inquiry should be undertaken and what judgement should be about.

To explore and evaluate this diverse opinion, this discussion is guided by concerns that evaluation theory should incorporate “*advice about what to do and how to do it*” (Shadish *et al* 1991,p60) in respect of the following components of evaluation practice:

- 1) “*when an evaluation should be done, [if at all]*

- 2) *what the purpose of the evaluation should be,*
- 3) *what roles the evaluator ought to play,*
- 4) *what types of questions should be asked,*
- 5) *what design will be used, and*
- 6) *what activities will be carried out to facilitate use.”*

(Shadish *et al* 1991, p58)

The need to understand *why* certain practice should be undertaken is also understood from their stipulation that theory should be explicit about ontology, epistemology and methodology. This therefore confirms the need for theory about appropriate evaluation methodology developed through this research to be explicit about the underpinning philosophy.

2.5.1. Types of evaluation and their purpose

Evaluation is commonly discussed in the literature in relation to **program evaluation**, i.e. inquiry associated with social intervention programs. Program evaluation is often comprised of two types of evaluation, originally classified by Scriven (1967). These had two different purposes, which he considered were:

1. to make judgement about the overall success of a program of intervention. This *may* inform decisions about future activity or resourcing of it, but he did not consider this its fundamental purpose. He called this **summative evaluation**.
2. to inform improvement decisions and action, but may also provide information useful to the summative evaluation. He described this as **formative evaluation**.

This distinction between different types of evaluation with different purposes has prompted much debate about the purpose of evaluation.

Weiss's (1972) definition of the purpose of evaluation was “*to measure the effects of a program against goals it set out to accomplish as a means of contributing to subsequent decision making about the program and improving future programming*” (Weiss 1972, p4). This encompasses Scriven's notion of evaluating to make judgements about the overall success of a program, as well as it informing future decisions and actions. She also highlights that the evaluation is “*conducted for a client who has decisions to make and who looks to the evaluation for answers on which to base his decisions*” (Weiss 1972, p6). She draws attention to the issue that different groups (such

as policy makers, directors, service staff and clients), may have very different interests in an evaluation. For example, policy makers are more concerned in the broader issues and whether it is worth investing in and pursuing social change initiatives, directors are concerned with the effectiveness and efficiency of particular strategy for which they have responsibility, service staff are concerned with the outcomes of their day-to-day actions, and clients are concerned that their needs are being met. Whose purposes the evaluation is intended to serve will influence the design of the evaluation inquiry.

The association of evaluation with informing decisions and actions of its different **users**, means that the theme of **use** or **utilisation** also features heavily in the debate about the purpose of evaluation. Weiss (1972) states that "*evaluation starts out with use in mind*" (Weiss 1972, p6). Patton (1986) was also particularly concerned with "*narrowing the gap between generating evaluation information and actually applying evaluation information for program decision making and improvement*" (Patton 1986, p13). For him, "*utilization occurs when there is an immediate, concrete and observable effect on specific decisions and program activities resulting directly from evaluation findings*" (Patton 1986, p30).

More contemporary perspectives consider Weiss's (1972) concept of program evaluation to be problematic because it can focus the inquiry too narrowly on exploring the extent to which predefined goals are achieved, without considering that there may well be value in unintended consequences. It also does not consider that the process of defining these goals, their intended beneficiaries, and the users of evaluation, may also be problematic.

The original formative/summative categorisation of types of evaluation proposed by Scriven (1967) has also been contested by Chen (1996). He believed this classification tended to result in a dichotomous and theoretical separation of evaluation concerned with process (formative) and outcomes (summative) that was not reflected by practice. Chen (1994) also argued that it is inappropriate to judge social activity on the basis of outcomes alone, without considering the means of achieving these. For example, it might be possible to achieve worthy outcomes, but through means which we would not judge worthy. Hence the questions 'what?' and 'how?' are integrally linked. He thought a classification based on *evaluation function* and *program stages* as shown in table 2.1 better described the different evaluation purposes required for different users over time.

Table 2.1: Chen's (1996) classification of evaluation types

	Improvement	Assessment
Process	Process improvement evaluation <i>(focus on implementation)</i>	Process-assessment <i>(concerns judgement about whether program successfully implemented)</i>
Outcome	Outcome-improvement <i>(focuses on how component parts are organised and implemented and are working to affect outcomes)</i>	Outcome-assessment <i>(concerns judgement about overall merit/worth)</i>

Both Chen (1996) and Scriven (1996b) agreed that context is important. Here the notion of different *levels* or a hierarchy of inquiry is introduced, and in such cases the summative evaluation for a project that is a component of a wider program of intervention may also be part of the formative evaluation for the program evaluation. The same inquiry could therefore be informing both summative and formative evaluations. This was a further reason why Chen (1996) thought the dichotomous distinction inappropriate. Scriven (1996b) disagreed with Chen's (1996) challenge, his main stated reasons being

"(1) [] evaluations should always strive to include both process and outcome dimensions, which makes it undesirable to use that dichotomy; and (2) [] improvement is typically based on judgement, not contrasted with it" (Scriven 1996b, p157).

There appears to be some confusion here between the *stage* in the evaluation and the *purpose* of inquiry. Although data collection and information gathering may be undertaken *concurrently* for different purposes, the **questions** that are guiding what is relevant to explore and the approach to doing this will be different for different purposes.

Rossi *et al* (2004) differentiated *process* evaluation from *impact* evaluation on the basis that they would be driven by different evaluation questions. Process evaluation is focussed on "*the activities and operations of the program*" and "*investigates how well the program is operating*" (Rossi *et al*, 2004, p56). Impact evaluation is intended to assess "*the extent to which a program produces the intended improvements in the social conditions it addresses*" (Rossi *et al* 2004, p58).

Patton (1996) also challenged whether all the possible purposes of evaluation can still be captured by the formative/summative distinction. In particular he identifies three main areas that are not covered by these concepts:

- (i) **knowledge-generating evaluations** aimed at conceptual rather than instrumental use. He argued that both formative and summative evaluations are aimed at instrumental use, whereas with conceptual use, no decision or action is expected to follow. Here he was referring to those evaluations that lead to "*generalizable evaluation findings about principles of effective programming [that] have become the knowledge base of our profession*" (Patton 1996, p134).
- (ii) **developmental evaluation** in situations where there is a lot of change and uncertainty, and aimed at continual improvement. He considered that the formative/summative distinction does not apply here because work is ongoing and does not necessarily come to an end. A final 'summative' decision is therefore not appropriate, as those responsible for an intervention may not want to achieve a stable model that would be appropriate to assess in this way.
- (iii) use of evaluation processes to **support interventions** or **empower participants** (e.g. Fetterman 1994). The purpose of these evaluations is "*increasing the effectiveness of the program through the evaluation process rather than just the findings. In such cases, the evaluation process becomes part of the program intervention*" (Patton 1996, p137).

In the case of knowledge-generating evaluations the specific examples he mentions are 'lessons learned', 'reducing uncertainty' and 'enlightening funders'. It could be argued that these *do* inform future decisions and actions. Why would funders be motivated to read an evaluation report if it was of no use to them? The question here may be about the immediacy of the decision and action. The 'knowledge base of a profession' could also be argued to be the understanding which informs practice. Hence any inquiry intended to inform this knowledge base could surely be interpreted as being intended to influence how this practice is undertaken. This may rely on other learning or action (e.g. sharing of knowledge/learning) for the necessary connections to be made to change practice. However, his overall argument is convincing, i.e. that the complexity of the 'purpose' of evaluation is not easily defined by the formative/summative classification because different purposes are not mutually exclusive, particularly in terms of the stage of an intervention at which they are undertaken.

Chelimsky (1998) describes the range of purposes in terms of the broad categories of (i) measuring the effects/outcomes of interventions (ii) providing accountability for resources, (iii) development of others to be able evaluate situations of interest to them and, (iv) evaluation for the sole purpose of developing knowledge about a more generally acknowledged issue (rather than context specific).

Eggers (Eggers and Chelimsky 1999) disagreed with this assumption that there are multiple purposes for evaluation, on the grounds that there is only **one fundamental purpose**, which is "*learning from experience to improve future work*" (Eggers and Chelimsky 1999, p92) and that "*evaluations that do not aim at being used are useless*" (Eggers and Chelimsky 1999, p92). He argued that all those purposes discussed by Chelimsky (1998) can be subsumed within this overarching purpose of being "*useful to people, to improve their quality of life, to create substantial benefits for their target groups*" (Eggers and Chelimsky 1999, p93). Chelimsky's (Eggers and Chelimsky 1999) defence of her position was her belief that it was helpful to consider this hierarchy and multiplicity of evaluation rather than evaluation in its broadest sense. However, Eggers' (Eggers and Chelimsky 1999) concept of purpose is helpful for highlighting the relevancy of experiential learning theory to evaluation.

A more recent definition of program evaluation is

"the use of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organizational environments and are designed to inform social action in ways that improve social conditions" (Rossi et al, 2004, p29).

But whilst Rossi et al (2004) considered that "*the role of evaluation is to provide answers to questions about a program that will be useful and will actually be used*" (Ibid, p20), they also acknowledged that that "*it may also have social action purposes that are beyond those of the particular programs being evaluated*" (Ibid, p20). By this they mean that it may well inform the decisions and actions of a wider audience. These descriptions are more explicit about the political dimension to evaluation and acknowledge that it may need to serve the interests of different users. They also associated the process of evaluation with **social research methods**, "*procedures for studying social behaviour devised by social scientists that are based on systematic observation and logical rules for drawing inferences from those observations*" (Rossi et al 2004, p29).

This association of evaluation with social research methods means that the term **evaluation research** is often used to describe this type of inquiry, but this requires that it be differentiated from other types of research. Clarke and Dawson (1999) describe evaluation research as

"a form of applied research, the primary purpose of which is not to discover new knowledge, as is the case with basic research, but to study the effectiveness with which existing knowledge is used to inform and guide practical action" (Clarke and Dawson 1999, p2).

Patton (1986) also differentiated evaluation research from basic scientific research by claiming it intends "*to inform decisions, clarify options, reduce uncertainties, and provide information about programs and policies within contextual boundaries of time, place, values and politics*" (Patton 1986, p14). Basic scientific research is considered to be less context-specific, being "*undertaken to discover about new knowledge, test theories, establish truth, and generalize across time and space*" (ibid, p14).

Placing the emphasis here on the 'audience' for evaluation, or *whose* purpose it is serving, does help to clarify its purpose. For example, Clarke and Dawson (1999) considered that basic research has an audience of peers and scholars, whereas evaluation requires the audience to be negotiated. Hence in research it is the researcher's own questions that guide the inquiry, whilst evaluation is designed around a client's questions. This also raises questions about the extent that the researcher can eliminate their own questions and perspective from the inquiry.

This discussion about the debate and different perspectives on the purpose of evaluation helps to illustrate what has already been succinctly emphasised by Weiss (1972), that "*unless and until the evaluator finds out specifically who wants to know what, with what end in view, the evaluation study is likely to be mired in a morass of conflicting expectations*" (Weiss 1972, p6). Even this is not straightforward. Weiss (1972) also points out that there is often a covert or 'hidden' purpose for evaluation, for example to delay decision making, or to abdicate responsibility for a decisions, or as a public relations exercise. The implication here for developing evaluation methodology is that it is also important that the methodology user is self-aware of how the evaluation design and hence its outcomes is also socially constructed, including their own role in this process.

2.5.2. Role of the Evaluator

The debates about the role of the evaluator in theories about how evaluation should be practised centre on the relationship between the evaluator, the evaluation, and the evaluand (the activity being evaluated).

Early writing about the role of the evaluator tends to focus on the need for the evaluator to be independent from the evaluand, but ‘expert’ in the use of appropriate evaluation methods. ‘Appropriate’ here means alignment with the purpose of the evaluation and context of its implementation. This would then enable the evaluator to develop an unbiased and reliable ‘judgement’ about the merit or worth of the evaluand (Scriven 1967, 1996a). This perspective assumes a more positivist stance, seeing it as important for the evaluator to be as objective as possible in the use of methods to reach their judgement. Weiss (1972) associated this approach more with ‘external’ evaluators, those commissioned to undertake an evaluation with no vested interest in the activity being evaluated and its outcomes. This was considered somewhat short-sighted as it did not also recognise the value of the ‘insider’s’ contribution to evaluation. She contrasts this with that of the ‘internal’ evaluator, who may be involved in the evaluand in some way and may therefore have a primary interest in the findings and outcomes. Whilst this type of evaluator may be less expert in the choice and implementation of methods, and less objective in their collection and interpretation of data, they do already have some insight and understanding of the evaluand to help focus their inquiry and provide context for their interpretation of findings. They may also be in a better position to influence utilisation of findings and be more committed to ensuring utilisation. On the other hand, the external evaluator’s findings may have wider credibility and influence.

Patton (1986) attempted to address this dilemma. He also noted from his own experience as an evaluation practitioner “*getting evaluation used takes a lot of follow through*” (Patton 1986, p312), and that those internal evaluators required to undertake evaluations were often excluded from the subsequent planning or decision making process. On the other hand, knowledge developed by external evaluators was often lost to the organisation when they moved on from their commission. As a result he did not consider the internal/external dichotomy useful, stating that “*there are a good many possible combinations of internal and external evaluations that may be more desirable and cost-effective than either a purely internal or purely external evaluation.*” (Patton 1986, p313). One approach he recommends for cost-effectiveness is for internal evaluators to be involved in collecting and analysing data, and external evaluators to evaluate the

process of evaluation i.e. undertake a meta-evaluation (see section 2.5.3). This external evaluation of process is one approach to providing some accountability to external stakeholders. This is a model that is currently adopted in UK higher education, where institutions are given guidance on criteria for quality assurance and self-assessment to provide accountability to its funding bodies, but an external agency makes judgements about the robustness of these processes.

However, Patton's view on ensuring utilisation of findings was that

"the researcher has no intrinsic rights to unilaterally make critical design and data collection decisions. [] ..it is critical that intended users participate in the making of measurement and methods decisions so that they understand the strengths and weaknesses of the data – and so that they believe in the data" (Patton 1986, p180).

This also reflects his view that the role should be more facilitative "*in helping decision makers and information users arrive at their own judgements*" (Patton 1986, p138). To this end he envisaged a number of possible roles the evaluator could take from

"collaborator, trainer, group facilitator, politician, organizational analyst, internal colleague, external expert, methodologist, information broker, communicator, change agent, diplomat, problem solver and creative consultant" (Patton 1986, p319).

He therefore considered that the evaluator should adopt a role that he considered 'situationally responsive' to the conditions that they face, and he accepted that this would also depend on their own 'personal style' of practice.

The recognition of a need to achieve a balance between the contributions that could be made by those with an 'internal' and 'external' role in the evaluation resulted in a shift towards considering the external evaluator as more of a 'facilitator' of the evaluation process (Stake 1975), providing expertise knowledge about methodology to guide those on the inside in undertaking their own evaluations to inform planning and decision making. Evaluation began to be seen as more of a *participative* endeavour, engaging relevant stakeholders. The term 'stakeholder' in evaluation work is now in common use to describe "*persons or groups that are put at risk by the evaluation*" (Guba and Lincoln 1989, p40, after Stake 1975). They are individuals or groups that have some input into the collective endeavour or its evaluation and may be positively or negatively affected by them.

In participative approaches such as responsive constructivist evaluation (Guba and Lincoln, 1989), stakeholders are involved in negotiating the 'parameters' and 'boundaries' of the evaluation. These determine what is relevant to explore in the inquiry and what counts as success. The

assumption is that there is more likelihood that the activity will be successful if the various stakeholders can agree on the meaning of success and the criteria by which it will be judged, and commit to achieving it. It also has emancipatory intentions, as it is expected that each stakeholder group has a voice. The evaluator becomes a facilitator for this inquiry, but one which cannot be considered neutral, since their approach to facilitation may influence the parameters and boundaries that are articulated. It is also their responsibility to introduce any outside information not necessarily known by the groups, which may also help to resolve conflict. The notion of success is a result of dialogue and negotiation between these different parties. There is no assumption that consensus will definitely be achieved, but the process does help to highlight those areas that are in conflict, and that may become an issue of particular focus for the evaluation.

This approach appears to be more targeted at change management and transformation initiatives where the criteria for judging success are defined from largely within the stakeholder group whose *actions* will result in change. It might be considered problematic by those with an external interest for accountability purposes (e.g. external funders of an activity). Here there might be an expectation of some external definition of criteria for success and independent evaluation against these criteria. Indeed it has been criticised for the assumption that it is appropriate to involve all stakeholders (Pawson and Tilley 1997, Mason and Barnes 2007).

Theory about participative evaluation assumes the evaluator to be a co-constructor of what is learnt from the evaluation and its impact on the evaluand, along with other stakeholders in both the evaluand and its evaluation. It goes further than Stake's (1975) concept of the evaluator as 'facilitator', in that it recognises that the evaluator co-constructs their role in the evaluation, rather than this necessarily being predefined.

One of the difficulties with a constructionist perspective on the role of the evaluator is that it does not fully take into account different stakeholders' relative power in this co-construction process. It is unclear when the process of negotiation should cease. A participative negotiation process assumes that at some point the negotiation must cease, but ceasing negotiation also assumes that some participants have greater power over others to influence the process, and insufficient consideration is given to these power relationships which "*allow some people to advance their ideas whilst others have their choices foreclosed*" (Pawson and Tilley 1997, p23). Pawson and Tilley (1997) also pointed out that although participants may have more detailed knowledge of the operational activity, they may be less aware of wider contextual conditions and outcomes, with the exception of those that have a direct implication for them. They may have the internal insight

and provide the continuity that helps to build experiential knowledge about their situation, but are not necessarily methodical in their approach. They may be less open to the need and opportunities for change than the external evaluator, who is seen as a means of introducing new insights from a wider context and theory with which they may make connections. Guba and Lincoln (1989) advocate that “*if audiences are not sufficiently knowledgeable or sophisticated at the start, it is the evaluator’s moral obligation to take steps necessary to bring them to whatever minimal level is required for full participation*” (Guba and Lincoln 1989, p203). The evaluator is therefore not just investigator, but also learner and teacher of evaluation methodology, in terms of enabling stakeholders to engage with the roles expected of them. This developmental dimension is also considered to be one of the necessary dimensions of empowering participants in evaluation (Fetterman 1994), where evaluators not only take responsibility for facilitating the evaluation to help less powerful stakeholders to have a voice in the evaluation, but also ‘coaches’ “*to help others conduct their evaluation*” (Fetterman 1994, p4).

Whilst this discussion about role of the evaluator may not lead to any specific conclusions about appropriate design of evaluation methodology for technology supported learning, it does help to highlight some of the social considerations and political tensions involved in evaluation that need to be taken consideration in the methodology design. The intention is that the methodology not only helps to understand how the evaluand is socially constructed, but also the evaluation, and the impact on this for what is learnt from the evaluation and subsequent decisions and action. Methodology therefore also needs to help the evaluator to be critically self-aware of their own role, and hence impact, in this process of social construction.

2.5.3. Evaluation design and meta-evaluation

If the aim of this research is to develop methodology for evaluating technology supported learning, this will involve designing, implementing and evaluating this methodology. The term attributed to the evaluation of evaluation is ‘meta-evaluation’.

Evaluation Design

The discussions about the purpose of the evaluation and role of the evaluator have helped to highlight that the starting point for designing evaluation needs to be a decision about its purpose, but this cannot be separated from consideration of *whose* purpose. If the evaluator privileges their own perspective in the design of the inquiry, then the danger is that the findings will not be relevant and useful to other stakeholders and will not be used.

A central premise when designing evaluation is therefore that it is only meaningful by reference to the activity being evaluated (Patton 1986). This means that as a process it cannot be considered in isolation, but its purpose, scope, methods etc will be dependent on the purpose and context of the activity being evaluated. It should lead to findings that are useful for informing the future thinking, decision and actions of the users of the evaluation data. The purpose of evaluation is “*to answer stakeholders’ questions*” (Ibid, p43), with the emphasis on “*utility, relevance, practicality, and meeting the information needs of specific decision makers*” (Ibid, p15).

Participatory approaches attempt to maximise the relevancy of evaluation to inform decisions and actions for improvement by empowering relevant stakeholders to participate in the evaluation, beginning with its design. However, approaches that assume that all stakeholders can be involved in designing the evaluation from the outset treat as unproblematic the initial selection of *which* groups or individuals should be represented. For example, Guba and Lincoln (1989) state that “*in most cases the major stakeholders can be identified with minimum of effort at the beginning of an evaluation*” (Guba and Lincoln 1989, p202). This fails to recognise that unless there is already good knowledge of what is relevant, then it is not necessarily known who to assume is a stakeholder. Initially some perspective will be privileged in this design decision.

The need for a more pragmatic approach is therefore recognised in Patton’s (1986) utilisation-focussed evaluation. Here the first step in any evaluation involves identifying the primary *users* of the evaluation, who are not necessarily the same as its audience. The audience may be a range of interested parties. Users are the specific stakeholders who intend to take some specific decision and undertake action informed by the evaluation.

The evaluation process is then designed to meet the needs of specifically identifiable individuals or groups who have an interest in the information that the process produces *and* a commitment to use this information. Ensuring the evaluation process meets their needs and maintains their commitment means involving them in all stages of planning and decision making about it. It is acknowledged that a single inquiry is unlikely to be able to answer all possible questions from the perspectives of all interested parties. The focus is on understanding the perceptions and expectations of the *primary* users of the evaluation about its purpose, scope, and questions. It is their purpose that determines the questions that will guide the inquiry, and hence the methodological approach. For example, if the evaluation aims to assess the achievement of goals or objectives, then questions will be focussed on outcomes. If it is to understand how something

works, or the effectiveness of actions, then questions will guide the exploration of connection between action or implementation and outcomes.

Rossi *et al* (2004) have agreed with Patton in as far as "*priority should be given to evaluation questions that will yield information most likely to be used*" (Rossi *et al* 2004, p89), therefore the "*discussion with the evaluation sponsor and other key stakeholders must establish who will use the evaluation results and for what purposes*" (Rossi *et al* 2004, p91). This is used to decide and prioritise the contextual questions the evaluation will address. However, unlike social science questions, these context-specific questions are concerned with issues such as 'effectiveness' and 'value' which are judgements about performance or success. Without these value judgements the inquiry is not 'evaluation'. In order to make these judgements, criteria need to be decided about *what* is important in making these judgements and indicators of good or bad performance in relation to these things. This process of deciding with appropriate stakeholders the evaluation purpose and questions, the criteria and indicators, is often called *scoping* the inquiry. As Patton (1986) points out - "*deciding what will be evaluated means deciding what will not be evaluated*" (Patton 1986, p65), which involves setting boundaries around what information is relevant and not relevant to those that will use the evaluation.

Only when the boundaries to the evaluation have been established is it possible to work out what methods are appropriate to collecting information needed. However, a further factor at play in designing evaluation is the resource that is available to undertake the inquiry. This is not finite. As a result "*any given design is necessarily an interplay of resources, possibilities, creativity, and personal judgements by the people involved*" (Patton 1986, p221).

Recognising that an evaluation is targeted at one particular user group, does not mean that it should not be sensitive to other stakeholders who will be affected by it in some way, or who may have an interest in its outcomes. Failing to recognise the needs and values of a wider group of stakeholders risks making judgements based on unrepresentative information, and may result in decisions for actions that are not socially or politically feasible, again rendering them unusable.

Hence although the starting point for evaluation design may well be the primary users of the evaluation, this enables others relevant stakeholders to be identified who can be involved in discourse and negotiation about the evaluation questions, criteria, methods and tools, to increase the likelihood that they will commit to any improvement action that is implied by the evaluation findings.

Prioritising these perspectives will be one of the considerations in evaluation. Guba and Lincoln (1989) state:

"It may be the case that, in many evaluations, the variety of stakeholders may lie beyond the power of available resources to accommodate. Some means must be found to sort out the audiences into included and excluded categories. It is our position that the only reasonable and ethical criterion that can be used for this sorting purpose is relative stake" (Ibid, p203).

Deciding this is not considered unproblematic, but Guba and Lincoln's recommendation is again that this should be part of the negotiation process, which raises again the question of when the negotiation should cease and who has the power to influence this. Smith (1993) concluded from his own experience of evaluation practice that "*many stakeholders did not want to be involved in evaluation planning or implementation, and did not feel that their participation would improve the quality or utility of evaluation*" (Smith 1993, p239). Alternatively, stakeholders may perceive their involvement as form of 'pseudo-empowerment', without having sufficient representation or any real power in the process (Mark and Shotland 1985). The extent to which this is the case may depend on the evaluator's perception of stakeholders' legitimacy or importance, and presumably this perception may also be influenced by other stakeholders.

Hence the issue of stakeholder involvement in the design of evaluation is not one that has yet been satisfactorily resolved. It has also been argued that there is lack of adequate guidance on how to conduct participatory approaches, particularly in taking into consideration the impact that power relationships may have on the process (Gregory (A.) 2000). Rossi *et al* (2004) emphasise that the real issue for evaluators is that of ethicality and fairness, which involves being transparent about different perspectives and which have been privileged (and presumably why this is the case).

"every evaluation is undertaken from some set of perspectives, but an ethical evaluator tries to avoid biasing evaluation findings in the design or analysis" (Rossi *et al*, p375) hence "*...the responsibility of the evaluator is [...] to be clear about the perspective from which a particular evaluation is being undertaken while explicitly giving recognition to the existence of other perspectives*" (Ibid, p376).

Meta-evaluation

Meta-evaluation is the *evaluation of evaluation*, and like any other evaluation the same questions arise about its purpose and practice.

There are two main purposes of meta-evaluation that are highlighted in the literature. The first of these is *quality assurance*, where it is considered “*as a systematic tool for the quality control of evaluation studies*” (Uusikylä and Virtanen 2000, p50). Patton (1986) explains how the need for this arose in the 1970s as concern developed, particularly in the United States, about the amount of money being spent on evaluations that could not be understood and were hence unusable by program staff and funders. He cites a particular meta-evaluation study (Bernstein and Freeman 1975) where the quality for evaluation research was based on criteria solely derived from the scientific paradigm, such that “*their definition of quality ignored whether the information collected was relevant, understandable, or useful from the point of view of stakeholders, or even whether the methods and measurements were appropriate to the problem under study*” (Patton 1986, p183). At this time, the discourse about the accountability of evaluators in the US led to the development of a set of standards published by the Joint Committee on Standards for Educational Evaluation (1981), with criteria for judging evaluations being based on “*utility, feasibility, propriety, and accuracy*” (Patton 1986, p25). The US Evaluation Research Society (1980) also stipulated these criteria, requiring evaluators to be more accountable in these respects. Therefore meta-evaluation from this perspective became “*about evaluating given evaluation studies based on the profession’s standards and principles*” (Uusikylä and Virtanen 2000, p53). Stufflebeam (2001) offers the following operational definition:

“*the process of delineating, obtaining, and applying descriptive information and judgemental information – about the utility, feasibility, propriety, and accuracy of an evaluation and its systematic nature, competent conduct, integrity/honesty, respectfulness and social responsibility – to guide the evaluation and/or report its strengths and weaknesses*” (Stufflebeam 2001, p185).

More naturalistic forms of inquiry became more acceptable (Stake 1975, and later Guba and Lincoln 1989), using qualitative data to provide depth and detail, exploring “*what people’s lives, experiences, and interactions mean to them in their own terms and in their natural settings*” (Patton 1986, p187). In ensuring *use* of evaluation, there has therefore been a shift to judging the quality of evaluation based on the ethicality of the approach, and the reflexivity of the evaluator about its strengths and limitations and how this might influence the interpretation of evaluation outcomes. In summary

“*To be able to utilize evaluation findings, three critical conditions have to be met. First there should be a general understanding of the results. Second, the findings of the evaluations have to be timely, valid and reliable, and in a form in which they can be communicated to decision-makers and to the general public. Finally, results and conclusions have to be legitimate (both substantively and in the processes through which*

they are created) and to follow sound and ethical guidelines for conducting evaluations” (Uusikylä and Virtanen 2000, p52)

The second purpose of meta-evaluation is to inform improvement in the wider theory and practice of evaluation, rather than assessing the quality of a single evaluation. Nearly 30 years ago, Smith (1981) highlighted the need for “*more knowledge about (1) the contexts within which evaluation is practiced, (2) the nature of evaluation utility, and (3) the effectiveness of specific evaluation methods*” (Smith 1981, p174). The term ‘methods’ here is more aligned with the term methodology used in this thesis, as “*the perceptual structure used to organize the phenomena under study, the standard sequence of events which are followed, and the body of specific techniques customarily associated with the approach*” (Smith 1981, p174). Despite this, there has since been very little empirical research or *evaluation of evaluation* to support the development of generalisable principles of practice (Smith 1993, Hanssen et al 2008). That which does exist has been found to concern the single case study (Smith 1981, 1993) and/or validate existing approaches (Hanssen et al 2008). Instead studies are recommended across multiple cases to develop “*theories that describe what evaluators do, why they do it (in terms of both their rationale and contextual forces which shape their behaviour) and what use, impact, or change results from their actions*” (Smith 1993, p240). The latter half of this statement also implies some explanatory component to theory which connects methodology with its outcomes.

A further topic in the debate is about the criteria by which we judge meta-evaluation that attempts to develop wider ‘generalisable’ theory about evaluation practice, since this will influence the design of such evaluation. Patton (1986) discusses how it might be more appropriate to apply Cronbach’s (1982) concept of ‘extrapolation’ “*using all available knowledge including information about quite different situations*” (Patton 1986, p235) to develop *credible* theory. He associates this notion of credibility with “*clarity, full and frank disclosure of data strengths and weaknesses, balanced reporting, defensible information sources, valid and reliable measurement, and justified conclusions*” (Patton 1986, p222). Smith (1981) suggests similar criteria to those that have been applied to evaluation design and the review of evaluation studies i.e.

“Need: *Is there a need for this method of evaluation? Does it provide a unique approach or are there stronger critical competitors?*

Utility: *Does the method work, providing the knowledge and impact it was designed to produce?*

Acceptability: *Do evaluation practitioners seek out this approach to evaluations? Do the evaluation’s clients value the products resulting from the use of this method?*

Compatibility: *Can the method be adapted to fit the context in which it was designed to be used? Is the method flexible with respect to situational constraints?*

Cost: *Are the resources, expertise and time required to use this method reasonable and generally available? Is the method marginally cost effective?*

Side effects: *Are the side effects of the use of this method generally well known and acceptable to most audiences?" (Smith 1981, p177).*

2.5.4. Evaluation Methodology

The previous sections have helped to outline the concepts that are necessary to help to evaluate some of the existing theory about evaluation methodology and its relevance to evaluating technology supported learning processes, on the assumption that these processes are socially constructed.

What has been learnt so far is that, as argued by Guba and Lincoln (1989), the meaning of evaluation has been continually renegotiated by those with an interest in the theory and practice. This means that there is no 'right' way to define or practise it. This will be contingent on its purpose and context, which are only meaningful in relation to the activity being evaluated (Patton 1986) and its stakeholders.

In this research project there are different 'levels' of evaluation that need to be considered in the design of methodology.

- (1) The evaluation methodology that will be applied to the evaluand- a context of technology supported learning. The purpose of this is to answer evaluation clients' questions. But as discussed in earlier sections, these concern how these contexts are socially constructed.
- (2) The meta-evaluation of this evaluation, with the aim of learning about how the evaluation works to inform improvement in evaluation theory and practice for these contexts.

Both of these purposes of evaluation involve developing understanding about the relationship between action and their effects, or *process* and *outcomes*. In the literature about program evaluation, this relationship is often called the *impact theory* describing "*a cause-and-effect sequence in which certain program activities are the instigating cause and certain social benefits are the effects they eventually produce*" (Rossi et al 2004, p141). In the first case, this concerns the relationship between the action that is being taken to support learning, and the transformation that is achieved by those involved. In the second case, it concerns the relationship between the

evaluation activity and its outcomes in terms of what is learnt and how this influences change in the evaluand. It is therefore necessary to consider how existing theory about evaluation can inform the design of evaluation methodology to develop insight into these process-outcome relationships.

In the physical and biological sciences an objective perspective is taken on the existence of cause-effect relationships, with inquiry designed to discover these using experimental method. The assumption is that progress towards discovery of cause-effect relationships can be made through the application of systematic inquiry underpinned by the following principles:

1. Phenomena under investigation have essential characteristics that can be observed or determined, independent of the perception of the investigator.
2. These phenomena can be reduced into smaller components to enable the isolation of variables so that theories about their relationships can be tested.
3. Testing these theories involves controlled experimentation or observation and rational analysis of experimental results or observations. This requires strategies that avoid dependence on subjective prior knowledge, which may be incorrect. Such strategies include practical interventions, cross-checking, and error control.
4. The methodology, analysis and findings are made publicly accessible to enable observations or experiments to be repeated, and hence the findings to be verified or refuted by other investigators.
5. Findings that can be consistently verified lead to accepted truths or facts about the world.

This scientific approach does not dispute that we each make sense of the world subjectively. However, it does assume that strategies can be employed to avoid or reduce the effects of this subjectivity. The success of the approach in developing understanding about physical and biological means that its principles are often applied to problems in the social sciences. This is reflected in experimental designs to program evaluation such as those described by Rossi *et al* (2004), where

*“participants are randomly sorted into at least two groups. One group is designated the **control group** and receives no intervention or an innocuous one; the other group, called the **intervention group**, is given the intervention being tested. Outcomes are then observed for both the intervention and the control groups, with any differences being attributed to the intervention”* (Rossi *et al* 2004, p237).

This approach describes the fully *randomised field experiment*, analogous with the testing of the effects of pharmaceutical products on a random population. A more common approach is the *non-randomised quasiexperiment*, “in which targets who participate in a program (the “intervention” group) are compared with nonparticipants (the “controls”) who are presumed to be similar to participants in critical ways” (Rossi *et al* 2004, p237). Both approaches rely on comparing processes and outcomes of the intervention and control group in order to make a cause-effect inference. The purpose of the control group is to control for the influence of contextual variables in the evaluand. It is assumed that if two populations are sufficiently similar, then any different effects observed in the population subjected to intervention can be attributed to the intervention.

The argument presented in this thesis is that these deductive inquiry strategies are not likely to be successful for helping managers understand the complexity of change in organised learning activity because:

- Learning activity has too many interdependent variables to assume that these would be straightforward to isolate or that it is possible to make sense of the whole process by doing so.
- These variables depend on motivated human behaviour, which is influenced by prior knowledge and experiences, and therefore unpredictable. It cannot be assumed that the same intervention in different contexts, involving different people, will have the same outcome. Each organised learning activity is highly contextual due to the unique mix of people involved.

The application of inductive logic to discover cause-effect relationships is also problematic. Here theories are produced from repeated observation of a phenomenon. However from a subjective perspective it can be argued that the same set of observations is open to different interpretations or theories.

The assumption that generalisable laws can be established, even in the case of biological and physical phenomena, has been criticised because of the impossibility of deriving a universal law if not all possible cases have been tested or observed. Both deductive and inductive approaches rely on sampling, so it can never be absolutely certain that an observation that contradicts the theory will not be encountered with a different sample or at some future point in time.

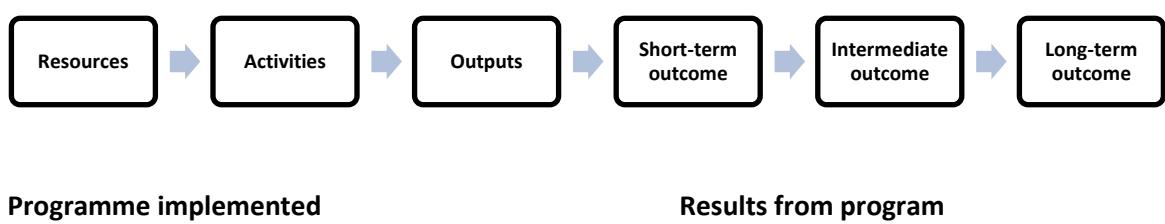
Theory-based (Weiss 1972, 1997) or *theory-driven* (Chen 1990, 1994) evaluation assumes the ‘theory’ being explored in the evaluation is context-specific, as “*a set of beliefs or assumptions that underlie action*” (Weiss 1997. p503). In this sense it is aligned with what Argyris and Schön (1978)

describe as a ‘theory of action’ in organisational learning theory, i.e. the theories people use in their everyday situations about the effects their actions will have, and therefore which guide their action. Argyris and Schön, and Weiss, acknowledge that these theories can be either explicit or implicit, and the theories individuals actually use to guide their action (‘theories in use’) are not necessarily always those aligned with those made explicit (‘espoused theories’).

Theory-based evaluation uses the ‘espoused’ or explicit theories of key stakeholders to guide evaluation planning, and is thought to be more likely to result in evaluation questions relevant to them and data relevant to answering these questions, (Rossi *et al* 2004). The data collected is then used to construct a model of the change process as experienced by those involved (the ‘theory in use’). This is then compared with the change that was designed (the ‘espoused theory’). If the intended change is not achieved, then the approach aims to identify the point at which the theory about cause-effect connections breaks down, and why. From this perspective the evaluation becomes a “*theory testing endeavour*” (Clarke and Dawson 1999, p33).

This type of evaluation typically starts with developing “*a conceptual model of how the program is expected to work and the connections presumed between its various functions and the social benefits it is intended to produce*” (Rossi *et al* 2004, p93). This process aims to prioritise issues relevant to understanding the program and raises questions about what is reasonable in terms of the assumptions and expectations of what the program can achieve and how it can do this. Rossi *et al* (2004) claim that there is no consensus about how to model or represent these theories, although one common approach is the *logic model* (see also Julian *et al* 1995). In its basic form, this is depicted in figure 2.3.

Figure 2.3 Basic logic model (adapted from Rossi *et al* 2004, p9)



In its contextual form, the relationship between these components is often represented in the format shown in table 2.2.

Table 2.2: Logic model for teen parent education program (adapted from Rossi *et al* 2004, p147)

Resources/ inputs	Activities	Outputs	Initial outcomes	Intermediate outcomes	Longer-term outcomes
Agency provides program manager, instructors, education manuals, videos and other teaching tools. Schools identify participants.	Instructors give parenting classes on prenatal, nutrition, development, safety, caretaking etc. Classes in school- 1hour, x2 per week, from 3 months before to 1 year after delivery of infants.	Pregnant teens attend classes.	Teens knowledgeable about prenatal health & nutrition, post-natal care, feeding and social interaction with infants.	Teens apply knowledge to own health prenatally. Teens deliver healthy infants. Teens apply knowledge to caring for and interacting with infants.	Infants achieve appropriate 12-month milestones for physical, motor, verbal and social development.

One of the key benefits promoted for using such a model is as an aid to communication between stakeholders about the program, to develop a shared understanding to frame both the program activity and its evaluation. It is a means of defining the boundary of the program, starting by defining

“the benefits the program intends to produce and working backward to identify all the activities and resources under relevant organizational auspices that are presumed to contribute to attaining those objectives” (Rossi *et al* 2004, p1480).

Some of the pitfalls highlighted by Rossi *et al* (2004) are that it can be time and resource consuming to produce (which may also depend on which stakeholders are involved), may be too linear in its representation of the complexity, and may be applied too rigidly so that the program and its evaluation are not responsive to new information. They recommend therefore not striving for ‘perfection’ in its articulation, considering alternative forms of representation, and revisiting the model regularly to check and revise it.

Despite the attempt here to be more contextually responsive than experimental approaches, theory based evaluations are still often accused of failing to give sufficient consideration to the complexity of the situation being evaluated, because of the inappropriate philosophical assumptions on which they are based (Virtanen and Uusikylä 2004). They are still often underpinned by an objective ontological perspective of theory building through the ‘discovery’ of connections between intervention and outcomes that work, without critically questioning *for whom* they work. The assumption is that what counts as ‘success’ is determined by those making the intervention and commissioning its evaluation, and the inquiry aims to uncover the ‘correct’

mechanisms for this success. The approach takes into account that we may each have subjective perspectives that may influence our own conceptual models of the change process being evaluated, but still assume that "*a program theory can be wrong*" (Weiss 1997, p506).

From a constructionist perspective, cause-effect relationships are not *de facto* connections awaiting discovery by rigorous scientific inquiry, but are socially constructed by those who have an insight and interest in them. This means that those actors involved in any collective endeavour being evaluated bring about any outcomes through their own actions. These outcomes are not just dependent on an intentional intervention to bring about change, but on how actors interpret and respond to it. This interpretation is influenced by their unique histories of learning and experience. Whether those evaluating the intervention consider outcomes successful and attribute them to the intervention is also a subjective judgment. This judgment is based on the information they have access to, and the implicit and explicit frameworks they use to make sense of this information.

Hence theory-based evaluation underpinned by an objective philosophy does not adequately consider how those involved in the activity will interpret its measures of success and influence of this interpretation on their response to any intervention and its outcomes. It also focuses on only one direction of change, the impact the intervention has in the context of its application. It does not explore the more complex dialectic relationship that a context of an intervention may have with its wider environment (Virtanen and Uusikylä 2004).

A critical issue for theory about evaluation methodology is therefore which stakeholders' theories of action are privileged in judgements about activities and their relationship with outcomes, what counts as success, and how we can understand the role of context.

Patton's (1986) utilization-focussed evaluation shifts from the objective assumptions about developing theory to a position that accepts

"it is not possible to establish causality in any final and absolute sense when dealing with the complexities of real programs in which treatments and outcomes are never quite pure, single, and uncontaminated. We cannot provide definitive answers, but we can arrive at some reasonable estimation of the likelihood that particular activities have had an effect" (Patton 1986, p151).

The role of evaluation therefore becomes not about proving relationships between variables but providing direction and reducing uncertainty by developing and testing of a "*causal model upon which program activities are based*" (Patton 1986, p152). In the design of evaluation, he therefore

privileges the theory of action of the evaluation's *primary* user. For the purpose of scoping their evaluation, a theory of action may be described in terms of components that comprise a whole having a distinct boundary. Of course, given the preceding discussions about the complexity associated with different purposes and levels of evaluation, this may be seen to be oversimplified. He addresses this by saying

"Program components may be conceptually distinct in the formal version of a theory of action, but in practice these analytically distinct components, links, and stages are highly interdependent and dynamically interrelated. In short, the cause-effect relationships may be mutual, multidirectional and multilateral" (Patton 1986, p164).

He therefore conceptualises a recursive hierarchy of 'higher order' and 'lower order' activities with a complex relationship that can be described by cybernetic systems concepts, where the interaction between different levels involves feedback mechanisms (see section 3.3.2 for more detailed explanation). A key challenge is that of representing this complexity, inevitably simplified to make sense of it, but in a way that is still useful for those conducting the evaluation. However, he provides little guidance on how these concepts could be *operationally* applied.

Shifting away from the objective stance on developing theory, may suggest moving further away from methodology that could help to develop knowledge about evaluation that is generalisable beyond the single context in which it is applied. This is because those who take an extreme subjectivist perspective assume that "*phenomena can be understood only within the context in which they are studied; findings from one context cannot be generalized to another; neither problems nor their solutions can be generalized from one setting to another*" (Guba and Lincoln 1989, p45).

From a realist position, Pawson and Tilley (1997) considered that the phenomena in the contexts we are interested in are 'real' in the sense that they exist independently of our perceptions of them. They were also very much concerned with how meaning and knowledge is developed that extends beyond the single case. For them, this also involves theory building and testing as suggested by theory-based evaluation, with theory development being informed by existing social theory and empirical evidence. Their assumption was that actions have a transformative potential, but only in certain conditions. Their point of departure from scientific/positivist approach was therefore that how phenomena come about and their meaning for society *is* socially constructed and regularities concern actions and outcomes *in context*.

"Realists do not conceive that programs 'work', rather it is the action of stakeholders that makes them work, and the causal potential takes the form of providing reasons and resources to enable program participants to change" (Pawson and Tilley 1997, p215).

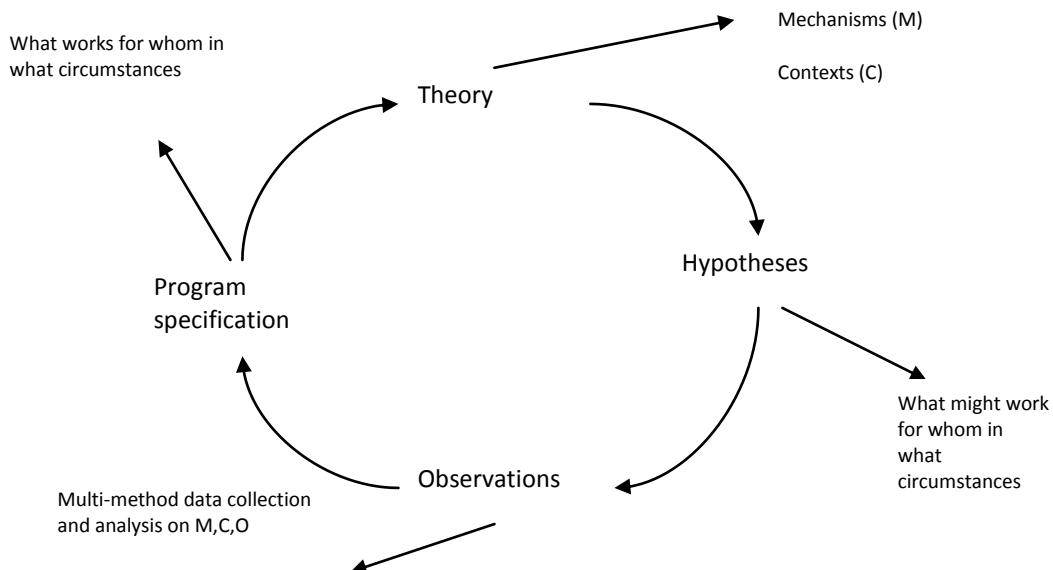
Hence those undertaking the inquiry need *"to understand the conditions required for the programs' causal potential to be released and whether this has been released in practice"* (Pawson and Tilley 1997, p215). Theoretical expressions therefore take the form:

$$\text{Outcome (o)} = \text{mechanism (m)} + \text{context (c)}$$

i.e. *"programs work (have successful 'outcomes') only in so far as they introduce the appropriate ideas and opportunities ('mechanisms') to groups in the appropriate social and cultural conditions ('contexts')"* (Pawson and Tilley 1997, p57).

Hence it is appropriate to test hypotheses, but their goal is not 'generalisation' but 'specification' of *"what works for whom in a set of given circumstances"* (Pawson and Tilley 1997, p86). Each context is perceived as a learning situation for its various actors and other stakeholders. Instead of leading to universal laws to explain the relationship between interventions and outcomes, the *generative explanation* aims to explain how the relationship comes about, i.e. how it is socially constructed. This involves deepening understanding of the change process through iterative testing that cumulatively leads to improvement in theory about C, M, O configurations. Each evaluation is a case study, with a series of case studies being used to test abstract theoretical concepts and refine understanding of CMO configurations for the particular contexts of interest. This process is conceptualised in figure 2.4.

Figure 2.4: The realist evaluation cycle (after Pawson and Tilley 1997, p85)



In summary the realistic evaluation approach takes some of the ideas from theory-based evaluation, in that it accepts that modelling the relationship between CMO configuration helps to plan for appropriate data generation to model the change process. This has some advantages for inquiry into the complexity of organised learning activity. The first is that it aims to address the question of ‘what works for whom’. It recognises that what counts as success is subjective i.e. “*when an evaluator tells that a program is a success (R) s/he should be demonstrating what it is (M) about the program that works for whom in what conditions*” (Pawson and Tilley 1997, p72, my emphasis added). It also acknowledges that the evaluation process is a social and political process that may have an impact on the context of inquiry and its outcomes. The theory is more pragmatic than that of Guba and Lincoln (1989), by accepting the inevitability that this process will lead to the interests of some being privileged over the interests of others. Pawson and Tilley (1997) claimed the focus is on investigating how the context of inquiry is socially constructed and building transferable learning through iterative evaluation. This develops and improves over time an ‘organising framework’ that provides a means of comparing cases.

The main limitation of this approach is the assumption that the ‘theory of action’ modelled to guide the inquiry can be established independently of the perspectives of the various stakeholders. This privileges the evaluator’s theory of change about what is important to investigate in the evaluation. This may be appropriate in situations where the team or individual planning and undertaking the evaluation are the same team or individual that will use its outcomes to inform their own decisions, actions and further theory building. This applies to managers engaged in their own evaluations of the situations they are managing, and independent research where the researcher intends to make some contribution to wider theory that is considered problematic as *interpreted by them* (as in the case for this Ph.D. research). However, in situations where a change manager commissions an independent evaluator to undertake the inquiry, it may lead to findings that the change manager does not find useful for their own purposes.

The approach was also criticised by Barnes *et al* (2003) because it is based on some of the same assumptions as theory-based evaluation. This leads to a tendency to consider the change process to be unidirectional. They cite the following as their evidence for this assumption:

“programs work by introducing new ideas and/or resources into an existing set of social relationships. A crucial task of evaluation is to include (via hypothesis making and research design) investigation of the extent to which these pre-existing structures ‘enable’ or

'disable' the internal mechanism of change" (Pawson and Tilley 1997, p70, my emphasis added).

This does not consider that the constraining/enabling conditions will also be dynamically changing as a consequence of the impact of the intervention.

A participative approach that its proponents claim builds on the theory-building strength of realistic evaluation *and* avoids privileging the evaluator's perspective is the '**Theory of Change**' approach (Connell and Kubisch 1998). This originated from the USA and the work of the Aspen Roundtable on Community Change, and has been used internationally in the context of community change initiatives. In the UK it has been used in the context of national health policy initiatives (e.g. Sullivan *et al* 2002, Mackenzie and Blamey 2005) and community development initiatives (e.g. Hughes and Taynor 2000).

It is claimed the approach recognises the need to take into consideration the social, political and economic dimensions to contextual theories about change. These are complex not only because they operate at the individual and collective levels in the program being evaluated, but are also affected by participants membership of other collectives (family, community, institutions) who may have different vested interests in the initiative. Therefore a participatively developed theory of change is used to guide program intervention and its evaluation. In addition to articulating assumptions about the relationship between context, activities and outcomes, stakeholders are also asked to articulate what they consider to be meaningful indicators of success, with acceptable thresholds. Stakeholders also need to consider that their theories are 'plausible', 'doable' and 'testable' based on their previous experience and their knowledge of the resources available for the activity and its evaluation and the conditions in which these will be undertaken.

The assumption of the approach is that collaborative negotiation of the theory of change, prior to generating data, strengthens the likelihood that stakeholders will attribute expected outcomes to the activities undertaken, if actions are undertaken as specified.

In addition to aiding the planning of evaluation the other advantages of this approach are advocated to be:

- it helps to refine the planning and implementation of change;
- it encourages collaboration and capacity building for organisational learning;

- it can be a means of managing expectations amongst stakeholders about what can realistically be achieved with available resources;
- it allows the value of the change strategy to be questioned and for it to be changed on an informed basis.

2.5.5. From evaluation theory to evaluation practice

The preceding section presents theory about evaluation that suggests that some form of participative and theory-based evaluation, implemented iteratively in a number of appropriate cases, might be useful for addressing the purpose of evaluation that this research intends to address. These purposes are (i) developing understanding of how technology supported learning processes are socially constructed, and (ii) developing theory about appropriate evaluation methodology for this purpose.

This section attempts to critique what has already been learnt about these kinds of approaches *from implementing them in practice*.

'Theories of action' or 'theories of change' provide useful frameworks to conceptualise change processes and guide inquiry to focus on relevant questions, data collection and analysis, and to make sense of data collected (Mason and Barnes 2007). Indeed there has been a recent trend towards using theory of change approaches to evaluate the impact of learning and teaching interventions in higher education (for examples see Saunders *et al* 2005, 2006, 2008). Saunders *et al* (2005) perceive the value of theories of change to be as *bridging tools* which help their users to conceptualise change in periods of transition, providing what they call *provisional stability* from which to make judgments about the impact of previous intervention and to plan future change. However, the existing literature remains problematic in its consideration of how these theories are constructed and the impact of this for the evaluation and its outcomes. As Blamey and Mackenzie (2007) point out, they differ with respect to *whose* theory is being tested.

A further criticism that has been made about the application of theory-based evaluation (Weiss 1997, Blamey and Mackenzie 2007) is that its users often fail to understand that there are two components to the theory. These are described as the 'implementation theory' and the 'program theory', but the descriptions of these terms are aligned with the concepts of 'prescriptive' and 'descriptive' theory used in Chapter 1. The criticism is that much evaluation practice fails to go further than exploring the implementation theory or *what* and *how* action leads to particular outcomes. This is the prescriptive component. They do not develop any real understanding of the

'program theory' which provides an explanation of *why* the implementation either works or does not work for those that plan them. This is the descriptive component. Both of these are necessary components of theory but do not in themselves constitute theory. Theory is a result of a tested relationship between these two components. Existing approaches do not necessarily make this connection when implemented in practice. Blamey and Mackenzie's (2007) suggested explanation for this is that in the Theory of Change approach the emphasis is on "*articulation relative to critique and testing*" (Blamey and Mackenzie 2007, p446). It is certainly noticeable in the original Connell and Kubisch (1998) description of the approach that there is little guidance about the process of integration and synthesis of data to make sense of it in relation to the articulated theory of change. In a reflection on what had been learnt from the application of the approach in practice, the Aspen Institute Roundtable on Community Change (Auspos and Kubisch 2004) also reported that the approach struggled to make any attribution of outcomes to process, and failed to take into consideration the complexity of the process, in particular the long-term nature of change. However, they thought that resolving this problem would not be as straightforward as extending the lifecycle of evaluations, since this may create problems such as stakeholders losing focus or commitment. They thought that greater consideration needed to be given to how to balance different evaluation purposes. Another concern was that "*too often, we have tried to understand the whole without having sufficient knowledge about the various working parts and how they function separately and together*" (Auspos and Kubisch 2004, p19).

This conclusion is reflected in Barnes *et al's* (2003) experience of using the approach. They found it useful at the individual project level for providing a framework for developing and documenting the evaluation strategy and different participants' perspectives, but less useful for developing understanding of the complexity of the impact theory at the higher level of analysis. Virtanen and Uusikylä (2004) also found it limited in its application to connecting project and program level theories (Virtanen and Uusikylä 2004).

2.5.6. Implications for this research

It has been suggested (Patton 1986, Barnes *et al* 2003, Virtanen and Uusikylä 2004) that systems or complexity theory might provide an organising framework for understanding not only how interventions lead to outcomes in social contexts, but also the dialectic relationship between different levels of analysis, such as the relationship between project, program, and the wider environment. This would also take into consideration that there might be different purposes associated with evaluation at these different levels. However, methodological guidance is still

needed about how to operationally apply systems thinking concepts in this kind of evaluation activity. It has also been proposed (Gregory (A.) 2000) that systems theory may provide an appropriate theoretical perspective from which to consider participatory evaluation approaches, in particular in developing understanding of the roles and relationships of different stakeholders and the problematic issue of power and conflict in the evaluation process.

2.6.Existing studies on the use of systems thinking in the evaluation of technology supported learning

Many of the knowledge management and learning theories that consider learning from a social activity perspective are rooted in the work of Vygotsky (1978) and his *activity theory*. This theory was influenced by the philosophical principle of there being a dialectic relationship between an entity and its wider environment. He developed ideas about the thinking and action of individuals being integrated and interdependent. In learning theory, this meant a move away from assumptions about thinking being conditioned in response to external stimuli i.e. change being unidirectional, to thinking about how the actions we take in response to thinking also have the ability to change our wider environment, and hence our future interaction with it.

These ideas are aligned with concepts about open systems, yet despite this there have been few published studies so far that attempt to make the explicit link by using systems thinking in the management, particularly evaluation, of technology supported learning. Those that have are conceptual papers rather than empirical studies (see for examples Achterbergh and Vriens 2002, Richardson and Courtney 2004, Guo and Sheffield 2007).

Britain and Liber (1999) used systems concepts to develop a *framework* for the pedagogical evaluation of virtual learning environments. Their concern was with evaluating the technology for its ability to support learning underpinned by particular pedagogical principles, and how to evaluate whether this technology could be embedded within a particular learning and teaching context. For this they used two conceptual frameworks. Firstly, Laurillard's (1993) Conversational Model was used to make an evaluation of whether a particular virtual learning environment will support this conversational model for learning. The difficulty here is that this one pedagogical model is privileged by the framework. The evaluation essentially intends to evaluate whether the technology can support key interactions between learner and teacher and in the designed learning activity.

The authors of the framework acknowledged that this model is therefore limited in enabling any evaluation of the ability of a virtual learning environment to support peer-peer interaction or for the teacher to manage many students. They argue that Stafford Beer's (1981) Viable Systems Model is better able to help with the evaluation of these aspects of platform design. They use some of the principles within the model to inquire into whether the virtual learning environment allows for appropriate organisation of the learning activity by its manager. For example, how it might help learners in the negotiation of their 'learning contracts' with their teacher, or help the teacher in the monitoring of whether learning is happening and what remedial action might be taken. Whilst these models and questions might help to assess whether a particular virtual learning environment might be capable of supporting a particular pedagogical design, and its management, it still does not help a particular user of it to understand how or why their particular strategies are working or not working. It therefore does not go as far as providing methodology for practitioners responsible for improving how technology is used in organised learning activity, and does not go beyond the case of the virtual learning environment.

Simon (2004) used systems thinking to evaluate the use of technology in organised learning activity. This was in the context of a social learning activity designed to help a variety of different stakeholders to come together to improve their understanding of the relationship between human activities and the natural environment. The study claimed the initial evaluation instruments (questionnaires and their questions) were based on the systemic conceptualisation of the various components of the project. These evaluation instruments were initially used by the development team members to guide their improvement of the earlier prototypes of the technology. One of the subsequent findings of their research was that this earlier formative evaluation led to a rather one-dimensional perspective which concentrated on the technology that was being developed and did not consider other contextual factors such as the learning of the development team and the context of the intended use of the platform. When feedback on the designed prototype was eventually sought from a group of potential users, the development team found there was lack of clarity amongst these users about whom the prototype was aimed at and why they would be motivated to use it. This suggests that the team's initial design of the prototype gave insufficient consideration to its relationship with learning activity, in particular its purpose. Therefore inquiry methods that had informed the design of the prototype had been insufficiently systemic. However, it was ultimately systems thinking about the evaluation activity that eventually highlighted this deficiency. From this experience the researchers learned of the need to be

systemically reflexive about the evaluation activity as well as the organised learning activity to which it is applied. However, there was no explicit guidance on how to do this.

2.7. Summary of chapter and gaps identified in existing research

It has been argued in this chapter that change initiatives in the context of technology supported learning are complex because of dimensions such as their participants, the purpose of the learning, the approach to learning that is appropriate for meeting this purpose, and the purpose and role that technology can take in this process. Existing theoretical frameworks have limitations in their usefulness for guiding the decisions and actions of change agents in these situations because of one or more of the following reasons:

- they are based on inappropriate philosophical assumptions, giving inadequate consideration to the complexity of the social and political processes involved in influencing both the organised learning activity *and* the evaluation activity, and the relationship between them. Particularly problematic is the inadequate consideration given to the role of power and conflict in these processes.
- they are not integrative in their consideration of the technology and its relationship with the organised learning activity, or relationship between different levels of strategy.
- they are too prescriptive or descriptive, so that practitioners are unable to make appropriate connections to decide on the transferability of concepts to their own specific contexts.
- they do not provide methodological guidance.

Appropriate methodology has been conceptualised as management action informed by evaluation activity that aims to improve the manager's theory of change about the connections between action and its outcomes and its relationship with the wider environment. The aim is to reduce uncertainty about the consequences of action.

Systems thinking has been suggested by a number of authors as an approach that may help to make sense of this complexity, in that it provides an organising framework for critically questioning how and why those involved in the learning, the evaluation, and any higher order strategy that these might form a part, construct the relationships between change activity and its outcomes.

Improving theory about appropriate evaluation methodology depends on research or meta-evaluation across multiple cases to improve understanding of principles of practice. However, there has so far been little research of this kind and in particular few studies have so far tried to explore the use of systems thinking for evaluating the integration of technology with organised learning activity. It is primarily this gap in knowledge that is addressed by the research.

Chapter 3. Systems theory and its role in change management practice

3.1. Introduction

In the discussion of the background theory it was argued that there is a need to develop appropriate evaluation methodology for technology supported learning that helps to understand how these processes are socially constructed. This theory needs to be developed through the meta-evaluation of the designed evaluation methodology across multiple cases. Existing evaluation theory underpinned by social constructionist philosophy is still considered problematic in its consideration of the complexity of socially constructed activity, particularly in relation to:

- (i) generating a tested and credible ‘theory of action’ that informs understanding about the complexity of the relationship between activities, outcomes and context;
- (ii) issues of power and conflict;
- (iii) connections between different levels of strategy, such as intervention programs and their component projects;
- (iv) the relationship between the evaluator(s), evaluation and the evaluand.

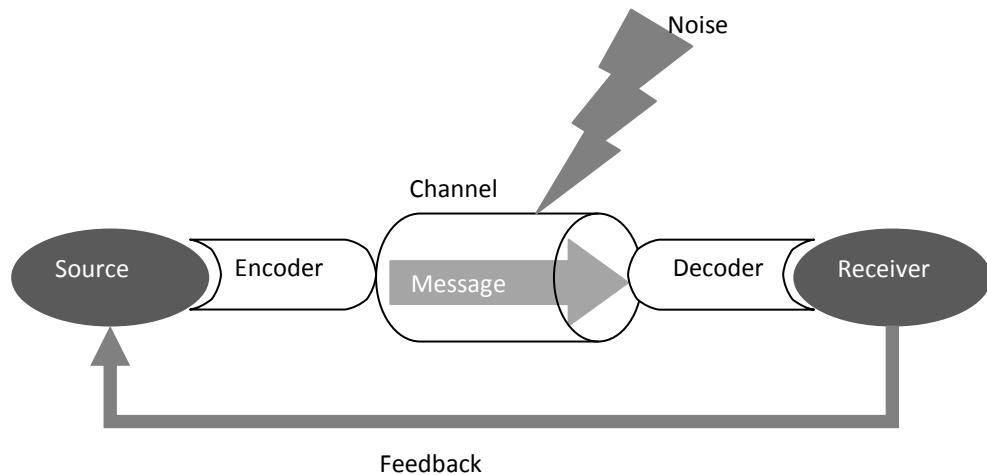
It has been suggested that integrating systems theory with evaluation theory and practice may help to address some of these difficulties. The aim of this chapter is to explore systems theory for its relevancy to designing these improvements in evaluation methodology.

3.2. Early systems theory and its application to change management

One of the early attempts to develop systems theory relevant to change management draws on the machine metaphor to explore human communication and action, with the aim of helping managers predict and control their domain of responsibility. This field of thinking became known as *cybernetics*, which Wiener (1948) defined as “*the science of communication and control in the animal and the machine*” (Wiener 1948, cited in Beer 1985, pix). He was particularly interested in the potential for machines to simulate human decision making, drawing parallels between the operation of living individuals and new communication systems. A key premise in cybernetic modelling is that learning and adaptation relies on feedback mechanisms. This concept originates from how the control in machines is achieved through messages. These are regular patterns of information from a sender to receiver. Sensory receptors in the receiver collect stimulus information, which is passed to a control unit that has the purpose of regulating system performance. The controller interprets the stimulus and sends a message to a component of the system intending to influence its behaviour in some way. Feedback messages are returned to the

controller about the actual performance compared to expected performance, so that future messages can be adjusted to influence any required change in performance. In change management methodologies underpinned by this theoretical perspective, the assumption is that the same principles can be applied to organisational systems, and that human behaviour can be predictably controlled by communication stimuli that will be interpreted in the way intended. This communication model is aligned with the behaviourist theory about learning. It is depicted rather more simplistically in figure 3.1.

Figure 3.1: Model of communication



In what Midgley (2000) has described a ‘first wave’ of systems thinking, Von Bertalanffy (1968) proposed a General Systems Theory, which he advocated as a common framework for developing understanding about phenomena in our world across all disciplines. Instead of a machine metaphor, he drew on the functioning of living organisms as his metaphor. His model of the ‘open system’ involved “*exchange of matter with its environment, presenting import and export, building up and breaking down of its material components*” hence “*the basis of the open-system model is the dynamic interaction of its components*” (Von Bertalanffy 1968, p157). This shift to perceiving the relationships as dialectic recognised that components would also be affected by their integration, rather than there being a linear, unidirectional cause-effect relationship. The communication and control mechanisms here were geared to maintaining a steady state (homeostasis), or stable change, in response to environmental disturbance. He also emphasised that systems theory was underpinned by philosophy about:

(1) Systems *ontology*, concerning what is meant by ‘system’. For example, some physical entities are real systems (cell, atom, galaxy) existing independently of observer. Others, such as social ‘systems’, are ‘symbolic constructs’ or abstractions. These are termed *conceptual systems*.

(2) Systems *epistemology*, concerning how it is possible to develop understanding about these ‘systems’. He advocated that “*investigations of organized wholes of many variables requires new categories of interaction, transaction, organization, teleology etc*” (Von Bertalanffy 1968, pxx), for example ‘perception’ involves interaction between a ‘knower’ and what they ‘know’.

Cybernetics and the original open systems model have been understood to reflect the objective perspective of the philosophical continuum, from which there is a tendency to consider the organisation as if it really were a system. This has become known as the ‘hard’ systems movement.

From this perspective, systems methodology for change management assumes there is an ideal way to organise and manage activity through communication and control mechanisms. Inquiry aims to use systems concepts to discover and model these. The expectation is that comparison of the operation of any real situation with the discovered ‘ideal’ systems model provides a means of diagnosing action required to correct any deviation of the real situation from the ideal, and that this ideal model can be transferred and adopted more widely. This approach is associated with social engineering and developing ‘best practice’ approaches. This may result in the setting of performance criteria, often expressed as thresholds or targets, and imposed on participants by managers not involved in the activity. Systems approaches underpinned by this theory make assumptions that humans will respond predictably to any approach at engineering their activity towards achieving some espoused outcomes.

Examples include:

3.2.1. System Dynamics

System dynamics, originally called industrial dynamics (Forrester 1961), involves modelling complexity in terms of entities and the ‘flows’ or relationships between them. The concept of ‘feedback’ is therefore important, as discussed earlier in relation to cybernetic systems theory. The approach is underpinned by an objective philosophy, such that the systems model is typically viewed as “*a sufficiently accurate representation of a real system, in which the constituent variables and their functional relationships, including the underlying assumptions, are formalized and therewith made transparent*” (Schwaninger and Grösser 2008, p449). The model is considered an abstract construction, but the aim is to improve on this to achieve as close an approximation to

'reality' as possible, to develop theories that enable prediction and control of the behaviour of the system modelled.

Theory-building involves iterative analysis of data, building models that represent hypotheses about change processes, and testing these alternative models. This involves inductive or '*data to theory*' stages (Schwaninger and Grösser 2008). A subsequent stage of the process is deductively testing the theory involving further data collection ('*theory-to-data*' approach). These processes are typically supported by computer simulation. Quantitative data modelling does feature heavily, although local knowledge of participants is seen as important in providing data and hypotheses, hence Kopainsky and Luna-Reyes (2008) state they are predominantly concerned here with qualitative data such as stories and documents. However the approach to analysis they describe is one rooted in positivism involving "*the process of discovering patterns in the data*" which "*ultimately leads to causal explanations of a phenomenon or problem, the dynamic hypothesis*" (Kopainsky and Luna-Reyes 2008, p 472, my emphasis added). Relationships between elements are therefore considered from an objective ontological perspective as cause-effect, to be explained by a functional expression that the methodology attempts to uncover, not subjective constructions of the observer. The resulting theory is described as "*a structured, explanatory, abstract and coherent set of interconnected statements about a reality*" (Schwaninger and Grösser 2008, p448).The approach is therefore seen as one of experimentation, with empirical rigour and relevance [to stakeholders] considered important at all stages, hence the process is described as "*tests and procedures to ensure that the model is useful with respect to some purpose and that its internal structure is valid*" (Kopainsky and Luna-Reyes 2008, p 472).

3.2.2. Total quality management

Total quality management (TQM) is defined by Oakland (1989) as

"an approach to improving the effectiveness and flexibility of business as a whole. It is essentially a way of organizing and involving the whole organization; every department, every activity, every single person at every level" (Oakland 1989, p14).

In this approach the focus is on ensuring that organisational processes as a whole lead to quality outputs (products or services) that satisfy customer needs. Inquiry is still seen as an attempt at discovering the best way of achieving this, i.e. underpinned by an objective perspective on the functionality of the organisation or 'system'. Every process within the organisation is therefore analysed in terms of its purpose in meeting the needs of specified clients. The approach is participative in terms of generating hypotheses and performance criteria, hence an emphasis on

co-operation between team members for the approach to be successful. Members from all levels in the process are involved in reviewing its purpose in meeting client needs. These clients may not necessarily be external to the organisation, but also internal. Responsibilities are devolved hierarchically, and staff development for participation is through training and instruction. The concept of the ‘internal customer’ means that improvement action is targeted at individual processes in the organisation (i.e. the ‘whole’ is the individual departmental level), rather than relationships between processes in the organisation.

3.2.3. Business process re-engineering

Business process re-engineering (BPR) is defined as:

“an improvement philosophy. It aims to achieve step improvements in performance by redesigning the processes through which an organization operates, maximising their value-added content and minimising everything else. This approach can be applied at an individual process level or to the whole organization” (Peppard and Rowland 1995, p20).

This is a remarkably similar definition to that of TQM, and builds on some of its concepts, but with the additional consideration of efficiency. There is also particular emphasis on the use of information technology, rather than machinery, to improve effectiveness and efficiency. BPR is also an approach taken to redesigning the organisation as the ‘whole’. Labour is organised to achieve management defined objectives across an interconnected chain of business processes, with the emphasis on performance measurement through measures and targets, individual or team rewards according to performance, and staff development through training.

3.2.4. Lean systems

This approach is advocated by Seddon (2003, 2008), who draws on the work of Ohno (1988) and his invention of the Toyota Production System. Some similarities can be drawn with TQM and BPR in that the focus of the approach is on the organisation of work to improve efficiency and effectiveness i.e. its functionality. It is also based on the premise that this functionality, or ‘system boundary’, is determined by a purpose which is dictated by client demand. Improving effectiveness and efficiency therefore involves elimination of work generated by failure to meet clients’ needs. Hence *“organisation needs to be designed for customers to ‘pull value’ from the organisation – to get exactly and only what they want, in the most expedient fashion”* (Seddon 2008, p69). Seddon classifies customer demands into two categories, ‘value’ demand and ‘failure’ demand. ‘Value’ demand requires work that the organisation expects to carry out to meet a target group of clients needs. ‘Failure’ demand is work generated by unsatisfied clients. Reducing failure

demand also results in an increased capacity to generate value for clients. Therefore the starting point for improving effectiveness and efficiency is understanding purpose *from the clients' perspective* and 'turning off' causes of failure demand. This depends on learning about appropriate performance measures relevant to this purpose and the application of these at a local level, rather than being driven by a managerial control and target setting. The emphasis is therefore on engaging workers in developing performance measures and allowing them to be more flexible and responsive in their own action situations. Processes are seen as adaptive, with improvement action guided by a form of heuristic inquiry i.e. it is not assumed that achievement and outcomes can be predicted (as in a target setting approach), but that action can be guided towards improvement with improved knowledge about value and failure from the clients' perspective.

3.2.5. Critique of the 'hard' approaches

A fundamental criticism directed at these kinds of systems approaches (e.g. by Emery 1969) is that, unlike machines and biological organisms, humans have the ability to make choices that transcend those relating to function and survival. Therefore the kind of 'prediction' and 'control' that they assume, for example in terms of client needs and behaviour of participants, is extremely difficult. Many of the premises of these approaches are therefore problematic. For example:

- (i) They adopt a 'goal-seeking' model of organisational activity and its management which does not take into account the subjective nature of the goal-setting process, i.e. that the perception of what is a problem, planning of control measures and monitoring activity, and the interpretation of this activity that will inform action, are all dependent on pre-existing knowledge and assumptions and values. The idea of a single goal for any collective social activity (including inquiry) is therefore problematic because of the number of different perspectives influenced by prior experiences and knowledge that will be involved in that activity. Some of these approaches also do not take into consideration that performance criteria will be subjectively interpreted by participants, leading to unpredictable behaviour. The setting of targets or thresholds for performance, when it is not really known whether they are achievable given the current organisation of activities, may result in them being used inappropriately and arbitrarily to guide action. Achieving desirable outcomes in one part of the organisation in order to achieve these targets may result in highly undesirable outcomes elsewhere.
- (ii) This is illustrated in lean systems by the narrow consideration of the concept of client and improvement, and the assumption that they can straightforwardly be identified. The lean

systems concept of client assumes this to be the recipient of key benefits (products/services) of the organisation, and that the benefits desired are relatively predictable. This may be an appropriate perspective for self-interested commercial organisations intent only on making a profit, and who may have control over selecting their target client. But should this be at the expense of a wider stakeholder concern? For example, wider elements of society may be concerned about environmental or 'green' issues. Some of the organisation's clients may also share these concerns, and this may of course determine their 'value' demand. However, not all society will have the same perspective. Should the organisation only be allowed to gear their product/service to a narrow group and ignore their wider impact on society? Government policy and legislation is often developed to ensure these wider needs are considered, which imposes on organisations the requirement to address these needs. This may increase costs or constrain design in a way that is not desirable by all stakeholders. Another problematic issue is who should be considered the client in public sector organisations. This might logically be considered to be the recipient of the designed service (e.g. patients in the health service), but the funding body responsible also has an interest to ensure that funds provided by tax payers are being used appropriately and aligned with these stakeholder expectations. There may well be some alignment in respect of their concepts of purpose, and effectiveness and efficiency in achieving these. However, unlike in commercial organisations, which may have freedom to increase capacity to meet clients' needs in line with their profits, public sector organisations are more constrained in their resources, in line with political decisions about appropriate levels of taxation and prioritisation of the distribution of these funds for particular stakeholder needs. It cannot be assumed that these resources are limitless and entirely driven by client demand, particularly given the potential diversity of this demand. This can be illustrated by recent debate about the expense of certain cancer treatment drugs, and the ethicality of choices made about whether they are prescribed by certain health authorities given that this may well mean other patients are consequently denied treatment.

In TQM the focus on improvement action in individual processes, and considering other functional process as 'internal customers' means there is a tendency to result in reinforcing the functional boundaries between processes, leading to criticisms about a lack of 'joined -up' thinking.

This very narrow concept of client and improvement means that the approach is limited in its application to contexts with diverse stakeholders with potentially conflicting perspectives, and for improving connectedness between different levels of strategy of human activity, which is one of the difficulties that this research is trying to address.

- (iii) The focus in lean systems is on clients pulling value from the system, which neglects the power organisations have to influence the value that clients expect, placing the emphasis on change predominantly being driven from the 'outside-in'. In practice, many commercial organisations depend heavily on developing a brand strategy and marketing products and services to create demand. Public sector organisations use information strategies to 'manage expectations' of clients to try to keep demand aligned with capacity. Lean systems therefore gives insufficient consideration to the 'inside out' dimension to improvement.
- (iv) There is a shift towards the importance of actors' own learning to inform action, and participation in formulating performance criteria and constructing hypotheses, so that these are based on local contextual and relevant knowledge. However, the participation process itself, and the impact of this on what is learnt, are not explicitly laid open to critique, for example in relation to participants' motivation and ability to give their input. This may be as a result of the way the participation process is designed, the political dimensions to the process, or the limitations on participants' existing knowledge in being able to make a contribution.

3.3. Human-centred systems theory and approaches

In what has been termed a 'second wave' of systems thinking (Midgely 2000) a shift is seen to a more subjective ontological position with respect to 'systems'. This 'soft' systems movement evolved in reaction to the perceived limitations of the hard movement in taking into consideration the complexity associated with actors' subjective interpretations and motivations in relation to human activity. Inquiry attempts to develop understanding of actors' constructions of their situations by accepting that the social world is *not* made up of systems that exist independently of our perception of them and which can be represented using models of this reality to help discover an ideal mode of operation. Instead, the only assumption is that our thinking about the world can be organised *systemically* to help understanding of its complexity. What constitutes a perceived system and its components is very much a matter of choice for each observer. The term *systemic* thinking, rather than systems thinking, is preferred by some (e.g. Flood 2001), since it is argued that the latter reinforces the objective ontological perspective of "*thinking about real social systems as if they exist in the world*" (Flood 2001, p133). The term 'systems thinking' is used in this

thesis, as this is still the more common usage, but the argument for terminology that improves clarity about the underpinning philosophical assumptions is accepted.

Change management approaches informed by systems theory from this perspective are broader in the perspective of stakeholder and participation, and emphasise the importance of human relationship maintaining in the face of conflicting purposes and motivations. As in the harder systems approaches, systems modelling is aimed at improvement action, through guiding users in representing elements of the world systemically to help their understanding of its complexity and inform debate about purpose and process. However, unlike the hard approaches, these models are not assumed to represent ‘truth’ or ‘reality’. Typically approaches include the following stages:

- (i) conceptualising a context of interest and potential action ‘as if it were a system’. This involves making an appropriate judgment about what is within and outside the control of involved actors, i.e. deciding on the nominal system boundary. The extent to which this modelling process involves stakeholders varies.
- (ii) constructing models of how the perceived system is operating in practice from different stakeholder perspectives. Both quantitative and qualitative data may be relevant to constructing models, but the emphasis is on the meaning of this to participants, and how this is influencing their decisions and actions.
- (iii) using these models to stimulate dialogue about desirable and feasible future action to improve the context of interest.

This dialogue informs decisions about further change to the purpose of activity and the way it is organised and resourced. This is analogous with the process of stakeholders developing ‘theories of action’ to guide evaluation and inform debate about improvement, as discussed in Chapter 2. Here, systems concepts are used to make sense of complexity associated with change.

Examples of methodology aligned with perspective are:

3.3.1. Interactive planning

Ackoff’s rationale for his approach to managing change is that “*control of change is preferable to responsiveness to it*” (Ackoff 1981, p5) since a more proactive rather than reactive approach aims to avoid “*paralysis in the face of change-demanding change*” (Ibid, p4). It is therefore based on the assumption that inquiry forms the basis for proactive intervention to improve problematic situations we face.

He considered that the limitation of a traditional scientific approach to change management was that it was too dependent on a reductionist approach of setting performance measures or targets for component parts that ‘bring them into conflict’, on the assumption that the “*best performance of the whole can be reduced to the best performance of the parts taken separately*” (Ibid, p18).

The underpinning philosophy for his methodology is based on two core principles that underpin the human-centred perspective in the systems movement.

The first of these is that the properties of a whole derive from the *interaction* of its parts. He argued that understanding these properties depends on the complementary process of analysis and synthesis. Analysis starts with decomposing a whole into parts to identify them and explain their behaviour and properties separately, then aggregates these explanations to explain the behaviour of the whole. Synthesis reverses this process. Reductionist approaches start with analysis. The key to systems thinking is that synthesis precedes analysis so that “*the thing to be explained is treated as a part of a containing whole*” (Ibid, p16-17). This involves

- identifying the whole which is to be explained as parts;
- explaining the behaviour or properties of this whole;
- explain the behaviour or properties of this whole in terms of role(s) or function(s).

This is what we have come to understand as systems modelling.

With analysis the focus is on describing *structure* or relationships, i.e. we might form an association that two things change at the same time and that there is a dependency between them. This informs our understanding of ‘how things work’, but not really why they work. For example, what specific action needs to be taken to lead to a desired outcome. This understanding has no predictive capacity. Synthesis focuses on *function* or ‘why things work as they do’, and provides the explanatory component about “*how changes in one variable effect or produce changes in another*” (Ibid, p207). However, the limitations of prediction in human behaviour have already been discussed at length earlier in the thesis. For human activity, explanation is of a more probabilistic nature. In order to explain this Ackoff (1981) defers to the earlier work of Singer (1959) who describes this relationship in terms of producer- product rather than cause- effect. In the former, the producer cannot completely explain outcome, but is always dependent on co-producers or its environment that form some component of the explanation. For illustration, he uses the example of an acorn- oak relationship, whereby the acorn is *necessary* to result in an oak, but this outcome cannot be predicted because its growth into an oak will be dependent on so

many other environmental factors. Hence a universal law can never apply since every environment or context is unique. In contrast, cause-effect relationships are deterministic in that cause will definitely lead to the specified effect, with no dependency on the environment to explain the relationship. Scientific experiment can therefore be used to discover universally applicable laws for these relationships where environmental factors can be controlled or eliminated.

The second core principle underpinning his methodology is that our perception of what is happening in the world is dependent on our ‘Weltenschaung’, or view of the world. Hence the concept of ‘whole’ in the preceding discussion is based on an individual’s assumption of its existence [i.e. subjective perspective], leading to the concept of ‘system’ being used to organise thinking about the world. Systems models can therefore be considered as “*simplified representations of reality [] in the sense that, in principle at least, they do not contain aspects of reality that are irrelevant to the inquiry at hand*” (Ackoff 1981, p197). Introducing the concept of relevancy or irrelevancy, therefore raises the question of ‘relevant to whom?’ (presumably the inquirer in the first instance) and how this is decided.

Therefore, in order for managers to deal with the problem situations they face they must determine

- (i) how it is similar to their previous experience of situations, to inform decisions about what is relevant;
- (ii) how it is different, and hence what they need to learn about.

This resonates with a need for an experiential learning approach to adapting to new situations, where problem solving involves iteration between theory testing (deductive inquiry) and theory generating (inductive inquiry). It is previous experience that enables us to formulate theories that can be tested, but the process of inquiry may reveal new problems, which lead to revision of theory, which can subsequently be tested etc. Contrary to the ‘target setting’ approach discussed earlier in this chapter, Ackoff argued for an approach where change managers “*focus on improving performance over time rather than how well they can do at a particular time under particular conditions*” (Ackoff 1981, p63).

Following on from this outline of Ackoff’s underpinning assumptions, his interactive planning approach relies on the principles that planning should be:

- (i) Participative: Participation leads to the development of organisational members, and hence the organisation. As participants develop improved understanding of their organisation they

can contribute to action more effectively. Planning involves effective vertical interaction/integration of stakeholders in planning process. This latter is an issue that Beer's (1972) theory about modelling organisation as viable systems addresses in considerable detail (see section 3.3.2).

- (ii) Continuity: Ackoff suggests that no plan works as expected on implementation. Hence decisions about improvement of future implementation depend on explicit articulation of the expectations and assumptions on which plans are based, and continuous monitoring and evaluation of implemented plans.
- (iii) Holistic: This involves (i) co-ordination, concerned with interactions between units at the same level of organisation and (ii) integration, concerned with interaction between units at different levels.

He divided this planning process into the following phases:

1. Consideration of threats and opportunities for the organisation.
2. Ends planning: He thought three types of ends need to be considered, but observed that this rarely happens in practice.
 - a. ends attainable within the planning period;
 - b. ends not achievable in the planning period, but which are desirable and achievable in the longer term. Progress is possible within the planning period;
 - c. ends unachievable, but where some progress may be made during the planning period.
These represent the ideals or ethos that guides the purposeful action.
3. Means planning: This involves deciding how activity will be undertaken to achieve or make progress towards the specified ends.
4. Resource planning: Involves planning what resources are needed and when and how these will be made available.
5. Design of implementation and control: Involves operational planning of activity (who, when, where etc) and planning the monitoring and evaluation activity.

3.3.2. Viable systems diagnosis

This methodology (VSD) was proposed by Stafford Beer (1985), based on his earlier development work in which he articulated an approach to modelling certain types of organisations as viable systems (Beer 1972, 1979). This approach to modelling organisations is based on some of the earlier ideas about cybernetics and open systems, in particular it is similar in its use of concepts such as feedback and homeostasis in relation to ‘control’ of the organisation if a complex dialectic relationship with the wider environment is assumed. However, he takes a more subjective perspective in relation to the system ontology. In contrast to Wiener’s definition, Beer preferred the definition of “*the science of effective organization*” (Beer 1985, pix). He makes no claim that his use of the cybernetic model is intended to represent ‘reality’, only that *he* found it *useful* for organising thinking about the complexity of the process of communication and control in social organisations. His approach to modelling organisation (Beer 1972, 1979) was intended only to guide the design of organisation, and inquiry about the implemented design, to inform decisions about improvement action. The focus for the inquiry, and hence for the modelling, is on communication and action, since this is considered to be the main influence on how the organisation is changing. The emphasis in the inquiry is on participation, using systems constructs to guide participants’ consideration of data and information flow that is *relevant* and *meaningful* to informing their contextual decisions about improvement action. Hence, unlike in the machine metaphor of cybernetic control, it is not assumed that messages sent by one person will be interpreted or acted upon by another person in the way intended. Activities are dependent on people to undertake them, and although they can be designed to lead to desired outcomes there is no assumption that people *will* act as desired or anticipated, or that systems modelling enables human behaviour to be engineered to lead to predictable outcomes.

Diagnosis of the effectiveness of the existing organisation of activities and resources to inform improvement therefore relies on the use of interpretive or *hermeneutic* principles. The term ‘hermeneutic’ derives from Greek language for ‘to interpret’ or ‘to understand’. The aim of a hermeneutic approach is insight into how social contexts are socially constructed using speech and language in the negotiation the meaning of phenomena. Such approaches explore participants’ underlying rationales for their behaviour and the connections they make between activity and the outcomes that they observe or experience, and what this means to them. The focus is therefore on relationships and communications between actors, and the influence this has on actors’ rationales for action.

One of the foundational premises of his approach to diagnosis is that the human activity being managed should be considered as ‘black boxes’, or at the very least ‘muddy boxes’, to those managing them. In organised learning activity, this concept is illustrated by the way that those involved in managing it may be able to observe the change in learners brought about by the learning activity. However, given the many possible ways learners could have developed new knowledge, skills, or abilities, they are not sufficiently involved in the process to understand *how* this transformation is achieved, or the explanation for this, without a suitable inquiry process. Beer’s argument is that “*it is not necessary to enter the black box to understand the nature of the function it performs*” (Beer 1979, p40). By this he means that managers do not have to immerse themselves in operational activities themselves to experientially *interpret* cause-effect relationships that will inform their future decisions and actions. Managers only need to be able to adequately distinguish between different states of organisation, or its *variety*. His model is founded on the premise that management or control is dependent on Ashby’s (1956) mathematically proven Law of Requisite Variety which, states that “*control can be obtained only if the variety of the controller [] is at least as great as the situation to be controlled*” (cited in Beer 1981, p41). In theory, management relies on managers being able to *measure* this variety and match this with their own change strategies. In practice, there are two main limitations to being able to do this. The first is that the number of possible states is impossible to know, especially when these are considered to be influenced by human behaviour. The second is that they are insufficiently involved in the process to be able recognise *all* possible states.

Managers are therefore informed by *comparison of variety* between different elements of an activity, i.e. by comparing states of organisations at different times using systems models. They rely on their reflections on trends in these models over time to reduce uncertainty about the impact of their change strategies. They infer connections about producer and product from these models, but these are understood to be the mental constructs of the managers, they are not *de facto* relationships.

The assumption of Viable Systems Diagnosis is therefore that change management is informed by iterative use of interpretive methods that helps the manager to develop, over time, some understanding of the relative merits of their implemented organisational designs, or ‘theories of change’. This is consistent with an action-inquiry approach to developing understanding about change. The role of the theory of change is to guide a ‘heuristic’ approach, which attempts to guide change in a particular direction (improvement) when it is unrealistic or impossible to specify

the exact nature of long-term change. This contrasts with the goal seeking model, such as target setting, that are operationalised in some of the methodologies discussed in relation to the hard systems paradigm, and which strives to find the 'best' approach to achieve these 'given' targets or goals.

To illustrate the principles of heuristic method, Beer (1981) uses the example of an individual's attempt to walk up a hill towards the peak, when the peak cannot be seen and the route is not specified. In this context the heuristic or general guide for action would be 'keep going up'. The heuristic is underpinned by an algorithm. This can generate information that helps to compare specific courses of action for their ability to comply with the heuristic guide. For example 'take a step in each direction n , and move to the next highest position'. Both the heuristic and algorithm guide movement towards the peak. The term *feedback* is used for that information which results from the inquiry that informs on progress from the previous position. This leads to corrective action to *either*

- (i) change to stabilise the organisational performance in a changing environment. This feedback is called 'negative' or 'corrective' feedback, or;
- (ii) continue change in the direction of a current trend in a stable or changing environment. This feedback is called 'positive' or 'reinforcing' feedback.

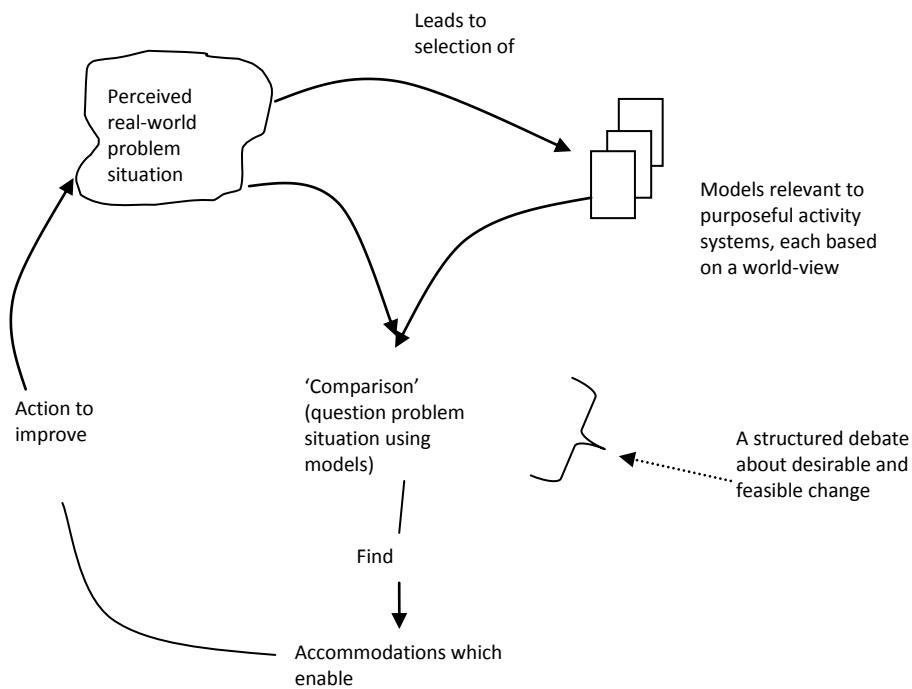
A feature of the viable systems model is that it also provides useful concepts to describe different components of organisation with different purposes, and different levels of organisation, so that the information flowing between them can be explored. The model consists of five components for each '*system in focus*' which represents a level in a *recursive* model of organisation. This describes a particular relationship between levels, whereby models of organisation are embedded in other models that replicate *exactly* the pattern of organisation *at each level of recursion*. Each of the component systems are conceptualised as performing different organisational functions:- System 1s are responsible for the operational activity; System 2s co-ordinate this activity; System 3 undertakes management control and performs an audit function; System 4 is concerned with inquiry into trends in internal operation and monitors the wider environment, passing information to Systems 3 and 5; System 5 is concerned with policy and its communication, and dividing resources between Systems 3 and 4, striving to maintain a stable relationship between the internal and external environment. Further detail is articulated in Chapter 4, section 4.7.2.

3.3.3. Soft Systems Methodology

Checkland describes this methodology (SSM) as “*a process of social inquiry which aims to bring about improvement in areas of concern by articulation of a learning cycle (based on systems concepts) which can lead to action*” (Checkland 1999, pA40).

The approach is intended to be flexible, so can be started at different points in the learning cycle, and its stages followed flexibly.

Figure 3.2 The inquiring/learning cycle of SSM (from Checkland 1999, pA9)



The methodology is informed by Vickers' (1965) ideas about 'appreciative systems'. He acknowledged that what differentiates humans from other animals

"is not their ingenuity in doing –that 'goal-seeking' of which we have heard so much –but their capacity for knowing where they are" which depends on *"the power of conscious reflection which enables us to represent to ourselves our relations with people and events and the relations of others which involve us"* (Vickers 1970, p95).

This importantly includes the dimension of time. The 'goal-seeking' to which he refers here is that conceptualised by 'hard' systems approaches. Instead he viewed the continuation and progress of human activity being complicated by the often conflicting perspectives of those involved about what constitutes success and how this can be achieved. Maintaining stability can therefore be

more meaningfully thought of as ‘relationship maintaining’. Vickers (1965) also preferred that the explicit purpose be expressed as a norm rather than goal, since goals tend to describe ends which once attained provide no reason to continue with activity, leading to the necessity to set new goals. Norms are values that guide human activity but are not necessarily achievable (c.f. the ‘ideals’ in Ackoff’s (1981) ‘ends’ planning). Their meaning and priority is socially mediated by stakeholders in the activity. The different interpretation of purpose by the various actors may influence their action towards achieving it quite differently. Likewise he considered performance criteria as more usefully being expressed as norms rather than thresholds or targets, emerging from the participants themselves, hence socially constructed.

In SSM the context that is modelled is described as a ‘perceived real-world problem situation’, but what is perceived to be a problem is entirely subjective. What is meant by improvement for any activity depends on criteria selected locally for judging its ‘efficacy, effectiveness, efficiency, ethicality and continued relevance’.

In this methodology there are several components to the models used to help understanding of a situation of interest. These are:-

- ‘Rich pictures’ for representing the situation, the relationships between people, activities, and other issues meaningful to the various stakeholders. These are used to engage them in discussion about the extent to which the models represent their perspective of the situation, and the feasibility and desirability of different courses of action to improve it. This may also help clarify who are the different stakeholders in the context of interest.
- Analysis 1, 2 and 3 where (i) analysis 1 focuses on the various roles in the context (e.g. client, problem owner, problem solver) from which it might be useful to model different perspectives (ii) analysis 2 considers the social/cultural context and (iii) analysis 3 considers power-related issues.
- ‘Root definitions’ which explore potential purposefulness of the perceived system in terms of expressions of the kind ‘do X by Y in order to achieve Z’. Note that these are effectively theories of action, or hypotheses about the connection between activity and outcome.
- CATWOE is an acronym for the elements that need to be considered when forming the root definition. T is the core transformation or change taking place to an ‘entity’ from an explicit perspective or Weltenschang (W), C are the clients, A the actors involved in activity to bring

about the transformation, O is the owner in control of the whole process (i.e. with the power to decide to stop the process), and E is the environmental constraints.

- 5E's, which are the criteria on which the transformation T will be judged a success. These are Efficacy, Efficiency, Effectiveness (particularly from the perspective of the owner O), Ethicality and Elegance.

Resulting models are not intended to be representations of the perceived systems but "*relevant to debate about the situation*" (Checkland 1999, pA21) and therefore "*devices to stimulate, feed and structure that debate*" (Ibid, pA21).

Checkland also emphasises that as a *methodology* rather than *method*, Soft Systems Methodology should not exclude other relevant ideas about systems modelling. For example, it is legitimate to apply Beer's (1972) Viable System Model in the conceptual modelling stages.

3.3.4. The Systems Failures Method

The authors of this approach (Fortune and Peters 1995) align it with other soft approaches such as SSM. Their analysis focuses on diagnosing failure in organisations by making use of systems models of organisational processes that accept that what constitutes 'failure', and conversely success, is subjective to the various interested stakeholders. By 'failure' here they mean when the organisational activity is perceived to:-

- (i) have not met stated intended objectives;
- (ii) have resulted in undesirable outcomes;
- (iii) be no longer appropriate or relevant.

Like many of the other approaches already discussed, the approach concerns developing understanding of the perceived 'failure situation' by comparing different systems representations of the different accounts of it. However, these are then compared to systems models of 'ideal' organisations that have been "*capable of purposeful activity without failure*" (Fortune and Peters 1995, p65).

3.3.5. Critique of 'soft' approaches

The Systems Failure Method somewhat misses the point of SSM and its underpinning 'soft' philosophy. Although it claims to consider how feedback loops are interpreted, it does not explain

fully the purpose and process of comparing different stakeholder perspectives, and the impact of this on the outcome. The implication is often that the diagnosis of ‘failure’ is purely the methodology user’s own diagnosis rather than the models being used to stimulate any kind of debate about what constitutes failure and how it has arisen amongst these stakeholders (or at least those involved in managing the situations). The case studies they describe do not talk about these different perspectives and how they have affected the process failures. The language used often reflects a positivist perspective, e.g. in their findings from their work across a number of cases they state that “*the analysis of the published accounts showed that false assumptions had frequently been made about how people worked, what their information needs were, and what links were needed within the system*” (Fortune and Peters 1995, p.197, my emphasis added). The comparison of models with an ‘ideal’ of ‘best practice’ is also more aligned with the ‘hard’ systems perspective.

Viable system diagnosis has also been accused (Flood and Jackson 1991) of having limitations for modelling social activity, because of its close alignment with the objectivist origins of cybernetic theory. However, Beer himself has argued against this, explaining how his theory is intended to inform an interpretive approach to understanding organisation, with the model being “*neither true nor false; it is more or less useful*” (Beer 1985, p.2). The criticism that is more justified is that the approach is limited in its consideration of *how* the purpose of activity is decided amongst various stakeholders and the influence of power on this and the resulting organisational activity (Flood and Jackson 1991). In the context of this PhD research, the potential advantage of this model over other models is that it offers some useful concepts for exploring the vertical complexity between different levels of strategy, as suggested by Patton (1986), and to model the relationship between the context of change and inquiry for different management purposes. Although Ackoff’s methodology explains the need for this kind of integration, the approach he describes (1981) tends to focus on working within pre-existing hierarchical institutional structures, rather than focussing on role and function in organisational processes.

Ackoff (1981), Checkland (1981, 1999) and Beer (1985) all envisage methodology that supports an experiential/adaptive approach to improvement. However, Beer’s (1985) focus is on the conceptual stages involved, and the modelling process that supports these. Ackoff (1981) also focuses mainly on the planning stages. What he does have to say about methods for evaluating plans modelled using systems concepts seems to somewhat contradict his underpinning espoused subjective philosophy, since he emphasises methods better suited to an objective inquiry such as

quantitative and decision modelling techniques, experimentation, simulation and gaming, illustrated by the statement:

"The design of effective evaluation of means requires technical competence in constructing models, manipulating them mathematically, in designing both natural and simulated experiments, and in carrying out statistical analyses of data obtained from experimentation of both types" (Ackoff 1981, p210).

Although he advocates participation, decisions about who participates seem to be treated as unproblematic, and based on selecting members that provide the necessary horizontal and vertical integration of subjective perspectives. Although he describes different types of conflict, he does not really suggest how this should be dealt with other than that its elimination "*is necessary for a continuous increase in one's ability to satisfy one's own desires and those of others; hence for development*" (Ackoff 1981, p94).

Checkland's SSM methodology is useful in articulating how systems modelling and action stages can be integrated and iterated in an adaptive learning cycle. The main criticism comes from the critical perspective, which considers the approach to be limited in its consideration of power and conflict in the process of constructing and debating models (Flood and Jackson 1991). If there are conflicting perceptions of a problem and required action for improvement, there is no consideration that at some point the debate must cease and that this will be decided by those with most influence (Ulrich 1987). This is the same accusation that has been directed at Guba and Lincoln's (1989) participative approach to evaluation. The issue of power is only addressed in the more recent variant of the methodology, which provides guidance that in Analyses 1-3 the models of the problem situation should take power issues into consideration. The focus here is still on the change situation – or evaluand, *not* the inquiry or evaluation process. Hence the ethical interest is acknowledged, but it has been accused of being unrealistic in the extent to which the methodology practically addresses this.

These limitations resonate with those already discussed in relation constructionist evaluation theory i.e. in respect of the complexity of the relationship of the change management approach with the change situation and the consideration of power and conflict. SSM offers some useful ideas about being ethical in the inquiry, seeking different perspectives and encouraging participation and debate, and VSD introduces some useful concepts for conceptualising different evaluation purposes and their relationship with the evaluand, and the relationship between different levels of strategy in an evaluand. However, the limitation with respect to the

consideration of power and conflict is still not addressed, suggesting a need to explore systems methodology from a more critical perspective.

3.4. Critical systems thinking and practice

As with the human-centred perspective, a ‘third wave’ of systems theory has evolved in an attempt to address the perceived limitations of the second wave (Midgley 2000).

Jackson (2001) explains how critical systems thinking (CST) draws on the strengths of critical social theory, but uses systems concepts to translate this theory into ideas that can inform practical management intervention. The aim is therefore to give attention to ethics, empowerment and emancipation without neglecting the importance of the more traditional functionalist considerations of efficiency and effectiveness.

Midgley *et al* (1998) outline three key dimensions to CST, although they acknowledge that this is a simplification of the issues considered important by critical systems thinkers:

- (i) *“critical awareness – examining and re-examining taken-for-granted assumptions along with the conditions that give rise to them;*
- (ii) *improvement – defined temporarily and locally, but in a widely informed manner, taking issues of power (which may affect the definition) into account; and*
- (iii) *methodological pluralism –using a variety of research methods in a theoretically coherent manner, becoming aware of their strengths and weaknesses, to address a corresponding variety of issues”* (Midgley *et al* 1998, p467).

The critical awareness referred to here is often discussed in terms of *boundary critique* i.e. “*considering different possible boundaries that might be used in analyses, and taking account of their possible consequences for intervention*” (Midgley *et al* 1998, p467). Being theoretically coherent implies a clear theoretical rationale for the research methods used.

Jackson (2001) attempts to succinctly define CST as:

“*essentially about putting all the different management science methodologies, methods and models to work, in a coherent way, according to their strengths and weaknesses, and the social conditions prevailing, in the service of a general project of improving societal systems*” (Jackson 2001, pp238).

Hence much of the debate about CST and its application focuses on the following premises:

- (i) that methodology user(s) need to be critically aware of how ‘system boundaries’ are constructed by different stakeholders, including the role of power and conflict, and the impact of this in the change context and its relationship with its wider environment (Ulrich 1983).

- (ii) that different systems methodologies have strengths and limitations for different purposes.

Implicit here is that these purposes originate from specific users. The role of the methodology user is to develop critical awareness of these strengths and limitations to make appropriate methodological choices that are contingent with the situation (Jackson and Keys 1984, Flood and Jackson 1991). This can include using multiple methodologies so that the limitation in one is addressed by the strength in another (Flood and Jackson 1991, Jackson 2006).

Discussion of the relevancy of this theory to this Ph.D. research is therefore structured in such a way as to:

- (i) explore the theory underpinning these premises;
- (ii) explore the interpretation of this theory in existing systems methodology;
- (iii) critique existing theory and methodology to inform the design of evaluation methodology for technology supported learning.

3.4.1. Boundary critique

The premise that methodology user(s) need to be critically aware of how ‘system boundaries’ are constructed by different stakeholders is underpinned by Habermas’ (1972) theory of knowledge constitutive interests. This attempted to address question of: *‘What knowledge is required to emancipate people?’* Brocklesby and Cummings (1996) summarise Habermas’ assumptions about the key underpinning and interacting interests guiding the search for knowledge.

1. Technical cognitive interest – concerned with prediction and control of the physical and social dimensions of our world. Inquiry is guided by questions about how we can most appropriately organise activity, resources etc to achieve particular goals or outcomes. Methodology is guided by the traditions of empirical-analytic science.
2. Practical interest- concerned with the social dimensions of our world and how these develop through striving for mutual understanding. Inquiry questions ‘what’ and ‘whose’ goals or outcomes are desirable and feasible and hence explores and is guided by different values. Methodology seeks understanding of how the context of interest is socially constructed using interpretive-hermeneutic approaches.
3. Emancipatory cognitive interest – concerned with our personal world, and how to release people from subjugation. Inquiry questions how certain values become privileged in the

context of interest, for example as a consequence of conflict and power of certain individuals or groups over others. Methodology is influenced by critical social theory and requires more critical awareness of the processes that allow certain values to become privileged over others.

From this perspective, human interests which guide knowledge development shift from the solely technical to include practical and emancipatory dimensions. This means that the purpose of human activity cannot be taken as given. Its different stakeholders may have different interpretations of this purpose, and how it might be achieved. These interpretations will affect their contributions to that activity. Methodology needs to explore how activity is socially constructed. Systems methodology needs to explore, using systems constructs, how different stakeholders conceptualise and negotiate their activity, and how this influences decisions and actions. This mode of inquiry, which explores how ‘systems boundaries’ (defined by purpose, stakeholders, activity etc) are constructed, has become known as *boundary critique*.

Churchman's contribution

The conceptual framework for boundary critique is largely underpinned by the work of Churchman (1971). He used Habermas' theory of knowledge constitutive interests to rationalise the reframing of systems constructs to inform understanding of how they could be used to inquire into the social construction of human activity. From this perspective the ‘system boundary’ cannot be taken as given. Boundary setting involves on deciding *what* is relevant knowledge for a particular inquiry, and *who* is relevant in generating it and having stake in it (Midgley *et al* 1998, Midgley 2000). Hence the system boundary is conceptualised as a “*socially constructed definition of relevancy*” (Midgley *et al* 1998). His ‘anatomy of goal seeking’ explains key systems constructs that help to model this relevancy and how it is constructed. These boundary judgements, associated with systemic conceptualisation of human activity are:-

Purpose: Purpose is the transformation organised activity affects, but what that is depends on the perspective of the interpreter. There may be an explicitly stated purpose for the collective activity. However, each actor involved in it may have their own implicit interpretations of this purpose, and their own motivations for becoming involved with the activity. This may or may not be aligned with the explicit purpose.

Measure of performance: These are the assumptions about what constitutes progress in relation to the stated purpose, but again could be interpreted differently by different stakeholders.

Client: ‘Good’ performance is judged to be when it is serving their interests. However, the perception of whose interests are being served may not be shared by each of the actors involved in the activity. This will have an impact on the compatibility of their behaviour with achieving its stated purpose.

Component activities: These have an organisational relationship and interact with each other in working towards the purpose. The purpose cannot be achieved by any of the individual components alone (the concept of ‘emergence’ discussed earlier). Activities will involve actors each with their own motivations and expectations of engaging in them. Success is therefore not only dependent on their activity, but this activity is influenced by their interpretation of the measures of success, and their negotiation of the meaning of success.

Environment: The context in which component activities take place, and which may exert conditions which enable or constrain the activities. It co-constructs measures of performance and can also be changed by component activities. Therefore the relationship between activities and their environment is dialectic.

Decision maker: Responsible for change in measures of performance of the whole and its component activities. He or she has the power to allocate resources and organise activity towards achieving the purpose. This will also influence the judgments about the boundary of the system, since what is considered to be inside its boundary is that which can be perceived to be nominally within the control of the decision maker. The term ‘nominally’ is used here because human behaviour cannot be predictably ‘controlled’, only directed towards the decision maker’s perception of the intended purpose. The outcome of this direction is dependent on individuals’ subjective interpretations and motivations and how this influences their behaviour.

Designer: There may be a number of different ways activities could be organised to achieve the purpose, and different measures of performance that could guide activity. The designer’s role is to advise the decision maker on the different potential models of organisation and their strengths and limitations for achieving their designed purpose. This is to enable the decision maker to make informed decisions about implementation and intervention. In practice this is a role and not an individual, and the role of designer and decision maker can be undertaken by the same individual(s). The identification of these as two separate roles focuses observation and critique on how this relationship is observed working in practice.

The designer's intention is to improve the system model to meet the needs of the client. It involves planning alternative approaches to organising activity, which is informed by a process of inquiry to develop understanding of how different models of organisations work towards achieving their purpose. It also involves questioning the continued relevancy of the purpose in terms of the needs of the clients. Although they may have some influence over the choice of model to implement, in practice they do not have control over whether any design is realised. This depends on the decisions and actions of the decision maker and other actors in the activity being organised.

Stability: There is an assumption that the system model is stable enough for the designer's intention to be realised. A rapidly changing situation may make it difficult to make sense of trends and relationships within the organisation that help to reduce uncertainty about the effects of action and inform the planning of future action.

Checkland (1988) acknowledged that in highlighting interaction between three different roles of client, decision maker and designer in his 'anatomy of systems', Churchman (1971) intended to address some of the complexity associated with socially constructed organisation. However, he argued that Churchman (1979) fails to really overcome the limitations of the 'hard' paradigm. The focus on the role of 'designer' has connotations with the engineering profession, where the role can be understood as "*someone who creates something in the world which will fulfil a predefined objective, meet a taken-to-be-desirable end*" (Checkland 1988, p380). Hence the 'designer' according to Churchman is taken to be designing some part of the 'real world' as s/he sees it 'as a system'. As a consequence this limits his intention of improving learning about how activity is socially constructed. Checkland (1988) also claimed that when the roles of decision maker and client are introduced, with measures that guide and test the serving of clients' interests, this becomes a goal-seeking model of human behaviour.

However, alternative interpretation of Churchman (1979) is made in this thesis. He thought the scientific approach did not adequately address "*the problem of selecting the right hypothesis to test*" (Churchman 1979, p11) and suggests reframing this question as "*how does the inquiring system select the right question to study?*" (Churchman 1979, p11). The 'inquiring system' to which he refers here is the inquiry of the designer. For him this was a question of addressing the emancipatory interest identified in Habermas' (1972) theory. He clearly states that:

"the important feature of the systems approach is that it is committed to ascertaining not simply whether the decision maker's choices lead to his desired ends, but whether they lead to ends that are ethically defensible" (Churchman 1979, p65).

This involves first considering from the broadest possible perspective "*who should be served by the social system, and in what way?*" (Churchman 1979, p64), then "*who should decide, and how?*" and "*who should plan, and how?*" (Churchman 1979, p64). To maximise ethicality in terms of decisions taken with respect to 'who' benefits from activity, Churchman (1971) suggested a process of 'sweeping in' as many perspectives as possible. His concept of what is 'right' in terms of hypothesis testing is what is 'relevant' to stakeholders. He acknowledged that it is never possible to 'sweep in' all that is relevant. This becomes a process of 'estimation' and judgement limited by existing knowledge. In systems approaches it is this notion of a 'theory of reality' which guides observation and interpretation, leading to revision of that theory.

He importantly thought there was a fundamental paradox in systems approaches that required addressing

"either the systems approacher is a servant of some set of individual decision makers who hire him, in which case he can hardly be called the designer of the system: or else the systems approacher does try to conceptualize the entire system, including the appropriate goals and ideals, in which case one can legitimately ask by what right he assumes such a role with respect to all society" (Churchman 1979, p37).

Here he is also raising the question of how it is practically and ethically possible for an individual or individuals in such a role to 'sweep in' everything. There is a dependent relationship between the inquiring system and system of interest which requires the 'designer' to critically question their role and relationship with other components and the impact of this on what learnt, and how this influences decisions and actions. Hence he states that in modelling social worlds systemically, we also have to consider the conceptualisation process systemically, i.e. this is *also* a purposeful activity with a dialectic relationship with the social context that is the focus of the inquiry.

Ulrich's contribution

Ulrich (1983,1987), accepted Churchman's (1971,1979) arguments that systems approaches need to consider that systems boundaries are socially constructed, but was concerned with the need to understand *how* these boundaries are socially constructed. He drew on Habermas' later theory of communicative action for insights into how such discourse could be conceptualised. Habermas' (1984a, b) theory of communicative action reframes his original theory such that the three worlds – (1) external natural (technical), (2) social, and (3) internal (personal), are not perceived as

concrete ‘reality’ but are differentiated using language and discourse. Hence any ‘communicative action’ or statement involves the following implicit and interconnected claims (summarised by Midgley 2000):

- (i) What is said is intelligible;
- (ii) That the propositional content (about the external world) is true;
- (iii) That making the proposition can be justified (in the social context);
- (iv) That the proposition is made with sincere intent (reflecting the internal world).

On this basis statements and assumptions about the world are open to challenge with respect to all of these claims. Knowledge is developed through ongoing debate and discourse based on these challenges.

Ulrich (1983, 1987) thought these ideas were impractical for real world situation in which some practical action for improvement was intended. In these situations discourse surrounds ‘justification strategies’, i.e. justification for planned action and “*every justification attempt must start with some material premises and end with some conclusions that it cannot question and justify any further*” (Ulrich 1987, p277). He therefore thought that the need for practical improvement action constrains the extent to which alternatives can be continually proposed and debated amongst stakeholders. At some point the debate must cease in order to take decisions about action. As Ulrich (1987) points out, the existing theory did not acknowledge the “*inevitability of argument break-off*” (Ulrich 1987, p277) which must occur in order for action to be taken. He also pointed out the impossibility of extending debate to every citizen in the world so that all viewpoints can be heard. Decisions also have to be taken about the extent of the ‘sweeping in’ process advocated by Churchman, and when *this* should cease. As already discussed in relation to evaluation theory, this implies some stakeholders will have greater power than others in respect of these decisions. Hence in intervention situations it is impossible to overcome the effects of power as conceptualised in Habermas’ ideal speech situations. Ulrich (1983) emphasised that it is the ‘purpose’ of inquiry that will limit what is swept in. His framework of Critical Systems Heuristics (CSH) therefore builds on Churchman’s (1971) ideas about boundary construction, to provide practitioners with practical tools to help them critically reflect on the ethicality of boundary judgements, and the processes of making these (see section 3.4.3 for further detail). He acknowledges that providing such a framework does not guarantee that

stakeholders will engage in this reflection, and that not all stakeholders may be willing or have equal ability to participate. This leads to a need to also critically question the extent of stakeholder engagement in relation to the present and future situation.

Midgley's contribution

Midgley (2000) considered that von Bertalanffy (1968) and Churchman (1971) focused on comprehensiveness as the 'ideal' in systemic inquiry—although the earlier quote from Churchman (1979, p37) does illustrate his awareness of the limitation of this ideal. Midgley (2000) agreed with Ulrich (1987) that 'comprehensive' or 'holistic' inquiry is not possible since in the 'boundary setting' process something is always left out. However, Midgley (1995, 2000) considered that Ulrich's (1983, 1987) CSH framework for guiding an ethical systems approach, involving critique of the boundary setting process, did not extend far enough. It uncritically assumes that there will be agreement amongst stakeholders about what is ethical. He explains how this assumption also needs to be questioned, since it is rare for moral claims to be universal. For example, killing someone may be justified by those engaging in war situations. What is considered ethical is also a subjective judgement in context. This involves the same social negotiation and political justification as any other judgment in relation to the activity being conceptualised as a 'system'. He therefore questioned "*what happens when there is conflict between groups of people who have different ethics (values in action) relating to the same issues, and thereby make different boundary judgements?*" (Midgley et al 1998, p469). He argued that "*when two ethical boundary judgements come into conflict, the situation tends to become stabilised by the imposition of either a sacred or a profane status on marginal elements*" (Midgley et al 1998, p469). The meaning of phenomena therefore becomes valued and devalued respectively in the decision making process. Which views become dominant is supported by 'social ritual'. He also argued that conflict often remains invisible and boundaries may well stabilise despite conflict, marginalising some groups. Hence, the key question regarding ethicality becomes "*is the balance between the desirable and undesirable emergent properties acceptable, and who should make this judgement?*" (Midgley 2000, p40).

He proposed making conflict more visible by "*widening dialogue beyond the boundary of those who are immediately identified as affected or involved*" (Midgley et al 1998, p470) to seek more marginal views that might challenge the dominant position and influence a questioning of this position. In the context of a social housing initiative, this 'rolling' out the boundaries of who was involved in debate was practically implemented by asking those easily identified initially to name others they should approach, asking who is either involved or affected (as suggested by Ulrich's

CSH). He also thought that the difference between Churchman and Ulrich throws into question a related issue of “*whether the theory of boundary critique is useful because it supports the professional intervener, or because it provides a language of debate for citizens more generally*” (Midgley 2000, p149).

Midgley’s (2000) main argument was therefore that systemic practice also requires critically questioning the process of making boundary judgements about the inquiry as well as the change situation to which the inquiry is being applied. He described this as a process of making both first and second order boundary judgements. First order inquiry involves ‘looking outward on the world’ (i.e. the situation of interest), and second order inquiry involves ‘looking back’ at the inquiry process involved in making first order judgements.

3.4.2. Methodological pluralism

Mingers (1997a) explains how ideas about methodological pluralism originated before the development of underpinning theory in the practice of *triangulation* in social inquiry. The purpose of this was to introduce different perspectives and reduce the possibility of bias in interpretation. Hence in social science and evaluation literature, pluralism is often understood to be in relation to:

- using the same data generation, processing and analysis methods with different data sources;
- using different methods with the same data sources;
- having different researchers or evaluators review the findings;
- considering how different theoretical perspectives might influence the interpretation of findings.

Bryman (2008) explains how in the 1970s the distinction between methods and methodology came to be important as

“*choices of how to do research were increasingly seen not just as a simple matter of making a technical decision about the most appropriate way to collect data. Choices about method were also increasingly seen as to do with commitments to philosophical positions*” (Bryman 2008, p161).

At this point methodology became concerned with “*the analysis of the assumptions that lie behind the methods employed within a discipline*” (Bryman 2008, p161). Methodological plurality is often more commonly associated with inquiries that attempt to combine quantitative and qualitative research approaches. Bryman’s (2006) study of published research argues that much of this is

problematic in that there is often a lack of clear rationale for the mixed approach, or where this exists the actual practice is not coherent with the rationale. His subsequent study into what actually influences mixed approaches argued that this was as much a consequence of social and political influences, for example the current trend, the type of research funders were willing to resource, and the publication policies of journal editors (Bryman 2007). This highlights the importance of researchers having a clear rationale for their methodological approach and subjecting this to critique of the wider context in which their methodological choices are made (i.e. the boundary judgements being made and the process of making these boundary judgements *about the methodology*).

In CST the rationale for methodological pluralism was initially founded on Habermas' (1972) theory of *knowledge constitutive interests* (already outlined in the discussion about boundary critique). Critical systems thinkers advocated that human emancipation can only be achieved by addressing all three human interests, but that the human-centred perspective was limited in its ability to address the emancipatory interest (Jackson 1985). Jackson (1982, cited in Jackson 1997) had argued that assumptions on which human-centred systems approaches were based (e.g. from Churchman (1971), Ackoff (1981), Checkland (1981, 1999)) often constrained *intervention*. The central requirement for debate was often impossible in situations of conflict or unequal power relationships. This often leads to abandonment of debate and hence intervention, or continuing intervention on the basis of limited debate. More appropriate theory was therefore required to guide practice in learning about each of the three human interests (technical, practical/social, personal).

Midgley (1997) criticised Habermas' original theory of knowledge constitutive interests since it encouraged a focus on humans' relationship with the environment as being one of 'prediction and control'. This is interpreted here to mean a linear relationship privileging the 'effects' of human activity. Midgley's own view is that "*it is far better to view human beings as having an interest in preserving and/or building a sustainable, interactive relationship with their non-human environment* (Midgley 1997, p264), i.e. placing greater emphasis on the complexity of the dialectic relationship. He preferred to draw on Habermas' later theory (1984a, b) of communicative action in which all claims and assumptions about the world can be challenged on the basis of intelligibility, propositional content, justification and sincerity. From his perspective claims and assumptions about what constitutes 'methodological pluralism' can also be challenged on these

grounds. The issue becomes one of justifying which assumptions are preferable [for a particular situation]. Inquiry designed to construct justifiable argument should therefore question:

- (i) Truth statements (about the objective external world);
- (ii) Rightness of statements (about the normative social world);
- (iii) Statements about an individual's subjectivity (internal world).

These justification and inquiry processes can be subject to the process of boundary critique.

Brocklesby and Cummings (1996) explained how Habermas' assumptions that inequalities can be made transparent and 'levelled out' by dialogue are considered problematic by some because "*we cannot assume that the conditions under which a 'true' consensus could be reached are in place*" (Brocklesby and Cummings 1996, p746). Reaching consensus suggests a need for a "*system of objective criteria by which particular 'thought-systems' can be judged better or worse*" (Brocklesby and Cummings 1996, p746). They outlined how recourse to the theories of Michael Foucault (e.g. 1980) provides an alternative underpinning of CST. Foucault takes a slightly different perspective to Habermas with respect to power and emancipation. For him power is ever present in a complex web of relationships, not possessed by people or things, but *exerted* in this relationship. Its success is in being largely hidden. He does not assume it is possible to 'level out' inequality in the same way that Habermas did, since this depends on the desires and motivations of the individuals involved. Hence Habermas was "*concerned with developing theoretical approaches that can be applied to collectively emancipate others from a 'worse' to a 'better' state*" (Brocklesby and Cummings 1996, p741), which places the emphasis on expert intervention. In contrast, Foucault believed it could not be assumed that 'experts' could surface and overcome the inevitable and largely hidden power relationships in a situation. He was more concerned with the importance of 'local knowledge' and "*providing tools which individuals can use themselves as they see fit*" (Brocklesby and Cummings 1996, p741). In summary, whilst Habermas was concerned with *human* emancipation, Foucault was concerned with *self* emancipation.

Hence with these different underpinning theories, what is meant by methodological pluralism is subject to an ongoing discourse by critical systems thinkers.

Mingers (1997a) described methodological pluralism as falling into three main categories:

- (i) Loose pluralism – where a discipline encourages use of various paradigms and methods within it, but does not prescribe the circumstances under which they should be used.
- (ii) Complementarism – where the context determines the paradigm and method that is appropriate to use.
- (iii) Strong pluralism – which assumes that “*most, if not all, intervention situations would be dealt with more effectively with a blend of methodologies from different paradigms*” (Mingers 1997a, p9).

Loose pluralism is illustrated by the position adopted by pragmatists, where there is a tendency to focus on what works in practice, regardless of the underpinning philosophical paradigm. For example, White and Taket (1997) aligned themselves with a ‘mix and match’ approach because of its flexibility and adaptability. They explained how they had been accused of relativism because of their acceptance that there is no possibility of objective criteria with which to observe the world. Hence “*the only certainty is uncertainty*” and “*all knowledge is partial, provisional and contingent*” (White and Taket 1997, p389). From this position it follows that *no* methodology is inherently emancipatory. The emphasis becomes on empowering those in context to take informed decisions and action based on their own values and judgement, including deciding methodology. Based on Foucault’s philosophy, this requires a reflexive approach involving “*a critical decentring of ourselves as expert and to encourage others to employ their own reason and to indulge in theorising for themselves alongside action*” (White and Taket 1997, p386).

In contrast, theorists in the critical systems movement argue that we need to understand *why* some methods work and others do not (Midgley 1997, Jackson 1997), not least because there are resource implications for each inquiry ‘reinventing the wheel’ through a trial and error approach to finding out what works. Hence “*learning can only take place if practice (successful or otherwise) can be related back to a set of theoretical presuppositions which are consciously tested through that practice*” (Flood and Jackson 1991, p47). Midgley (1997) also argued that lack of theory may lead (unintentionally) to the support of authoritarian practices. However, both pragmatists and theorists are concerned “*with developing a flexible and responsive practice of intervention*” (Midgley 1997, p251). Brocklesby and Cummings (1996) emphasised that adopting Foucault’s theory as a foundation for CST does not mean that *anything goes*, as critics would suggest of the pragmatist position, but *everything depends*. The aim is the mixing and adapting of methodology as appropriate, with the aim of helping users be more aware of alternatives and the role of power

in enabling or constraining inquiry and intervention, and providing participants with a voice in change processes.

This '*everything depends*' position is reflected in Midgley's (2000) justification for methodological pluralism. He argued that methodological decisions are dependent on context (aligned with the complementarist position as described by Mingers (1997a)), but these can be subject to the process of boundary critique on the same basis as any other boundary decisions in context. Taking a systemic view of any intervention requires that the associated inquiry that informs this is considered as just one component of the wider change process. If it is justifiable to define any of a number of boundaries for the inquiry then it follows that it is justifiable to draw on theories that support and are supported by these decisions. Theories become more or less useful depending on the purposes of intervention they support. Change agents make choices about inquiry methodology and intervention guided by criteria *relevant* to the change context, not objective criteria. These criteria may be influenced by their purpose(s) for learning and what constitutes knowledge in relation to this purpose, which in turn depends on the purpose(s) of the intervention. This concept of theory is therefore aligned with 'theories of action' (Argyris and Schön 1978). Choices, and criteria that guide these may change with time due to different influences (including existing knowledge), but these can be subject to the process of boundary critique. These ideas about theory building imply that improved knowledge about methodology that has wider applicability depends on also developing understanding of the contexts in which the method works.

Mingers (1997a) supported the case for strong pluralism or 'multimethodology', often referred to as "*the whole area of utilizing a plurality of methodologies or techniques within the practice of taking action in problematic situations*" (Mingers 1997a, p2). His argument was that inquiry based on principles of different paradigms is needed to focus attention on different aspects of complex and multidimensional real world problems. In addition, inquiry and intervention is usually iterative, and the different stages involve different tasks and problems that may be more effectively handled with different methodologies. Since many practitioners already employ multimethodology in practice, the key issue is that choices need to be clearly rationalised by appropriate philosophy and theory.

This advocating of mixing methodology based in different paradigms *for the same inquiry and intervention situation* is the source of the main criticism and debate about methodological pluralism. This contrasts with the *selection* of one approach appropriate to the situation. The

debate centres on the issue of *paradigm incommensurability*, i.e. that paradigms based on completely different ontological and epistemological assumptions are not compatible. They make very different assumptions about the nature of the situation being inquired into and how we can come to learn about it. Flood and Jackson (1991) originally addressed this issue by proposing that Habermas' theory of knowledge constitutive interests provides a meta-theoretical rationale for methodological pluralism. This means it is a theory operating at a level *above* the different paradigms, and justifies the bringing together of different methodologies. However, this theoretical rationale has since been criticised since it fails to establish any ontological or epistemological position of its own (e.g. Mingers 1997b).

Midgley (2000) argued that it is only methods can be mixed, not methodologies. Each time a mixed *method* approach is taken in a situation, a new methodology is constructed underpinned by its own philosophy informed by earlier learning. He agreed with Yolles (1996), that "*while paradigms may be incommensurable, new paradigms are born from old ones*" (Kuhn 1979, p149 - cited in Yolles 1996, p556). In order to shift from one paradigm to another, a 'virtual paradigm' is created which may subsequently become a new paradigm.

"A virtual paradigm becomes established when there is a reasoned set of propositions that provide it with some formal respectability, and a Weltenschauung that enables a relative paradigmatic view of a situation to occur. The virtual paradigm may become a new paradigm under the necessary condition that a group believes it, and the sufficient condition for that group to be a critical size" (Yolles 1996, p558).

Hence, individuals and small groups develop a virtual paradigm which only becomes an actual paradigm when shared by larger group or the wider community. New paradigms therefore develop through a process of social construction. Learning about methodology requires appreciation of others perspectives, which involves dialogue and perspective taking (as described by Gregory (W.) 2000 – see section 3.4.3, Critical Appreciation).

Jackson (2001) has since acknowledged that the original meta-theoretical rational for methodological pluralism (Flood and Jackson 1991) is no longer tenable, but did not agree that the 'declaring' of a new paradigm in the way suggested by Yolles (1996) was appropriate, since a single new paradigm cannot be considered to be methodological pluralism.

A further debate in CST also illustrates some of the difficulties associated with interpretation and the use of language in the social construction of new theoretical perspectives. This concerns the terminology for the underpinning concept of methodological pluralism. Zhu (2006) highlights that favour has shifted back and forth between the terms 'pluralism' and 'complementarism' since

ideas were first proposed in the 1980s, and considered whether this is important. Jackson (1997) explained that his original introduction of the term complementarism in the late 1980s was intended to be synonymous with pluralism. The concept of complementarism was also considered to be one of the key components of proposed practice in the form of Total Systems Intervention (Flood and Jackson 1991 –see section 3.4.3). Zhu (2006) pointed out that the two have quite different meanings. The most similar noun to complementarism defined in the Oxford English Dictionary is ‘complementarity’ defined as a “*relationship or situation in which two or more different things enhance or emphasize each other’s qualities or form a balanced whole*” (Oxford University Press 2001, p375). The definition of ‘pluralism’ as “*a condition or system in which two or more states, groups, principles, sources of authority, etc., coexist*” (Oxford University Press 2001, p1428) does not place the same emphasis on balance and enhancement in the relationship. Jackson’s (1997) explanation for the shift back to a preference for pluralism over complementarism was that perhaps the latter was not a good choice of term as “*it suggested something of a ‘happy compatibility’ between epistemologies and methodologies that was not intended*” (Jackson 1997, p353). Despite this, Zhu observed instances where the interchangeability of the two terms is still implied, e.g. “*TSI grounds its pluralism, or complementarism, on Habermas’ early theory of human interests*” (Jackson 2003, p297, cited in Zhu 2006). Given the shift in critical systems practice from selecting single systems methodologies for a given situation (Jackson and Keys 1984, Flood and Jackson 1991) to flexible use of complete or parts of methodologies in combination (Mingers 1997b, Midgley 1997, 2000, Jackson 2003), then Zhu (2006) suggested the use of terminology appears to be shifting in the opposite direction. He concluded from this that the different use of the terms was “*significant merely in package and presentation, not in substance or spirit*” (Zhu 2006, p759) and arises as a consequence of ‘institutional forces’ and ‘institutionalisation processes’ of the systems research community. In other words, these forces are part the process of socially constructing a theoretical perspective. This highlights the need for researchers to also be critical of the processes through which knowledge is developed in such communities and presented to wider society such as interested practitioners.

For Flood and Romm (1997) the key to complementarism is the emphasis on choice and justification of the choices made. However, making such choices relies on criteria to allow comparison. For example, if purposeful design and organisation are considered to be important, this might lead to a choice to use an approach based on organisational cybernetics. Flood and Romm (1997) advocated a ‘triple loop learning’ approach, involving developing “*awareness of debates revolving around processes of knowledge construction*” and “*increasing the fullness and*

deepness of learning without the diversity of issues and dilemmas faced” (Flood and Romm 1997, p312). They did not make the explicit connection with the organisation learning theory of Argyris and Schön (1978, 1996), but their description of the differentiation between single, double and triple loop learning has a distinct resemblance. Here single loop learning focuses on questions of ‘how’ defined outcomes can be best achieved and why certain means work, double loop learning focuses not only on ‘how’ and ‘why’, but also ‘what’ (and implicitly ‘whose’) goals are appropriate. The aim of triple loop learning is reflexion on the interplay between all the questions of how, what and why, and which methodologies might address these questions.

In making some of the opposite assumptions to that of complementarism, Gregory (1992, cited in Midgley 1997, 2000), suggested that it is the discordance of different methodologies based on different paradigms, and the different interpretations of these, that leads to learning and hence improvement in methodology.

3.4.3. Critical Systems Practice

The aim of this section of the chapter is to illustrate how the underpinning CST theory has been translated into ideas about systems practice. This provides further background to the design of the research methodology articulated in Chapter 4.

Critical Systems Heuristics (CSH)

CSH was proposed by Ulrich (1983) as a framework for undertaking the process of ‘boundary critique’ in practice. He described it as a “*tool for reflection*” (Ulrich 1987, p281), although acknowledging that this does not guarantee reflection will be undertaken. He developed a set of 12 questions to guide systemic inquiry into a current situation and consider potential alternatives. In addition to using the different roles of ‘client’, ‘decision-maker’ and ‘designer’ (from Churchman 1971), Ulrich introduced two new roles of ‘experts’ and ‘witnesses’ to encourage exploration of a wider range of perspectives on the ‘is’ mode and the ‘ought’ mode when comparing systems models of a situation of interest.

Ulrich divided the 12 questions into 4 groups, and for each of these groups he developed 3 questions which critique the boundary judgments being made in the conceptual modelling process. The first is concerned with the role of relevant stakeholder(s), the second relates to the relevant concerns of that role, and the third relates to issues important in making these first two boundary judgments. A summary of Ulrich’s checklist of questions (1987) for critical inquiry into social activity (S) is:

Sources of motivation i.e. judgments being made about the purpose, client, and criteria for success of the process conceptualised as system S.

Questions:

1. Who *is/ought to be* the **client** (beneficiary) of the system S to be designed or improved?
2. What *is/ought to be* the **purpose** of S such that it is serving the interests of the client?
3. What *are/ought to be* S's **measures of success** (or improvement)?

Sources of control i.e. those categories related to decision making and resource allocation.

Questions:

4. Who *is/ought to be* the **decision maker**, who has the power to change S's measures of improvement?
5. What *are/ought to be* the **components** (activities, resources, constraints) of S within the control of the decision maker?
6. What resources and conditions *are/ought to be* part of S's **environment?** i.e. not controlled by the decision maker?

Sources of expertise assumed to be contributing to the process, i.e. in terms of the design work that informs the decision maker.

Questions:

7. Who *is/ought to be* involved as the **designer** of S?
8. What kind of **expertise** *is/ought to be* informing the design of S? i.e. concerns role of 'expert' and who fulfils this.
9. Where *does/ought* the designer seek the **guarantee** that their design for S will be implemented and be successful if judged by their designed measures of success i.e. what are the designer's assumptions underpinning their design?

Sources of legitimacy i.e. concerned with whom else is involved in or affected by the process, their relationship, how they influence the process etc.

Questions:

10. Who *is/ought* to be the relevant stakeholders (**witnesses**) affected by S and what *is/ought to be* their role?
11. To what extent and how *do/ought* these stakeholders have control over their own interests in S?
12. Whose '**worldviews**' or perspectives *are/ought to be* underpinning the design of S?

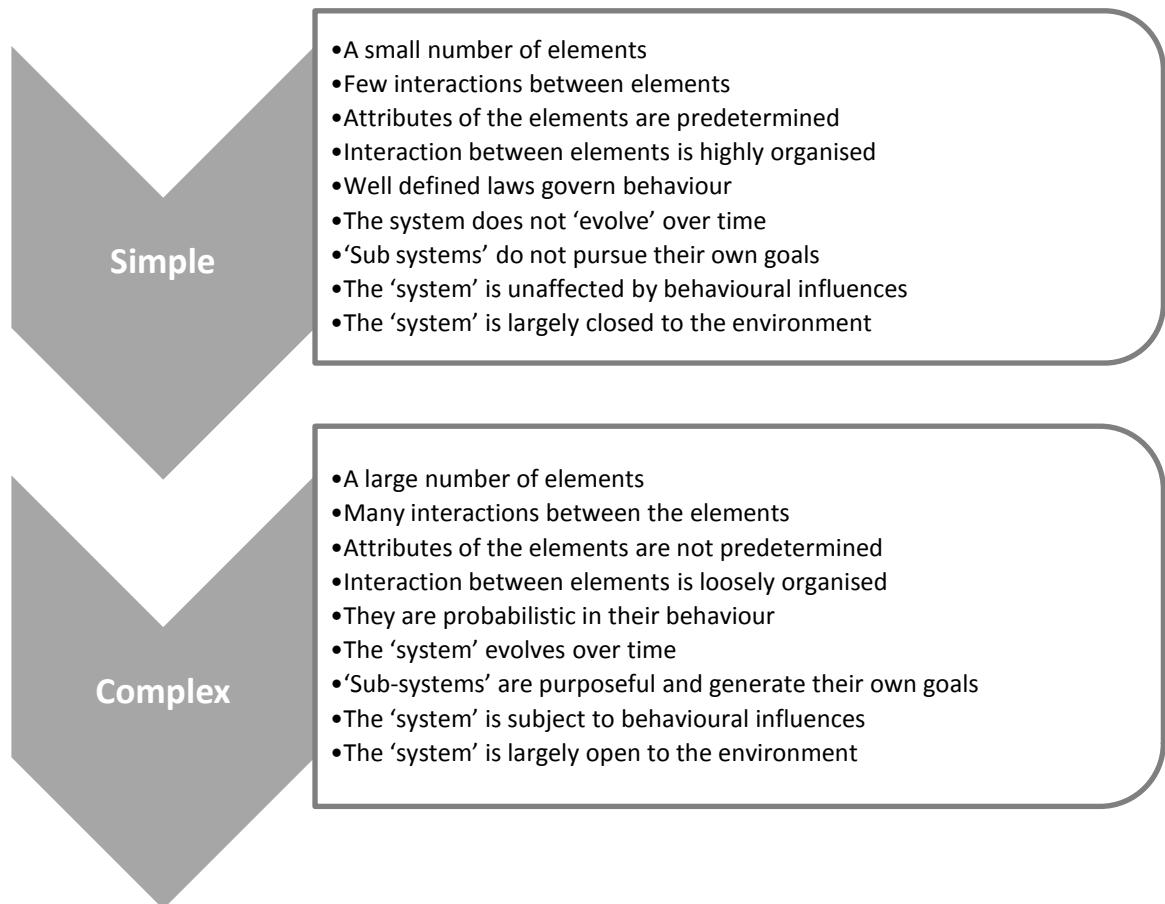
This framework has been argued (Flood and Jackson 1991) to be limited in its consideration of the management of complexity in organisations and its promotion of reflection on how the underpinning assumptions of the designer's ideas become privileged over others. This concerns the relationship of the inquiry process with the inquiry context. Midgley's criticism is that the questions are "*not all phrased in plain English, and their generic nature makes them relatively abstract*" (Midgley *et al* 1998, p474). Those using it therefore need to consider modifying them to make them accessible to stakeholders in a specific context.

System of systems methodologies

The system of systems methodologies (SYSM) was proposed by Jackson and Keys (1984) as a framework for critical reflection on methodological choice with respect to context. They argued that a strength of the systems thinking movement was the diversity of existing approaches developed from different perspectives, and which had been tried and found useful in different circumstances. What was therefore needed was an approach to help managers faced with these different approaches to choose a suitable approach for their particular situation. They developed the SYSM framework to help managers make these choices.

The first dimension of the framework concerns the complexity of the situation, summarised in figure 3.3.

Figure 3.3: Complexity of a situation (Flood and Jackson 1991, pp33-34)



The second dimension focuses on issues relating to participants that might affect their relationships in situation of interest, and hence complexity (figure 3.4). The terminology chosen was taken from the industrial relations literature.

Figure 3.4: Issues affecting participants' relationships in situation of interest (Flood and Jackson 1991, pp34-35)



A framework for analysing situations according to these two dimensions allows for refinement of the consideration of complexity in situation to six categories (table 3.1).

Table 3.1 Framework for analysing complex situations (From Flood and Jackson 1991, p35)

	Unitary	Pluralist	Coercive
Simple	Simple-unitary	Simple-pluralist	Simple-coercive
Complex	Complex-unitary	Complex-pluralist	Complex-coercive

Different methodologies are critiqued in order to suggest their suitability for handling different levels of complexity (table 3.2). The practitioner selects a methodology according to the situation they are faced with.

Table 3.2: System of system methodologies (Flood and Jackson 1991)

	Unitary	Pluralist	Coercive
Simple	Operational research Systems analysis Systems engineering System dynamics	(Churchman's) Social systems approach	Critical systems heuristics
Complex	Viable system diagnosis General system theory Socio-technical systems thinking Contingency theory	Interactive planning Soft systems methodology	??

As the discourse surrounding the need for methodological pluralism has deepened, this framework has been criticised on the following grounds.

- It is too restrictive, as it encourages accepting only one interpretation of systems models and ignores the developments researchers make when they learn from different theoretical perspectives (Gregory 1992- cited in Midgley 1997);
- It constrains methodologies too tightly to a single type of context (Yolles 1996);
- It presumes that situations of coercion can straightforwardly be identified in advance of choosing the methodology (Midgley 1997, 2000).

Total systems intervention (TSI)

Where SYSM guides the selection of methodology depending on context, TSI (Flood and Jackson 1991) was intended to build on this by proposing “*a meta-methodology for using methodologies adhering to different paradigms in the same intervention on the same problem situation*” (Jackson 1997, p353). Also underpinned by Habermas’ theory of knowledge as constitutive interests, the

premise is that 'hard' functionalist approaches support learning about technical interests in the situation of interest, 'soft' approaches help to learn about practical interests, and critical approaches serve the emancipatory interest.

Total Systems Intervention is based on five main commitments (Jackson 1991, cited in Flood 2001) of:

- (i) critical awareness- in terms of both questioning the underpinning assumptions and values of different theories, frameworks and models and the appropriateness of the systems methodology for its intended purpose in the conceptual process;
- (ii) social awareness - of the cultural environment which may influence these assumptions and values, making some more acceptable than others;
- (iii) human emancipation – in terms of concern for equitable and ethical treatment of people to ensure their well-being and encourage them to achieve their potential;
- (iv) theoretical complementarity – linked with (i) to consider how systems theories can be used together to achieve the intended purpose of the conceptual process, so that the strength(s) in one theory might compensate for the weakness(es) in another.
- (v) methodological complementarity – same principle as (iv) but concerning methodology.

It therefore accepts that there is no 'best' approach to all problems and that different approaches may be appropriate for different types of perceived problem. Each systems methodology is appraised for its merits and limitations and a mixed approach is advocated that enables the merit of one to compensate for the limitations of another. It is this latter which is claimed to be different to the approach suggested by SYSM.

An early criticism of TSI (in the context of wider criticism of CST) was that it was "*logically confused, methodologically weak, theoretically unsound, and practically a mix of 'pick and choose' and common sense*" (Tsoukas 1993a, p67-68). This was largely based on many of the criticisms that have already been articulated about methodological pluralism. Tsoukas (1993a,b) also argued that there was very little in the way of exemplars of *how* it could be used in practice to support Flood and Jackson's claims about the methodology. Later criticisms from within the CST community were about it being "*concerned with selection of methodologies rather than combination, and with the use of complete methodologies rather than with their component parts*"

(Mingers 1997b, p407-8). Mingers (1997b) argued that if only a single methodology is used, important aspects of a situation may be ignored. Midgley (1997) also argued that while TSI suggests an approach for using methodologies in a complementary way, it is not a truly ‘mixed method’ approach. He considered using mixed methods involves creative design of methodology rather than a simple choice of “*off-the-shelf methodologies*” (Midgley 1997, p261). In such an approach, inquiry is guided by a number of systemically related research questions, not all of which will be known at the outset. These are context dependent and developed with stakeholders, and each may require a different method *or part of a method* to investigate it.

Jackson (2001) subsequently agreed with accusations that TSI is “*inflexible because it emphasises the use of ‘whole’ methodologies*” (Jackson 2001, p239) and that this lack of flexibility needed addressing (see also Mingers and Brocklesby 1996). However, he did not agree that the pragmatic approach such as that advocated by White and Taket (1997) would provide a solution to the problem of flexibility, for the reasons argued earlier in the chapter i.e. that learning about methodology relies on a theoretical underpinning. Although he acknowledged CST did need a new theoretical underpinning..

Pragmatic approach

White and Taket (1997) advocated a pragmatic approach in which pluralism should be concerned with:

- (i) the use of methods/techniques;
- (ii) the role of interventionist;
- (iii) the modes of representation used;
- (iv) the ‘nature’ of the client.

Their concept of ‘theorising’ here seems to be aligned with the concept of participative development of ‘theories of action’ as a basis for critically reflective practice. In terms of their relationship with systems modelling, they stated that representations need to be “*transparent and relevant to participants*” hence “*produced from shared analysis and results in shared meaning between all parties*” (White and Taket 1997, p392-3). They acknowledged that this is not unproblematic, and therefore critical reflection on the processes used is also required, as well as being pluralistic in approaches to representation, and not being limited to existing approaches to systems modelling.

Mingers (1997b) had some sympathy with White & Taket's (1997) position, though not their philosophy of “*doing what feels good*” (White and Taket 1997, p390). This latter seems to preclude evaluating the effectiveness or legitimacy of action, or developing theory about patterns of actions. However, he did draw attention to the importance of the role of the methodology user and not just the other human actors in the change context, stating that this is somewhat neglected in the CST literature.

Critical Appreciation

This is an approach proposed by Gregory (W. 2000), underpinned by Habermas' later (1984a, b) theory of communicative action. Its purpose is “*sustainable improvements for individuals and groups*” (Gregory (W.) 2000, p498). A key underpinning assumption of the approach is that self and society are in dynamic interaction, such that “*individuals are created both through socialization processes and through their individual ability or capacity to be critically self- creating*” (Ibid, p484). Hence methodology needs to help individuals critically reflect on and understand their own role in change and how social processes influence this consciousness and understanding. This critical reflection should include questioning the wider values and norms of society. Assuming a dynamic relationship between self and society means accepting that these values and norms are influenced by the way individuals choose to act. Individuals would be influenced in their assessments, decisions and actions by a ‘moral stance’. This raises the question of how an individual decides amongst competing values and norms, and presumably (implicitly) how they judge what is moral. She considered that critical reflexion to make these judgements involves a process of *mutual perspective taking*, whereby an individual adopts an objective and subjective stance, but also tries to appreciate the perspective of everyone else. This corresponds to attempting to understand the complexity of the social lifeworld as conceptualised by Habermas (1984a, b) in terms of the objective (external), intersubjective (social) and personal. Hence “*judging competing values and norms must always be undertaken in dialogue*” (Gregory (W.) 2000, p496) in a public arena. This leads to questions about how to practically motivate and empower individuals to engage in this kind of dialogue, particularly as discussed in Chapter 2, “*many stakeholders did not want to be involved in evaluation planning or implementation, and did not feel that their participation would improve the quality or utility of evaluation*” (Smith 1993, p239).

Systemic Intervention

Jackson (1997) stated that the methodology gap for coercive contexts, as categorised in SYSM, was never adequately filled by Ulrich's (1983) CSH. Midgley (2000) claimed that 'systemic intervention' builds on Ulrich's work to fill this gap.

The intervention referred to is "*purposeful action by an agent to create change*" (Midgley 2000, p128). The methodology is underpinned by systems theory about boundary critique and methodological pluralism, leading to its definition as "*purposeful action by an agent to create change in relation to reflection on boundaries*" (Midgley 2000, p129). The methodology therefore requires agents to:

- (i) critically reflect on and make choices about boundaries;
- (ii) make choices between theories and methods to guide action, focusing on theoretical and methodological pluralism.
- (iii) take *action for improvement* (where improvement is understood to be subjective). However, as discussed in relation to critical appreciation, improvement also needs to be sustainable and geared towards longer term stability. Improvement may therefore be legitimately considered as improvement in the 'knowledge base' that may ultimately influence change management practice.

Midgley (2000) considered these three activities to be inseparable. Instead of an emphasis on *choice* of methods as advocated by SYSM he suggests change agents need to engage in

"creative design of methods" which "*involves the development of a dynamic set of interrelated questions expressing purposes for intervention that evolve over time, each of which might need to be addressed using a different method or part of method*" (Midgley 2000, p241).

'Methods' here are *not* just data generation, but activities such as engaging stakeholders, facilitation etc.

Creative Holism

Jackson (2006) described 'creative holism' as "*an enhanced version of 'total systems intervention'*" (Ibid, p653), consisting of four phases.

1. Creativity. This involves 'boundary setting' about the problem situation. The problem is analysed critically, initially from the broadest possible viewpoint, and then by making decisions about what is most important to address at the particular point in time.

2. Choice. This involves ‘boundary setting’ about the systems thinking and practice relevant to address the situation identified in 1. This relies on awareness of the field and the relative strengths and limitations of different concepts and approaches as a consequence of the metaphors they use, and their influencing research paradigm (functionalist, interpretive, emancipatory or postmodern).
3. Implementation of the chosen methodology and methods, to inform decisions about changing the situation identified in 1.
4. Reflection on the success of the intervention in bringing about improvement. This reflection is framed by the paradigm originally considered to be most significant to the problem (dominant). Therefore, although it is not explicitly stated, reflection must consider not only the success of the planned intervention, but also the role of the systems approach used in this change. Jackson considers a successful intervention to be one which can demonstrate progress in relation to all four paradigms, i.e. with respect to efficiency, effectiveness, fairness and inclusivity.
5. The intention is also that there is iteration between these stages as the intervention changes the situation and priorities with respect to problems (and implicitly opportunities) change. This allows for learning about (i) the change situation and (ii) the methodology in relation to its context of application.

3.4.4. Role of the methodology user

In much of the preceding discussion about critical systems thinking and practice the emphasis has been on the conceptual frameworks and their application in change situations. There has been some discussion of the process of socially constructing methodology and its relationship with the context of change, and the role of choice and justification in this process, but there also needs to be some exploration of the roles of the people involved, particularly given some of the difficulties associated with the role of the evaluator highlighted in Chapter 2. Mingers (1997b) suggested that

“in the development of management science, too little attention has been paid to the nature and role of the agent(s) involved in interventions in terms of their relationships to the problem situation and the intellectual frameworks available to them” (Mingers 1997b, p420).

In the human-centred approaches to systems practice the systems intervener is no longer considered an ‘expert’, but a facilitator of democratic debate about change in an ‘organisation’

that is the target of intervention. The concept of democracy here is of a society “*in which ordinary people can effectively participate in decisions on matters of collective or public concern*” (Ulrich 2000, p247). The main criticism of this human-centred perspective from the critical perspective is that “*granting citizens rights of participation is not sufficient to ensure effective participatory chances; if the issues are beyond most people’s knowledge and understanding, how can they argue their concerns in a competent manner?*” (Ulrich 2000, p250). In this kind of debate some might have more power and ability to express a viewpoint and influence outcomes (Ulrich 2000) and this is not discussed (Fuenmayor and Lopez-Garay 1991).

Midgley (2000) argued that a focus for attention in change situations are the forces that seek to stabilise conflict, leading to the marginalisation of some stakeholders. This involves challenging perceptions of ‘consensus’ on boundary judgements. Avoiding this marginalisation requires ‘expertise’ to facilitate the change or evaluation process, but in such a way that it does not “*enforce our own ‘sacred’ status as problem solvers, thereby making participants feel profane, disempowered and resentful*” (Midgley et al 1998, p473). A key issue for the facilitator is managing tensions caused by different viewpoints, including their own. From this perspective the professional intervener is only one of the agents in the change process. Hence whilst this role is still likely to be important in the change process, their ‘expert’ judgements should be open to challenge on the same basis as any other judgements being made. It is therefore important for the facilitator to develop clarity about the purposes and questions guiding their inquiry in dialogue with stakeholders, allowing them time and space to surface issues confidentially. This latter is necessary to help them identify issues of power or conflict (Midgley 2000).

Ulrich (2000) considered that empowering those with less power to have a voice in influencing change decisions and actions requires a “*focus less on civil rights and more on civil competencies*” (Ulrich 2000, p250). The question then becomes about how the professional intervener can help participants become more competent in their contribution to change. He also argued that while it is important to appreciate others’ perspectives (as suggested by Gregory (W.) 2000), “*we need not agree in order to understand why we do not*” hence “*mutual understanding means genuine communication, though not necessarily consensus*” (Ulrich 2000, p253). Whilst we may accept that consensus may often be impractical in situations where there are diverse and conflicting viewpoints, methodology can strive for agreement about the sources of disagreement. Ulrich (2000) suggested therefore that systemic thinking provides a framework for developing reflective

competence amongst participants. Boundary critique should be used to guide participants in reflecting on and challenging the boundary judgements being made, with key questions being:

Self reflective - '*What are my boundary judgements?*'

Dialogical - *Can we agree on our boundary judgements?*'

Controversial - '*Do you claim too much?*'"

From this perspective the responsibilities of the professional intervener are to:

- *"reflect on the boundary judgements that underpin his or her propositions;*
- *disclose these boundary judgements to all concerned parties;*
- *limit his or her claims accordingly;*
- *make it clear that for every boundary judgement, there are options;*
- *examine and explain the way in which asserted facts and values may look when boundary judgements are changed;*
- *make it clear to all concerned parties that when it comes to boundary critique, they are as competent as anyone else; and consequently,*
- *accept and make sure that citizens can play the critically competent role that is theirs in a functioning society" (Ulrich 2000, p266).*

3.4.5. Critique of critical systems approaches

In summary, the discussion of the critical perspective on systems thinking and practice presents a picture in which there is agreement that the complexity of change management situations needs to be understood not only in terms of issues such as their purpose, organisation, efficiency and effectiveness, but also how these are socially constructed by the different actors involved. Taking the stance that this will be influenced by diverse stakeholders with different perspectives and roles means that it is inevitable that power and conflict will play a role, and this cannot be ignored in methodology.

However, drawing on some of the ideas from CST to inform development of evaluation methodology for technology supported learning is not straightforward. There is still considerable debate about how methodology can be designed to practically address the technical, social and emancipatory dimensions to change, and how this methodology can be theoretically justified.

Methodological pluralism is presented as a way forward for designing inquiry that seeks to understand these different dimensions of human interest. The debate here is whether it is possible to justify the combining of *methodology* based on different theoretical paradigms as advocated by likes of Jackson (2006) and Mingers (1997a), or whether it is only *methods* or approaches to practical action that can be combined, as suggested by the likes of Midgley (2000)

and White and Taket (1997). If the latter stance is taken, this also leads to the question of whether a pragmatic approach can be justified, or whether the action should require and build on a theoretical underpinning.

The review of the theory leads to the conclusion here that methodology concerns a strategy for thinking and action, but one which is underpinned by a theoretically informed rationale. Such a strategy is developed by its user(s) to be relevant for a particular purpose and context, and is therefore contingent on these. As Midgley (2000) argued, this does not mean that change management strategies should be limited by particular philosophy, but it does require the users being aware of the strengths and limitations of their methodology for the intended purpose and context, in order to defend the choices made. It is therefore difficult to accept that such a justification for a particular research or evaluation question about a situation of interest can draw on theoretical paradigms that make very different ontological and epistemological assumptions. However, it is still possible for multimethodology to be developed underpinned by theory that takes a compatible stance with respect to ontology and epistemology, or that can be interpreted in different ways depending on a particular ontological and epistemological perspective (Gregory 1992). Beer's VSM (1972, 1979) is a typical example of the latter, whereby many (including Flood and Jackson 1991) have argued an interpretation informed by the functionalist paradigm of systems thinking, whereas Beer himself (1985) argued for VSD to be interpreted using principles from the softer human-centred paradigm. This is an illustration of how the SYSM which underpins methodology such as TSI is restrictive, since it "*constrains the methodologies discretely, not providing them with the facility to be able to shift classification*" (Yolles 1996, p559). Therefore any particular methodology for a situation needs to be developed from a particular epistemological and ontological position, but the strategy for thinking and action may draw ideas from different methodologies underpinned by a compatible position with respect to ontology and epistemology. It is the choice of methods that is designed to answer questions about the external, social and internal worlds. The differences between methodologies can be thought of in terms of their approach to:

- (i) modelling (as in the 'hard' approaches);
- (ii) managing different perspectives and debate between stakeholders (as in the 'soft' approaches);

(iii) ethical critique (as in the critical/emancipatory approaches).

(Midgley 1997)

With respect to addressing the issue of power and conflict in change management, the arguments put forward by Ulrich (1993) and Midgley (1997, 2000) are persuasive. How is it possible to identify all of the characteristics of the specific context of interest before beginning to undertake inquiry? With respect to the technology supported learning contexts that are the focus of this research, some general ideas about the nature of learning and the use of technology have been developed from the literature review. However, in a specific context of learning that is the focus of any single change management process, the activities of identifying values and goals of its stakeholders, and the issues around which there is potential conflict, are undertaken in the early stages of the inquiry. This may near completion before it is realised that compromise between the different perspectives of a particular group of stakeholders may not be possible. It cannot be assumed that situations of coercion and conflict can be identified at the outset, and based on Foucault's ideas about these being an inevitable consequence of the diversity of roles and perspectives, "*methods to aid critical reflection on boundary judgements should be used to enhance critical thinking up front*" (Midgley 1997, p262).

Returning to the process of 'boundary critique', this appears to be fundamental if a systemic approach is to be taken to guide critical reflection not only on 'what' and 'who' is relevant in a change situation of interest, but also 'why' this is the case and 'how' this has come about. Ulrich's (1983, 1987) CSH provides a useful framework of questions to guide this process, but it seems to be lacking guidance for concrete action in a specific context. Related to this is the point made by Midgley *et al* (1998) about the accessibility to practitioners of the language used. In terms of an earlier argument in this thesis, it is descriptive in nature but lacks any prescriptive dimension that explains how to implement it in practice. Its focus also seems to be on boundary judgments about change in the situation of interest, without considering the process of inquiry that guides the intervention and its relationship with the intervention situation. This suggests that methodological guidance is also needed for the process of boundary critique of the second order inquiry (terminology used by Midgley 2000).

The importance of developing theory about methodology has been argued in the earlier chapters in relation to the need to develop knowledge of what works and why in relation to evaluating technology supported learning. This also features heavily in the debates in CST, which suggest it is

iteration of this second order inquiry that enables the conscious testing and reflection on how the first order inquiry supports change management in a particular context. However, an important component of this reflection is on the boundary judgements being made about the theoretical assumptions underpinning methodology, and whether these are helpful in guiding learning that is *relevant* to the purpose of the inquiry, and consequently those key stakeholders in this purpose.

The issue of the diversity of stakeholders in the context of interest *and* inquiry is also one that raises significant questions in the CST debates about appropriate methodology. Gregory's (W. 2000) suggested approach of perspective taking, where stakeholders are encouraged to critically reflect on their own assumptions and judgements as well as those of everyone else suggests that 'everyone else' can straightforwardly be identified. Similarly Ulrich's (2000) recommendation that it is the responsibility of the intervener to disclose boundary judgements being made to all concerned parties also takes for granted that they will know who these are. What is really meant here is full disclosure and critical reflection amongst all those included in the evaluation, but this choice will affect the perspectives considered in the inquiry and the impact on use. Hence who is considered a stakeholder, whose boundary judgements are 'swept into' the inquiry, how and why, the impact of this on what is learnt, and the decisions and actions taken as a consequences of this learning, must all be a focus for boundary critique of the second order inquiry.

A further problematic issue identified by Gregory (2000) and Ulrich (2000) is that the intention to 'sweep in' different perspectives does not guarantee that these will be surfaced. Stakeholders also need to be willing and capable of participation, and this may not only be limited by power. Ulrich (2000) identified the issue of competency as a limiting factor, and the need to develop 'critical competency' amongst participants. But he did not highlight that what counts as 'critical competency' and who decides this is also a boundary judgment. In emphasising the shift in focus from civil *rights* to civil competencies, he does not address the issue of civil *responsibility* and the motivation of participants to engage in this responsibility. Much critical systems practice appears to be striving for equality in debate in change situations, whether from the human emancipation or self emancipation perspective, but what about situations where participants resign themselves to accepting that this equality can never be achieved and therefore disengage from change management processes? Second order boundary critique provides a framework for exploring these issues, but the perspective on which it is based may be quite narrow in situations where there is a high level of disengagement.

3.5. Summary

In the introduction to this chapter it was explained that the aim was to explore the extent to which systems theory might inform the design of evaluation methodology to address some of the difficulties identified with respect to evaluation theory and practice, namely:

- (i) generating a tested and credible ‘theory of action’ that informs understanding about the complexity of the relationship between activities, outcomes and context;
- (ii) issues of power and conflict;
- (iii) connections between different levels of strategy, such as intervention programs and their component projects;
- (iv) the relationship between the evaluator(s), evaluation and the evaluand.

The aim here is to evaluate what has been learnt for its relevancy to designing improvement in evaluation methodology for technology supported learning.

The argument has already been made for the need to improve understanding of how technology supported learning is socially constructed. This suggests that systems theory is needed that is underpinned by a subjective perspective with respect to ontology and epistemology. Churchman’s (1971) anatomy of teleological systems provides some useful concepts that could be applied to the systemic modelling of change, since it helps to focus inquiry not only on a ‘theory of action’ about the relationships between component activity, outcomes and context, but also the different roles involved in constructing it. It emphasises that the interpretation of those involved in these roles about the purpose of any collective endeavour, how it can be achieved, measures of performance etc, will influence their decisions and action. There is therefore not a single ‘theory of action’, but multiple theories associated with the numerous stakeholders involved. Change becomes a matter for negotiation between these stakeholders about what is relevant. In terms of a formal systems approach, this negotiation is informed by inquiry which seeks to understand stakeholder values and interpretations. A key feature of this inquiry is its ‘ethicality’ in terms of decisions about which stakeholders are relevant, and the ‘sweeping in’ of diverse and marginal perspectives.

Churchman’s (1971, 1979) work is useful for providing some of the key concepts about ‘what’ and ‘who’ might be involved in generating theories of action, but is less helpful in terms of providing suggestions for practically generating and testing these. It is Checkland’s (1981, 1999) articulation of SSM, also underpinned by the subjective paradigm, which provides greater clarity about how to

use systems thinking to inform improvement action in a learning cycle which iterates between stages of (i) conceptualisation and inquiry, and (ii) action to improve the situation. He also offers practical suggestions and frameworks for engaging stakeholders in the inquiry and debate which informs their improvement action, including how to represent their theories of change.

However, most of the discussions and concepts in Churchman's and Checkland's approaches centre on a single context of change. Whilst the basic concept of emergence and hierarchy does provide a framework for considering the connectedness of a context of interest with its wider environment, there is little guidance on how change management with respect to different levels of strategy, and inquiry for different purposes in informing these strategies, might be practically connected. This may be because Churchman describes himself as having "*a bias that is against hierarchy as an essential aspect of systems or the systems approach*" (Churchman 1979, p38). A further difficulty identified by the CST literature is that relying on debate and the 'sweeping in' of perspectives into this debate ignores the issue of how decisions are made about who should participate, how participation is enabled or constrained, and when debate should cease.

It is Stafford Beer's VSM (1972) and his articulation of how this might be interpreted to explore organisational functionality and performance (1985) that provides additional concepts that help to understand the connectedness between different levels of strategy. His description of how the concept of recursion can be applied to organisations, and the types of information relevant to informing management decisions at different levels of organisations, provides a framework to help design interpretive inquiry relevant to different management purposes. Here the emphasis is not on inquiry to 'discover' the most effective design of organisation, but generating relevant data and reflection on the meaning of this to the various actors involved in constructing organisation. However, as with SSM, the difficulty with Beer's VSD is that it does not satisfactorily address the emancipatory interest, since it does not offer an approach to developing understanding of how certain interpretations, and hence decisions and actions, become privileged.

Ulrich's (1983, 1987) CSH provides a framework for boundary critique, which guides consideration of whose views *are* and *ought* to be relevant in terms of the purpose, design, control, implementation and outcomes of the organisation. This makes no assumption that issues of power and conflict *can be* resolved, but provides a tool for critical reflection on what the impact of this might be on the organisation, and hence its purpose and outcomes, and how it might be improved. Whilst this addresses some of the emancipatory concerns, it is less useful in providing concepts that explore the relationship between these different views and the functionality of

organisation, or the connection between different levels of organisation. Its focus is very much on the situation of interest, and not on the complexity of the relationship between the evaluator(s), evaluation and evaluand.

However, it is the core ideas of CST, those of methodological pluralism and boundary critique, that provide a theoretical justification for drawing on some of the strengths of the conceptual thinking and practical guidance from all of these approaches that have some relevance to improving methodology for technology supported learning. It is important here to note that all of the approaches drawn on here are based on a subjective perspective in relation to systems ontology and epistemology, although they vary in their emancipatory intentions and possibilities. Boundary critique makes it possible to reflect on strengths and limitations of different methods for application in a particular context of interest, the focus being on the justification of the decisions being made about which methods to use, why, and how. Drawing on Midgley's (2000) work, there is a need to be critical about the boundary judgements being made about the process of inquiry and the context of inquiry, and the relationship between the two. This involves a process of 'second order' boundary critique. Ethicality from this perspective does not mean eliminating the effects of power and conflict, but engaging stakeholders *at the outset* in this process of boundary critique. The aim is therefore to help raise their awareness and understanding of how various factors, including power and conflict might be influencing what is learnt from inquiry and how this is used to justify decisions and actions. This includes critique of the role of evaluator/change agents in the process.

Drawing from CST, the main implication for the role of the evaluator is the emphasis on their responsibility for the ethicality of the evaluation (Churchman 1979). Habermas' theories focus attention on *human* emancipation. From this perspective there is a tendency to place the responsibility for judgements about ethicality firmly with the evaluator as 'expert'. The expertise required is that of facilitating participation of stakeholders and the ability to critically reflect on the effectiveness and impact of this facilitation and participation on what is learnt from the evaluation. Foucault's ideas about *self* emancipation suggest that the evaluator's responsibility should go further than their own inquiry and critical awareness to facilitating other stakeholders in developing critical awareness and skills in critical inquiry that can be applied to influencing change in their particular situations. This may include critique of what *they* consider to be emancipatory in their context (Midgley 2000).

However, an important question to address is why organisations/individuals appoint a ‘professional’ or external evaluator, and who has decision making control over this appointment. This may be to bring something new to the situation, such as a different perspective, different skills, or a different way of thinking (Ulrich 2000). But it may be politically motivated, to absolve responsibility for decisions about change, or to justify decisions that will be made anyway (Patton 1986). Whilst Ulrich (2000) highlights the responsibility of the evaluator in developing the competence of stakeholders to participate, Gregory (W. 2000) raises the issue that participants may not be motivated to do so. These purposes and motivations are all ones which also need to be subject to second order boundary critique, but it cannot be assumed that it is always possible to involve relevant stakeholders in this critique of either the first or second order.

A further implication of drawing on CST as a framework for designing improvement in evaluation, is the limitation on taking a pluralist approach due to the bounded skills, knowledge, values, and experience of the evaluator. The evaluator may well undertake a commitment to critical awareness and pluralism, and to improving their knowledge, skills and experience with respect to these. But at any point in time and context this will always be bounded. This adds a further level of complexity in the process of boundary critique, possibly a *third* order, which involves critique of their own decisions, judgements and role in the inquiry and which might have wider implications for evaluation theory and practice.

Chapter 4. Research Methodology

4.1. Introduction

Having explored in Chapter 3 how CST can be used to inform methodology design for technology supported learning, the aim of this chapter is to articulate this methodology design and provide the rationale for the approach to the *research* intended to make a wider contribution to informing improvement in evaluation theory and practice. This research has also been conceptualised as meta-evaluation, i.e. the evaluation of evaluation methodology implemented, across multiple cases.

Since the intention of the research was to explore the potential for systems thinking to inform improvement in evaluation theory and practice, the research methodology draws from the theoretical concepts outlined and critiqued in Chapter 3, and discusses how these are used to inform the methodology design to address some of the problems argued to be associated with existing evaluation methodology. To recap, these problems were considered to be:-

- (i) generating a tested and credible ‘theory of action’ that informs understanding about the complexity of the relationship between activities, outcomes and context;
- (ii) issues of power and conflict;
- (iii) connections between different levels of strategy, such as intervention programs and their component projects;
- (iv) the relationship between the evaluator(s), evaluation and the evaluand.

The conclusion from Chapter 3 was that no single existing systems methodology addresses all of these issues. Systems modelling (using different theoretical models) can be used to generate theories of action from different perspectives, and these can be tested in practice using methodology (such as SSM) that embeds the conceptual process in an iterative cycle of action research. However, models that help understand functionality differ in respect of their ability to consider the relationship between different levels of decision making and the role of power and conflict, and practice approaches differ in respect of their ability to address issues regarding ethicality.

Adopting a pluralist approach, as advocated by critical systems thinkers, allows methodology to be designed to draw from the strengths of existing models and approaches, but this requires the

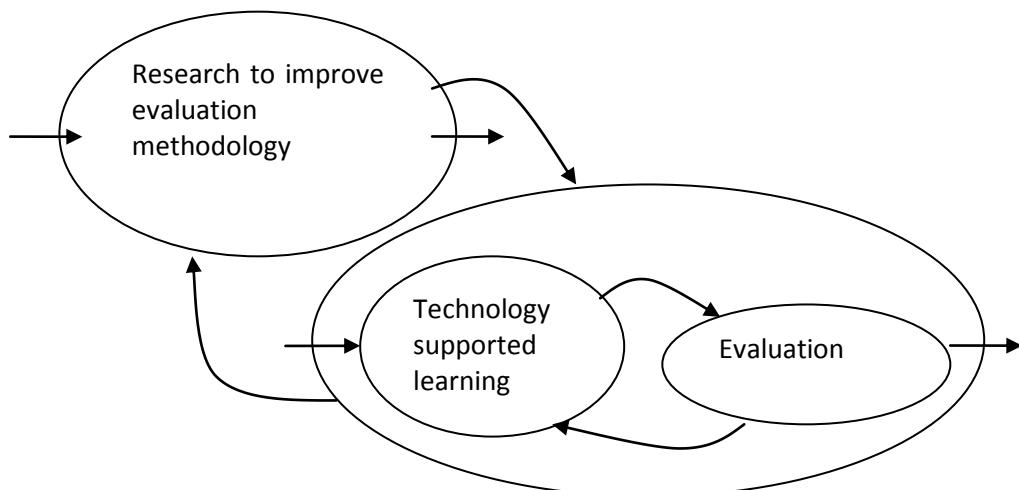
methodology designer and user to be critically self-aware about the methodological decisions and their application, what is influencing these, and the potential impact of these decisions and actions on what is learnt.

Developing theory about 'what' and 'why' evaluation methodology works therefore depends on an iterative process of making some initial boundary judgements (a theory of action) about the methodology using systems constructs, testing these in practice, and *critically* reflecting on the appropriateness of the initial boundary judgements made based on what is learnt from the inquiry. This approach relies on the process of boundary critique being applied at the following levels:

- (i) the first order boundary critique of a specific context of technology supported learning that has been evaluated;
- (ii) the second order boundary critique of the evaluation activity and its relationship with the specific context of technology supported learning that has been evaluated;
- (iii) the third order boundary critique of the research. This requires iterating this second order critique and undertaking boundary critique of the relationship between the research, the evaluation activity, and the more general context of technology supported learning.

The relationship between the different levels of inquiry that are subject to the process of boundary critique is conceptualised in figure 4.1 using a low resolution systems model.

Figure 4.1: Systemic conceptualisation of relationship between research, evaluation and evaluand



A further aim of this chapter is therefore to clarify the relationship between these different levels of inquiry, and how CST was applied in practice at these different levels.

4.2. Purpose of the research

From a systems perspective, the starting point for designing the research methodology is conceptualisation of the research process as socially constructed human activity. Taking a critical systems approach means being critically self-aware of the boundary judgements being made in the design process, and critically reflecting on these judgments in relation to what is learnt. Critical reflection on these judgements is undertaken in the substantive discussion about the research findings in Chapter 6.

The process of boundary critique fundamentally draws on Churchman's (1971) core constructs about roles and relationships in teleological processes. These constructs were applied to the research process. The initial assumptions and judgements that were made in the research design phase were:

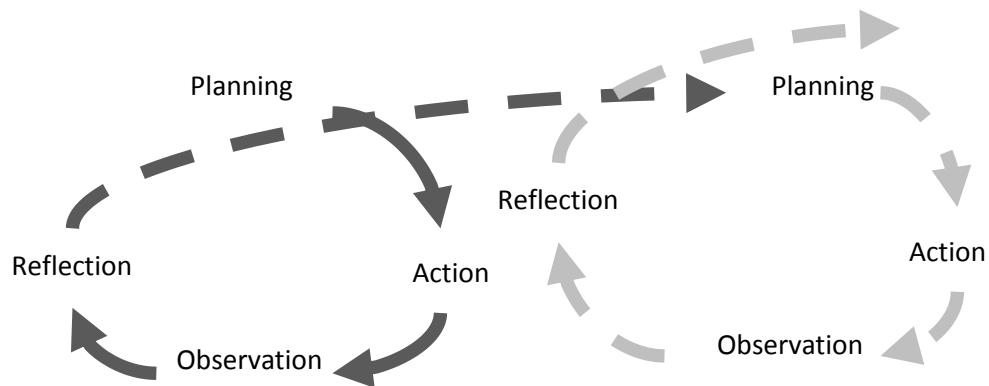
- (i) As this was an independent Ph.D. research project, the researcher was conceptualised as the primary contributor to the roles of 'designer' and 'decision maker', although there were other influences at play here, such as the input of supervisors, managers, and colleagues.
- (ii) The 'client' was considered to be those likely to be interested in the outputs from the research, principally researchers and evaluators with a particular interest in evaluation methodology, or practitioners with some responsibility for evaluating technology supported learning, and not forgetting the Ph.D. examiners .
- (iii) The purpose and scope of the research was therefore aimed at the perceived needs of these clients, influenced by the background research articulated in the earlier chapters of this thesis, and the Ph.D. examination regulations. The intention was to make a contribution to the wider field of knowledge about evaluation methodology, particularly as applied to the context of technology supported learning, and the interpretation and application of systems theory in practice.
- (iv) The sub-activities involved in the research concerned the particular approach to thinking and action intended to achieve this purpose.
- (v) The researcher's interpretation of 'performance' and how this would be judged related to the extent that the research addressed the needs of the 'clients' identified in (ii). Criteria therefore

included things such as the Ph.D. examination criteria, feedback from conference presentations, and acceptance for publication in peer reviewed journals.

4.3. Testing theories of action through action research

In taking the core purpose of the research to be contribution to evaluation theory, in particular about the use of systems thinking in evaluating technology supported learning, it was assumed that the research approach required iteration of the evaluation methodology, in multiple relevant contexts, to experientially develop knowledge about what works and why to inform its improvement. The approach is therefore founded on the experiential learning theory discussed in Chapter 2 (Schön 1983, Kolb 1984). At the start of the research, the iterative approach to inquiry was more accurately perceived as a spiral rather than cycle (see figure 4.2), as the starting point for each iteration was intended to be a different position than the previous. This is because at the start of each iteration the researcher should have improved knowledge about the context of action due to their learning from the previous iteration.

Figure 4.2: Action research spiral



The intention was for the action research approach to be flexible and responsive to unanticipated constraints and opportunities. It was accepted that change would not necessarily be experienced by those involved as anticipated because of the complexity of factors involved. This is largely due to the unpredictability of human behaviour, and influenced by social and political factors.

According to Kemmis and McTaggart (1981), the aims of action research in the context in which it is undertaken are:

- (i) those undertaking it improve their understanding of change in context;
- (ii) empowerment of practitioners to be more effective and to improve their own practice;
- (iii) which should lead to the desired improvement.

4.4. Context of the action research

The contextual nature of action research means that each research study can be considered a case study.

Three types of case study have been identified by Stake (2000) as:-

1. the *intrinsic* case study – where the researcher has an interest in a particular case. Here the purpose of inquiry into the case is NOT theory building or abstraction of general principles (although these may be unintended outcomes).
2. the *instrumental* case study- to facilitate understanding of a more general issue. The choice of case is therefore determined by the extent that inquiry into it will lead to understanding of this general issue;
3. the *collective* case study- i.e. the instrumental study across a number of cases. Here the choice of cases is driven by their relevance for developing further understanding of a general issue.

It is possible that any single case study could fit the criteria for all of these categories.

The motivation to improve evaluation methodology for technology supported learning has been argued to be driven by a more general problem for management. However, the aim was not ‘generalisation’ of the findings, as is the case with quantitative studies. The action research intended to build experiential knowledge about the use of systems thinking in the evaluation of technology supported learning, and required iteration and improvement of a designed evaluation methodology in a *collective* of instrumental case studies. Choosing cases involves a form of sampling, but the criteria used are not the size and randomness of samples as is the case with quantitative research. Stake (2000) considers that the key to case studies being useful in helping to build experiential knowledge is that there is sufficient similarity between the range of cases

chosen for the experience to be meaningful to the researcher and the research question. However, there also needs to be differences between them, so that the researcher can learn something new from each case. This provides opportunity for the researcher to make connections between new experiences and their own prior personal knowledge, as well as building on a recognised body of theoretical knowledge. The choice of cases is determined by those cases “*from which we feel we can learn the most*” (Stake 2000, p446). Other criteria may also play an important role in the choice, such as accessibility at the time of undertaking the research, and the resources available to undertake the research.

The key criteria applied to the choice of cases for this research were:

- (i) that a case involved organised learning activity for a group of learners with the same espoused learning purpose;
- (ii) that the learning activity was supported by technology in some way;
- (iii) that the case was accessible during the period of research supervision;
- (iv) that evaluation of the case could be undertaken and completed as part of normal day-to-day professional practice during the period of research supervision.

The specific cases used to illustrate key learning stages of the research are outlined in more detail in Chapter 5 and Appendices 1 and 2, and are summarised in table 4.1. Other case studies informing the research presented this thesis are summarised in Appendix 4, in chronological order. All the case studies were undertaken in my own professional practice over a period of 5 years from February 2003 to June 2008. The diversity in the role of the technology used in these cases illustrates how the evaluation methodology needs to be flexible enough to accommodate this diversity.

This range of case studies therefore fulfils Stake’s (2000) requirements for experiential knowledge building in the sense that:

- (i) they are all similar in respect of being organised learning activity in which technology is being used to support learning. Although there may have been some role for the technology in supporting individual learning, the technology also needed to play some part in organised learning activity, for example by supporting group work, or mediating communication

between learners. This allowed connections to be made between them about the application of systems methodology for evaluating them.

- (ii) there is diversity between them in terms of the intended purpose of the learning, the participants involved, and the pedagogical assumptions underpinning the learning design and the use of the technology.

Table 4.1: Summary of detailed case studies

	Learners	Purpose of learning	Role of technology	Technology used
Case 1 (See Appendix 1)	Network of practitioners (48)	To develop practitioners' understanding of e-business theory and practice, and appropriate models for the teaching of e-business in virtual learning environments.	As a tool for mediating communication of learners, their exchange of ideas, experiences, artefacts, across distributed geographical locations.	Collaborative groupware technology
Case 2 (See Appendix 2)	Level 3* UG students (12)	To engage students in a more experimental, creative, analytical and critical approach to the study of their discipline. To develop their understanding of how multimedia and language can be effectively integrated to present and influence the interpretation of literature.	As a tool to facilitate active learning and creativity. To provide access to information and resources. As a tool for mediating critical reflection and discussion in preparation for face-to-face discussion in seminars.	Creative multimedia technologies Virtual learning environment, including discussion tools
Case 3 (See Chapter 5)	M Level* UG and PG students (67)	To improve students' awareness of sustainable development issues and sustainable design skills, including the more social dimensions of these, in a range of built environment disciplines.	To provide access to information and resources about a 'real' development site and different stakeholder perspectives of the site. Information and resources inform group learning activity.	Virtual learning environment embedding a variety of multimedia resources

*UK higher education describes the progressive nature of the learning intended in its degree courses by 'levels' whereby level '0' represents the lowest or foundation level, and levels 1,2 and 3 normally (but not always) correspond to years 1-3 of a three-year full-time undergraduate (UG) degree course. 'M' level represents the stage progressed to after satisfactorily completing level 3. This may be either the final year of a four-year professionally accredited undergraduate course (e.g. MEng) or a postgraduate (PG) course.

4.5. Rigour in action research

In action research, the researcher and the practitioner are roles not individuals, and the roles could be undertaken by the same individual. Because of this potentially dual role of the researcher, and association of the research with reflective practitioner inquiry, the rigour of action research is subject to criticism on a number of grounds.

Criticisms are that day-to-day pressures of practice can be distracting and result in a focus on short-term rather than long-term goals, and familiarity with the work and its context can lead to bias (Argyris and Schön 1996). The counter argument here is that although this may be true, research is also a form of practice. An academic researcher may be subject to a number of constraints that might influence or limit what is learnt from their inquiry. These constraints may be imposed by their own organisation, funding bodies, and national and international regulation and legislation. They may also be undertaking the research alongside many other duties, including teaching and administrative responsibilities.

A further criticism is that practitioners judge their theories by “*how well they work*” (Argyris and Schön 1996, p37) in practice, rather than their proximity to ‘reality’. Therefore, the practitioner may cease inquiry at a different point to that of an academic researcher. Where practitioners may continue their theory formulation and testing only until an intended outcome is achieved or other outcomes are acceptable, hypothesis forming and testing by an academic researcher is more likely to continue as long as plausible hypotheses emerge (Argyris and Schön 1996). This point could also be debated on a number of grounds, not least the socially constructed nature of ‘reality’ already discussed in the theoretical background to this thesis. If practitioner learning is aimed at improvement of an organisation, then common sense dictates that practitioner inquiry should continue as long as the organisation exists. However, many research programmes cease simply because of constraints such as lack of funding and changes of personnel.

The most significant criticism is that knowledge derived from this kind of research is not generalisable. Kember (2000) argues that this criticism could be equally applied to many quantitative studies which attempt to generalise from one population to another without any real justification other than that the researcher judges the contexts to be similar.

Notwithstanding these criticisms and arguments, criteria *are* needed for judging the rigour of action research and the formal evaluation involved in an iterative action learning cycle. These can be summarised as:

- A clear rationale for the planned action. For research inquiry this is informed by an existing theoretical body of knowledge. For an evaluation it may be based on previous experience, assumptions about good practice developed elsewhere, evidence from routine monitoring or market research that might highlight a problem or opportunity.
- An intention to develop useful and transferable knowledge. For research the intention is to contribute to some wider body of theoretical knowledge. For an evaluation this may involve a contribution to wider organisational knowledge about good practice.
- Planning/designing (i) intervention and (ii) systematic inquiry into the success of intervention. This latter informs judgments about further action. The inquiry strategy is therefore guided by “*intent to provide a sound basis for critical self-reflection*” (Kemmis and McTaggart 1981, p9).
- Reflection. This requires the research or evaluation to generate a rich, descriptive picture of the context of inquiry from a variety of perspectives.
- Reflexivity. This requires the researcher(s) or evaluator(s) to be critically self-aware of the relationship between the inquiry and the context to which it is being applied.

Figure 4.2, of the action research cycle, does little to represent the extent to which rigour can be designed and implemented in formal inquiry. Much of the rigour is argued to be associated with the conceptual stages of the inquiry, in terms of the rationale, planning and critical reflection and reflexivity. It is at these stages where the use of systems thinking needs to be explored to improve evaluation methodology.

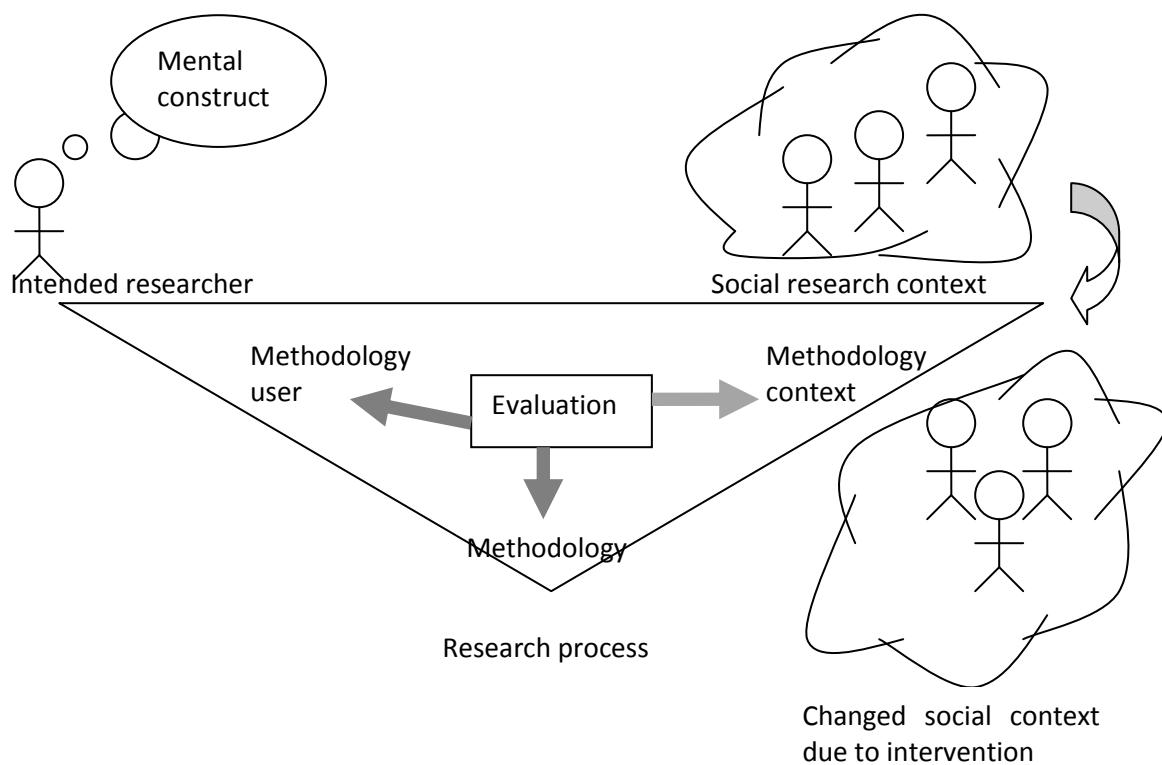
4.6. Critical reflection and reflexivity

It has been argued that conceptualising reflection in the action research cycle as a linear progression between this and other stages of the cycle is too simplistic (Preskill and Torres 1999). Reflection and reflexion are acknowledged to be more ‘messy’ than this (Johnson and Duberley 2000) with little guidance on how to undertake them (Kawalek and Jayaratna 2003). In this research, this is further complicated by the different levels of inquiry. Some also suggest that for organisational change to occur, this reflection process needs to be undertaken and organised at the collective level (Biggs 2001, Vince 2002), hence “*at the level of the group or subsystem, the aim of reflection is to explore and understand relations across the boundaries of self and other, and across the boundaries of sub-systems*” (Vince 2002, p74). This relates to the earlier arguments in the thesis, that assumptions that change can be driven in a unidirectional way by individual

reflective practitioners or researchers are flawed because they neglect the dialectic relationship their activity has with their wider environment. This involves understanding the political and social processes involved and the role of ‘self’ in these processes, as well as relationships between organisations. Alvesson and Skoldberg (2000) also propose that this questioning of one’s own approach to thinking should not be too narrowly focused theoretically and philosophically, but should be comprehensive in its considerations of the historical, political and social context of these relationships.

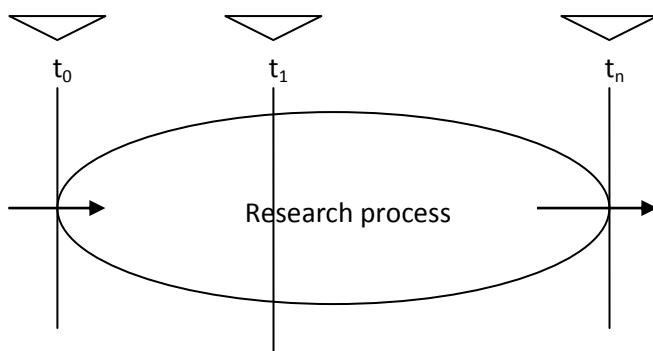
One framework that has been proposed to help those referring to it to “*make up their own minds about which methodology to select, adopt, adapt or even create in a given situation*” (Jayaratna 1994, p49) is the NIMSAD (Normative Information Model-based Systems Analysis and Design) framework (figure 4.3). This focuses the methodology user, adapter or creator to critically evaluate the relationships between the methodology, its user(s), and the context of application.

Figure 4.3: Conceptual diagram of elements of the NIMSAD Framework as interpreted in research context (after Kawalek and Jayaratna 2003)



In addition, Jayaratna (1994) recommends that this critical evaluation should take place at three stages, prior to implementing the methodology, during implementation in the specific context of use, and after implementation (figure 4.4).

Figure 4.4: Conceptual diagram of the evaluation stages of NIMSAD as applied to a research process (after Kawalek and Jayaratna 2003)



Whilst this framework can be helpful for conceptualising the relationship between a methodology and its application in a specific context by a specific user, and highlights the need for the methodology user to be critically reflective and reflexive about this relationship, it still does not provide any more specific guidance on how to practically undertake this critical reflection and reflexion.

Alvesson *et al* (2008) have recently attempted to bring some clarity to what is meant by reflexivity in research by undertaking a literature review of organisation and management theory. They examined the different approaches and techniques used by researchers in practice and identified four main types of practice illustrated in writing, each with its limitations. These were classified as:

- (i) Multi-perspective. This approach recognises that the outcomes from the research will be influenced by the theoretical perspective that has informed the approach taken. It therefore attempts to consider the research context from different theoretical perspectives to find new ways of looking at an issue. Alvesson *et al* (2008) question how rotating between different perspectives is any better than being positioned within one, or how it is possible to combine perspectives, particularly if a researcher is naturally aligned with one perspective. This has resonance with some of the criticisms of methodological pluralism. The position taken in this research and summarised in Chapter 3 is that there is some value in combining different

systems theories/models but in the context of this research problem these are more appropriately underpinned by a subjective epistemological perspective.

- (ii) Multi-voicing. This approach recognises that a researcher's approach to their research activity and interpretation of its meaning is subjective and influenced by their unique prior learning and experience. In being reflexive about this, a researcher reflects on how their own perspective influences their interpretation of the perspective of others in the research. The emphasis is on considering how the outcomes from research are constructed by researchers and others. Outcomes are presented in such a way as to either attempt to fairly represent different voices, or to be more transparent about which voices may have been privileged and why, but in particular the voice of researcher in relation to others. Alvesson *et al* (2008) consider this a paradox, in that attempting to position their own voice in relation to others in the research, researchers perhaps draw too much attention to their own. From a CST perspective, there is no escaping this paradox, but the process of 'boundary critique' places responsibility on researchers to be critical about and make transparent their boundary judgments, to inform the interpretation and judgement of those parties interested in the research.
- (iii) Positioning practices. This goes further than (ii) by considering how the relationship between researchers and their research is influenced by a wider context, for example research communities with which they are associated, organisations within which they work, expectations of wider society. Alvesson *et al* (2008) also consider this contradictory. On the one hand a researcher acknowledges the socially constructed nature of knowledge and the complexity of this process, but on the other hand presents their own research as a 'significant contribution', as if they have somehow been able to successively 'navigate' themselves through this complexity. From a CST perspective, the undertaking of the second and third order boundary critique focuses researchers on considering this dimension of the complexity.
- (iv) Destabilising practices. This is practice from a critical perspective, which constantly challenges any research from a different epistemological perspective, but particularly that which makes claims to exposing some 'universal truth'. Attention is again drawn to the contradiction in this approach, in that in trying to highlight that no claims to knowledge should be privileged in this way, the authors are attempting to privilege their own perspective. From a CST perspective, this difficulty is also acknowledged. The position here, underpinned by Habermas' theory of communicative action (1984a, b), is that making such claims is a necessary part of the theory

building process. The emphasis is on making the second and third order boundary judgments and critique explicit so that these can be subject to external critique and further challenge in respect of the following:

- That what is said is intelligible;
- That the propositional content (about the external world) is true;
- That making the proposition can be justified (in the social context);
- That the proposition is made with sincere intent (reflecting the internal world).

This latter position is therefore aligned with Alvesson *et al*'s (2008) conclusion that the value of research be judged by "*whether it makes a productive difference*" (Alvesson *et al* 2008, p495) i.e. that "*some kind of tangible result should be demonstrated, such as ideas, concepts, challenges to conventional thinking, or suggestions for new research*" (*Ibid*, p495). Its purpose is therefore to "*improve research and theorizing*" (*Ibid*, p495), although they acknowledge that what improvement means is not 'self-evident'. The interpretation here is that this is an evaluative judgment made from a particular viewpoint.

4.7. Using systems theory to improve the rigour of the conceptual stages of action research

The aim of this section of the chapter is to explain how the systems theory explored in Chapter 3 was used as a theoretical framework for the conceptual stages of the action research and development of evaluation methodology for technology supported learning.

4.7.1. Using systems constructs to clarify the purpose of the evaluation, and the roles and relationships of stakeholders

Critical to the design of the evaluation methodology for technology supported learning are judgements about the purpose of the evaluation and the roles and relationships of the stakeholders in the evaluation and evaluand. This section illustrates how systems constructs were used to inform this design work. It draws on some of the development work undertaken in the earlier cases, particularly Cases 1 and 2 (see table 4.1). Further detail about these cases is given in Appendices 1 and 2. A full illustration of the application of the methodology in the final stages of the research is given in Chapter 5, using Case 3.

Case 1 provided the first opportunity to test the utility of applying systems constructs to the evaluation and evaluand. This was a knowledge management initiative intended to support a

group of geographically distributed lecturers to improve their practice by developing new e-business courses. They also needed to learn how to use technology in their teaching of these courses. It is important to note here that the initiative formed one component (sub-project) of a broader EU funded project. The broader project aim was to develop a network of lecturers whose improved skills and knowledge, and work together as a cohesive community of practitioners, would contribute to longer-term activity that could improve the ability of the Eastern Mediterranean region to participate in global e-business.

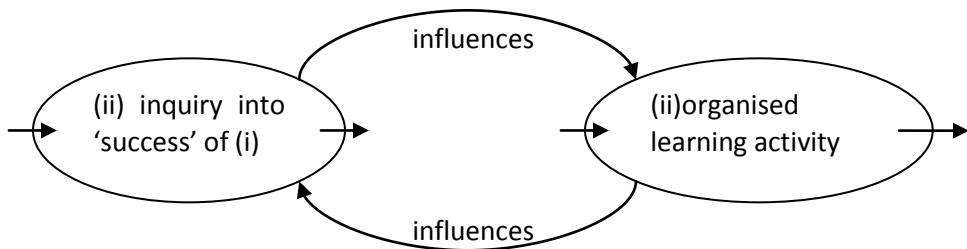
My own role in the knowledge management initiative was to collaborate with a colleague in its design, implementation and evaluation.

Taking a systemic view of the evaluation as a teleological process (from Churchman 1971), the core boundary judgement concerned the client user of the evaluation information that would be generated. Although we had responsibility for implementing the knowledge management initiative, the ultimate decisions about organisation and resourcing rested with those project managers with a more permanent role in the context of interest. To make these decisions, these managers needed to be informed about issues relevant to improving and sustaining the knowledge management process. We therefore envisaged ourselves in Churchman's (1971) role of designer, working collaboratively with other decision making project managers, but with responsibility for providing information that would inform these decisions.

As a result, the design, implementation and evaluation of the knowledge management initiative was conceptualised as a participative action research project. This involved collaboration with project managers about the purpose of the evaluation, the criteria and data on which the evaluation should be based, and the methods that would be used to generate data.

From this perspective, the design of the evaluation was only meaningful in relation to the activity being evaluated (see figure 4.5). This is aligned with Patton's (1986) concept of utilization-focused evaluation, whereby the first step involved in evaluation is to identify the *primary* users of evaluation, and its purpose is "*to answer stakeholders' questions*" (Ibid, p43).

Figure 4.5: Systems model of relationship between organised learning activity and inquiry into its success

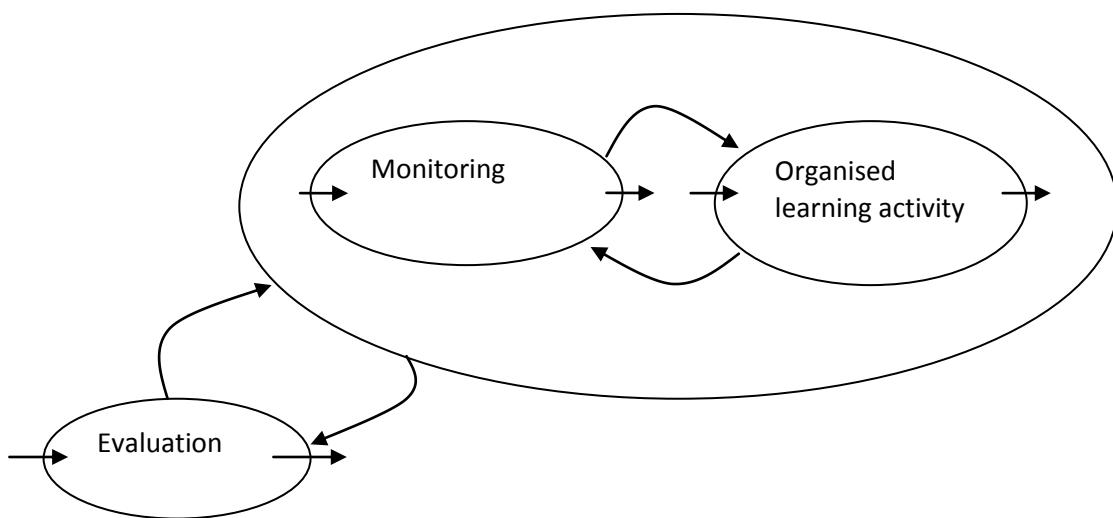


In Case 1, the evaluation was conceptualised as operating at two different levels:

- (i) monitoring of the operational success of the knowledge management activity. This involved consideration of the extent to which the implemented design appeared to be operating as planned and was being positively experienced by those involved. An example issue of relevancy to this evaluation was whether network members were contributing to learning activity and completing planned collaborative work.
- (ii) evaluation of the strategic success of the knowledge management activity. This was concerned with whether it was achieving its strategic aims. This level of inquiry was informed by the operational monitoring, but was also concerned with connections being inferred between operational activity and the achievement of intended outcomes, and the extent to which the strategic aims were still appropriate and desirable. In Case 1, an intended strategic aim was meeting the learning needs and expectations of the participants in the knowledge management initiative.

This led to reconceptualising the relationship of these inquiry processes with the organised learning activity, as shown in figure 4.6. In this model the role of evaluation is also to consider how the monitoring process, and perceptions of measures of performance, are influencing the activity of those involved in the organised learning activity.

Figure 4.6: Monitoring and evaluation of organised learning activity



Several points of learning emerged from the research in Case 1. These were:

- (i) By conceptualising ourselves as 'designer' and working collaboratively with decision makers and other stakeholders, we made assumptions that our evaluation against collaboratively agreed criteria for success would form the basis of decisions about improvement of the knowledge management initiative. We also provided information from a wider environmental analysis, for example by basing design proposals and recommendations for improvement on theory about good practice in developing communities of practice, online collaboration and learning, and socio-technical systems. However, the decision makers responsible for the overall project management exerted considerable pressure on us as implementers of the knowledge management initiative to act according to *their* ideas about managing the learning activity rather than allowing local intervention to be informed by the evaluation inquiry. Hence decision making for the knowledge management initiative was not sufficiently influenced by the feedback loops designed by the evaluation. Instead, its operationalisation was more strongly influenced by the instrumental requirements of the EU project leader to undertake tasks and achieve deliverables that had been pre-determined at the EU project design phase.
- (ii) The design of feedback loops, did not sufficiently integrate with other EU project components. This was illustrated by some confusion shown by the lecturers about the relationship between the more informal and discursive learning approach represented by the knowledge

management initiative, and the formal didactic professional development offered by another of the sub-projects. [Example comment from lecturer: “*I think there was confusion on when we should use the Knowledge Management platform and when to use our other Course [] Platform. Some of the comments were being repeated in both platforms, others contributed in one platform and not the other.*”]

- (iii) The lecturers’ contributions to the knowledge management initiative, and feedback given during the evaluation, indicated that their participation (or lack of) was also guided by motivation to undertake only the minimum activity they perceived to be required to meet their contractual obligations to justify the funding allocation. This suggested that they did not consider themselves to be the immediate beneficiaries of either the learning activity or the decisions made as a consequence of the evaluation. [Example quote from lecturer: “*Perhaps such activities are helpful. But I currently choose to allocate the minimum time possible to such reporting, platform exploring activities due to a high demand on my time.*”] This issue was also highlighted by comments made during evaluation interviews. [Example lecturer quote: “*Please tell me if you need any more information. And if I didn’t answer your questions in the right way please tell me what to do.*”]

It could therefore be argued that there was a lack of alignment between the designers, decisions makers and other sub-project managers and stakeholders of their understanding of the purpose of the evaluation and its role in the management control of the initiative and the overall project. We had envisaged it as an adaptive learning activity aligned with the principles of action research, and intending to benefit the learners in terms of informing improvement in their learning activity and hence learning. However, the overriding ethos was one of providing accountability in the form of deliverables and outputs to the EU funders. Indeed, the evaluation activity needed to generate information relevant to both of these purposes, but there was insufficient clarity amongst stakeholders about the relationship between them.

Case 2 provided a further opportunity to use systems constructs to explore the purpose of evaluation and the relationship between evaluation for different purposes, in order to improve the design of relevant feedback loops. Case 2 was a new taught course forming a component of an undergraduate degree programme. The course leader had secured some funding for the initial development work from an internally allocated University grant scheme, although the source of this grant funding was the Higher Education Funding Council for England’s Teaching Quality Enhancement Fund. A condition of the funding was a full evaluation report to be presented to a

monitoring panel for the grant scheme, and that the course leader should aim to engage others in what had been learnt from the development work by sharing his experience more widely.

Informed by previous experience of planning evaluation using systems constructs, my assumption was that information relevant to the evaluation depended on the needs of the evaluation client, and their purpose or use for the information generated. I was informed (by grant scheme administrators) that my role was to collaborate with the course leader in planning and preferably undertaking the evaluation. However, the course leader had decision making control in terms of choosing to undertake all of the evaluation himself, asking for assistance, or requesting that the evaluation be conducted for them. If he chose the former, then my role was to report to the monitoring panel a 'meta-evaluation' of his evaluation, commenting on its appropriateness, quality, and the meaning of findings in relation to judgements about 'success' of the educational development work. From my researcher's perspective, this conveyed a lack of clarity about the purpose of the evaluation and my role in it. Although formative evaluation was often undertaken in the context of these projects, the emphasis appeared to be on the summative component of evaluation and reporting, with the 'external' evaluator as 'expert' having overall authority to pass judgement on the success or otherwise of the project, based on their own evaluation activity or their judgement of the quality of the course leader's evaluation. This suggested an ethos of evaluation for accountability purposes at odds with the collaborative approach that appeared to be being encouraged. From the documentation about the grant scheme and its evaluation, several clients could be interpreted, each with different potential interests.

- (i) The course leader(s) or project leader(s) had an interest in the implications of the findings for informing improvement to their learning design when implemented with future groups of students.
- (ii) Other teaching staff, and those supporting them in their educational development work, needed to understand what worked and did not work in order implement, advise, and support future educational development activity.
- (iii) The scheme administrators and monitoring panel had an interest in what was being done with the funds allocated at project level, and the extent to which this represented 'value' in terms of outcomes and impact. But also, they needed to know if the grant scheme itself, through the funding of small scale development projects, was leading to any overall improvement in teaching practice and the learning experiences of students.

These different interpretations could potentially lead to inconsistency in the evaluation approach and its value to the range of different stakeholders. A meta-evaluation of projects funded by the grant scheme (Diercks-O'brien 2005) had also identified that existing evaluation practice, whilst useful at the project level for informing future action, was not leading to evidence of impact beyond the immediate context of evaluation. It was therefore *not* informing those responsible for the grant scheme about whether it was making a difference in the quality of teaching and the student experience at the institutional level. The problem was seen to be primarily due to the traditional formative and summative approach to evaluation. Summative evaluation was focussed on the extent to which the originally intended aims and objectives of the educational development project had been achieved, and the extent to which lessons learnt were being shared across the institution. With this emphasis the evaluation was insensitive to unintended positive outcomes and not really leading to understanding about how and why these outcomes were being generated. In relation to the previous discussion about Case 1, the feedback loops that were designed were inappropriate for the types of decisions that they needed to inform.

4.7.2. Using the Viable Systems model to clarify stakeholders' interests in the evaluation and their evaluation questions

In Chapter 3 it was argued that Beer's (1972, 1979) Viable Systems Model provides concepts with the potential to guide interpretive inquiry for generating data for different evaluation purposes. This includes the concept of recursiveness that focuses modelling on the connection between different levels of strategy. The aim of this section is to argue the relevancy of the model to organised learning activity, and to begin to illustrate how the model was interpreted and applied in the design of evaluation methodology for technology supported learning. Initially this was in clarifying the different stakeholders' interests and their core evaluation questions. Explanation of the model is used to illustrate how these questions were derived.

Beer's main condition for applying the VSM to organisation is that the organisation should be able to be conceptualised as autonomous in its own environment, or "*able to maintain a separate existence*" (Beer 1985, p1). This describes the particular relationship of organisation with its wider environment that enables it to survive. The model uses the concept of 'recursiveness', rather than hierarchy, to describe the vertical relationship involved in organisation. Each level of organisation is embedded in another model that replicates *exactly* the VSM pattern of organisation. The organisation that is the main focus of inquiry he calls the '*system-in-focus*'. In order to be considered viable this system-in-focus should be able to be conceptualised as a collective of lower

level viable sub-systems that *produce* it, not serve it, and it must also be conceptualised as *producing* the higher level model of organisation in which it is embedded. This is aligned with Singer's (1959) concept of producer-product relationship discussed in section 3.3.1.

Interpretation of the VSM in the context of organised learning activity

Case 2 was used as a context in which to test the application of the model. In this case, the questions exploring the relevancy of using the model were:

- (i) If an educational course is the system-in focus, can each individual learner be conceptualised as a sub-system of the course? For this to be the case they need to be considered as viable systems in their own right, and *produce* the course.
- (ii) Can the educational course be considered as *producing* the organisation in which it is conceptualised as being embedded?

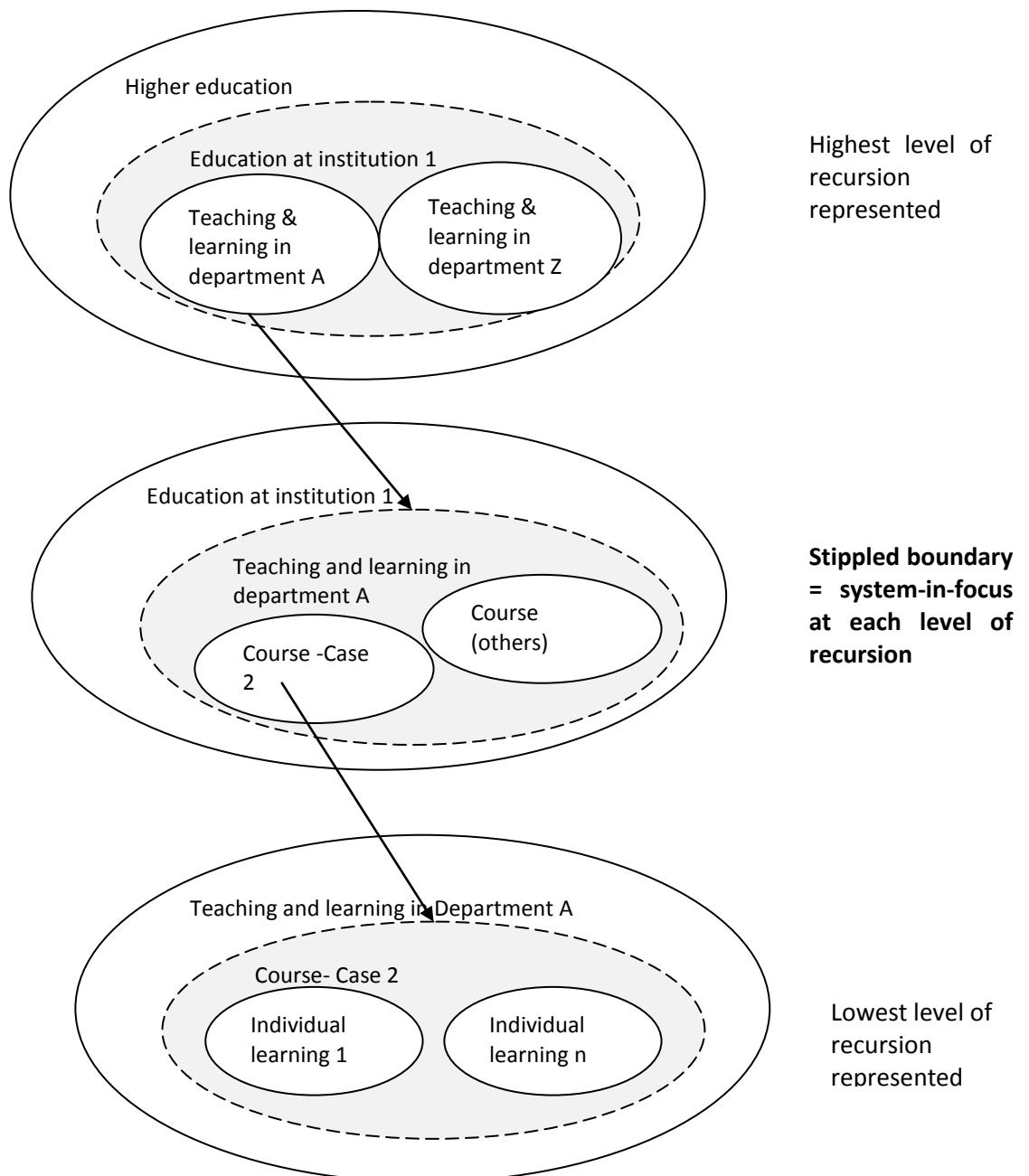
It was decided that individual learners *could* be modelled as viable systems. They could survive independently as learners without the need to participate in the Case 2 course. They could withdraw from this course at any time to join a different course. It would also be fair to say that the learners *do* produce the course, because it could not exist without their participation in it.

It was also decided that the course could be modelled as a viable system. It too could survive in its own right if all its components were transferred, in tact, to a department in the same educational institution, or in a different institution. Courses are considered as *producing* the higher level of educational organisation because without courses (or some other form of organised learning activity) the organisation would not be able to be modelled as an educational organisation. It would be an organisation with some other primary purpose, such as research.

In these courses the teaching activity and administration cannot be considered to be viable activity since they would have no purpose without the course and learners who actively participate in the course. They are conceptualised as service activities. How these service activities fit into the recursive model is discussed later.

Figure 4.7 attempts to diagrammatically represent the recursive nature of a course in an educational institution.

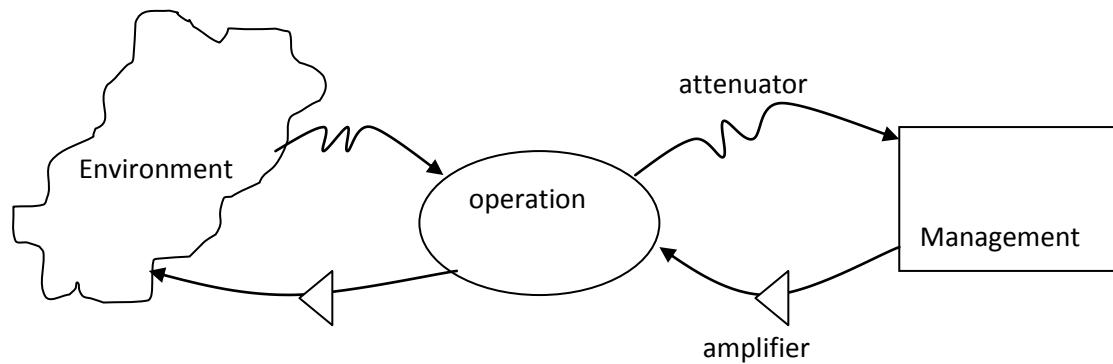
Figure 4.7: Recursive model of educational activity



It was explained in Chapter 3, that Beer (1985) intended the VSM to be used to help managers understand and model *variety* in the organisations they are managing. Comparing this variety at different times is intended to guide reflection on trends that help to reduce uncertainty about the consequences of their actions in particular circumstances. Figure 4.8 illustrates how Beer (1985)

conceptually separates operational activity (circle) from its management (square) and from the environment (the amoeboid shape) in which it is embedded.

Figure 4.8: Conventions used by Beer (1985) when representing information flow in the Viable System Model



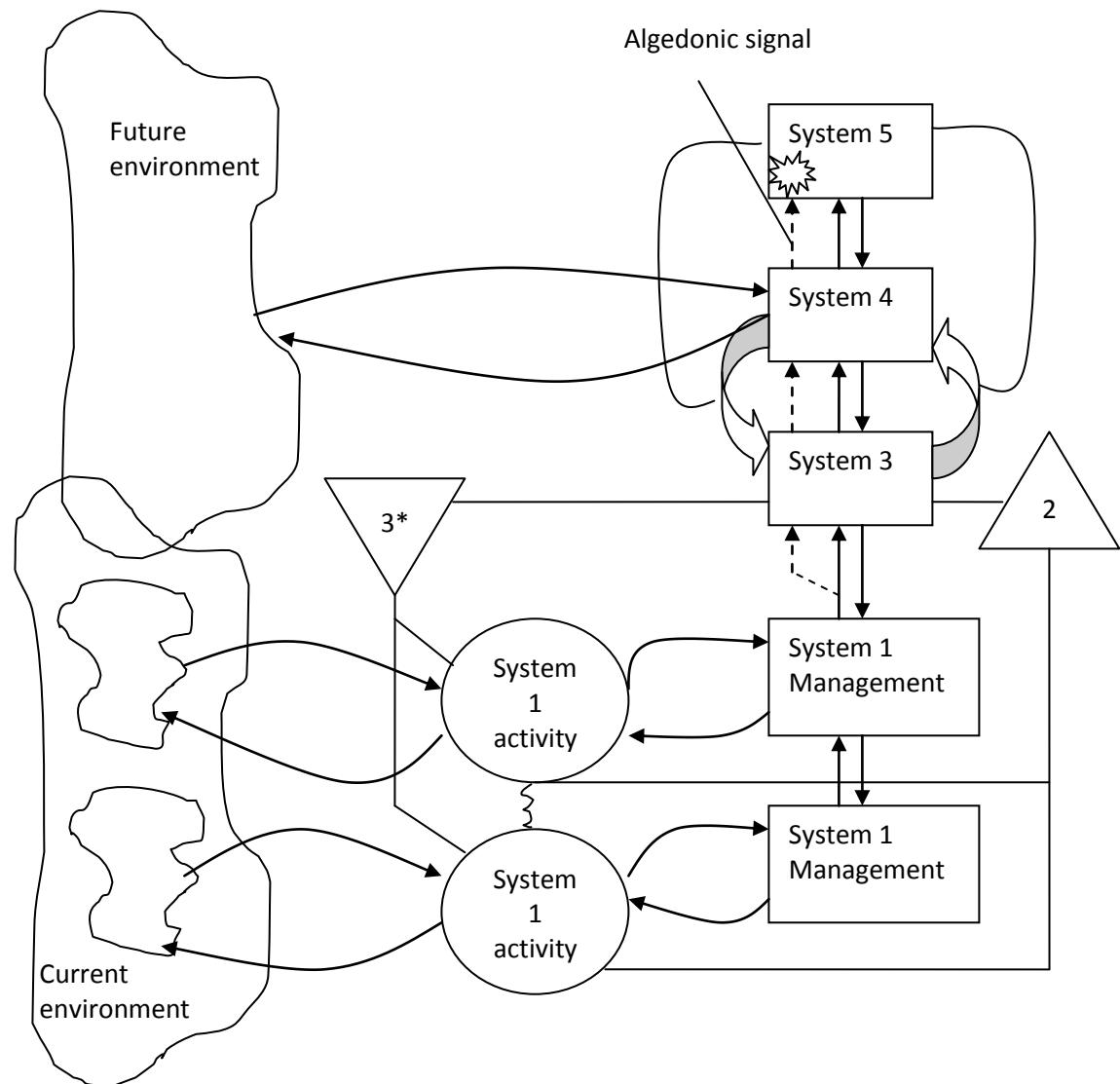
The variety or possible number of states of the operational process is *less than* the variety of the wider, more complex, environment in which it is operating. Variety becomes comparatively less in progressing from the environment of operation to the management of the operation. Change management involves designing interaction between these different elements to maintain stability. These interactions are represented by the following two concepts.

- (i) Managers *amplify* their own low variety with communication and action. They communicate their expectations of the operational process. In organised learning activity example communications might be about the expected learning outcomes, assessment criteria, communication protocols etc. Amplifying actions might include admitting learners with particular knowledge and experience to the process, or encouraging activity that appears to be helping learning.
- (ii) Managers reduce the variety of the operational processes they are responsible for managing through a process of *attenuation*. This involves being selective about information that will enable them to have a reasonable understanding of how their expectations are being translated in practice. It can also be helped by using information processing tools that can filter, summarise, aggregate and present information much more quickly than the human brain has the capacity to do.

Management must therefore have the ability to both limit the variety generated by the operational system (through its *amplifiers*) and understand the different states that are manifested by it (through its *attenuators*). Those involved in the operational process must also have a reasonable understanding of the variety of the process to respond appropriately to the amplifying information and actions of management. Organisation must therefore be designed in such a way to ensure that there is sufficient redundancy (or overlap) in communication and action throughout it for the variety of the operational activity to be managed.

Figure 4.9 is a simplified representation of the Viable Systems Model, showing the system components and their connectivity.

Figure 4.9: Viable System Model (Adapted from Beer 1985)



The model of the system-in-focus (the *course* in Case 2) consists of five sub-systems, labelled 1-5 in the diagram.

System 1s – the operational processes: In the generic model, these are semi-autonomous operational units, where autonomy is considered as “*freedom of an embedded subsystem to act on its own initiative, but only within the framework of action determined by the purpose of the total system*” (Beer 1985, p105). In the specific context of the organised learning activity of Case 2, the individual learners were considered to be these system 1s. Although the learner is described as a viable system, what is actually meant is *individual learning activity*, i.e. the individual learner’s approach to their own learning. The learners are autonomous operational units in terms of managing their own learning. However, in organised learning activity they rely on interaction with other learners, and this must be managed in some way for it to operate as intended by the decision maker, in Case 2 the course leader. Their collective action is guided by a framework communicated by this decision maker. They are also dependent on this decision maker for the allocation of resources. As a consequence, they are also accountable to this decision maker for the effective and efficient use of these resources. In Case 2, examples of resources were the technological hardware and software required to support the planned learning activities, and time allocated for facilitation of collective learning activity. Using Churchman’s (1971) systems constructs, whilst what constitutes effectiveness and efficiency is understood to be defined by the decision maker, this is open to different interpretation by the various actors involved. Hence in Case 2, application of the VSM made no assumption that the learners *would* act in accordance with the course leader’s chosen model for the course. It was assumed that the learners would take independent responsibility for their learning and participation in organised learning activity. Therefore the activity of these system 1s is that which works towards the purpose of the system-in-focus.

System 2s – co-ordination and service processes: The intended function of system 2s is to ensure the system 1 components operate coherently to maintain the stability of the system-in-focus. These functions are not the same as roles. They also operate within a framework determined by the decision maker. They exist only to perform services for system 1s, which may be served by more than one system 2.

Examples of service functions for learners participating in a course such as that of Case 2 were taken to include providing information about how learning activity is organised and expected to be undertaken, developing and enforcing communication protocols, and facilitating the learners' participation in learning activity and interaction. These kinds of activities would be undertaken by the course leader through his teaching practice. Other examples of co-ordinating activity in an educational context are timetabling of classes, and implementing policies for learners' to access limited learning resources, such as library books, laboratory space and equipment. The learners will also have some responsibility themselves at this level for ensuring the coherency of their actions towards achieving the intended educational outcomes, for example by reading or listening to communications, and attending and participating in learning activities.

System 3 - Management control and audit: This management function is responsible for inquiry into and making decisions affecting the current and internal environment of the system-in-focus, or what Beer (1985) calls the '*inside-and-now*'. It engages with system 1s in the strategic planning and is responsible for communicating operational requirements to systems 1 and 2 and making resources available to them to enable their coherent, purposeful activity. It also monitors the activity and outcomes of these systems to ensure the effective and efficient use of resources. This management function incorporates parts of both the 'decision maker' and 'designer' roles as described by Churchman (1971), and was envisaged as being undertaken by the course leader in Case 2.

Beer (1985) calls the interaction between systems 1 and 3 the *resource bargain*. In Case 2, this would determine the extent to which the learners could be autonomous in their learning. Whilst individual learners are responsible for their own learning, they are provided with access to resources for organised learning activity e.g. facilitation of interaction and participation, artefacts that might stimulate or inform discussion or collaborative work, and technology supporting the process. The System 3 manager responsible for allocating resources to systems 1 and 2 are enabled or constrained in this by resources provided to them by managers at the next higher level of recursion, which in Case 2 is an academic department of the University. However, they can inquire into the extent to which these resources are adequate and effective for the purposes allocated, and provide the results of their inquiry to managers at the higher level of recursion.

System 1s are *accountable* to System 3 for how resources allocated to them are used. This could be illustrated by learners in Case 2 fulfilling their responsibility in the resource bargain by

participating in learning activities, making use of appropriate resources etc. The routine and regular monitoring of compliance with this resource bargain is handled by System 3* (three-star).

In summary, the System 3 manager for organised learning activity would be responsible for:

- communicating to the learners and service functions (including learning facilitators) the intended educational aims and outcomes and teaching, learning and support activity required to achieve these;
- monitoring that activity is operating effectively and efficiently towards intended aims and outcomes;
- monitoring that the service functions (system 2s) are effectively and efficiently co-ordinating learning activity;
- monitoring that the allocated resources are appropriate for helping learners and service functions to work towards their intended aims;
- providing information to learners and service functions about potential corrective action if the organised learning activity is not operating effectively.

Management inquiry at this level is equivalent to organisational learning that Argyris and Schön (1978) called single loop learning. It seeks information about the extent to which the organisation is operating and is effective in accordance with *existing* values and norms, but does not question or lead to change in these norms and values. In Case 2 this would involve seeking information about:

- a) system 1s and 2s' operation from their participants' perspectives. This would include students' satisfaction with teaching, learning resources, and co-ordination of learning activities. It will also include the learning facilitator's perceptions of student engagement with the learning activities.
- b) students' fulfilment of the resource bargain (e.g. attendance, participation, completion of required work etc).
- c) students' achievement of the expected outcomes of their involvement in the learning activity. Evidence for this might be available through formal and informal assessment.

Examples of corrective action needed as a result of this monitoring activity might include the allocation of additional resources, re-designing learning activities, exclusion of some learners from the group learning process, providing additional help and support to some learners.

In addition to exchanging information with systems 1 and 2, System 3 is also responsible for exchanging information with systems 4 and 5. For example, it is responsible for keeping System 4 informed about which model of organisation is being implemented and its effectiveness in practice.

System 4 – System analysis/modelling : This management function is responsible for monitoring the external environment and looking to the future, or what Beer (1985) calls the ‘outside-and-then’. It is concerned with overall awareness and understanding of the trends in internal operation in relation to relevant needs of the wider external environment that the operation is attempting to meet, or could potentially meet, and that guarantee its sustainability. Inquiry at this level is equivalent in organisational learning terms to what Argyris and Schön (1978) described as *double loop learning*, in that it leads to understanding about how the norms and values of the organisation are influencing its operation, and can inform the negotiation of their redefinition. This requires modelling what is currently happening, and comparing this to alternative models of how the process could be improved to meet external and future needs. The purpose of the system-in-focus and the approach to organising activities and resourcing these activities are therefore being questioned. Models are communicated to the System 3 manager to make them aware of the need for change. This System 4 function is equivalent to part of the ‘designer’ role described in Churchman’s (1971) systems constructs.

For organised learning activity, the System 4 function will be interested in trends in internal operation, such as how learners’ experiences and their learning are changing with time. External information needed might relate to how the needs of future learners may differ from those currently involved in the activity, how changes in institutional or organisational policy will influence the activity, how changes in a knowledge domain need to be accommodated, and what is being learnt from other organised learning activity about good pedagogical practice and the use of technology in supporting learning.

A further function of System 4 is to alert System 5 of any major failings which require System 5 intervention, for example if it appears that the activity is no longer feasible and must be discontinued.

In Case 2 this function could be considered to be partially undertaken by the course leader, in terms of the learning design. However, the evaluator also plays a part in undertaking this function by designing and undertaking the evaluation inquiry that influences decisions about changes to the design of the learning activity.

System 5 – ultimate level of responsibility and decision making: This system is responsible for:

- a) the prevailing ethos which frames the values and norms for the system-in-focus, through its communications with systems 3 and 4.
- b) dividing resources appropriately between system 3 and 4 to maintain stability of the system-in-focus. This is not the same as being static. The aim is for the rate of change to be manageable, and the direction of change to be that of improvement.
- c) any interventions other than (a) or (b) are undertaken *only* in the case of major systems failure.

It monitors the effectiveness of its decisions and actions through the models provided by System 4, and communicates progress in achievement of purpose to the system at the next highest level of recursion. In Case 2, the next highest level of recursion could be considered to be the academic department in which the course was based, since this was in overall control of the majority of the resource available for the course and decisions about the viability of the course and whether it should continue to be resourced in the future.

All five sub-systems are interdependent on each other for the effective operation of the system-in-focus.

Core evaluation questions derived from VSM

The discussion of the interpretation of Viable Systems Model attempted to demonstrate how it provides concepts that help to model the relationship between different management functions involved in organised learning activity. The level of detail provides greater clarity about the purpose of communication and action between the different actors undertaking roles in operational activity, planning, inquiry and decision-making as conceptualised by Churchman (1971).

As illustrated by Case2, evaluations of a particular context are often undertaken with multiple clients and purposes. An example is a project evaluation, which may need to inform the decisions

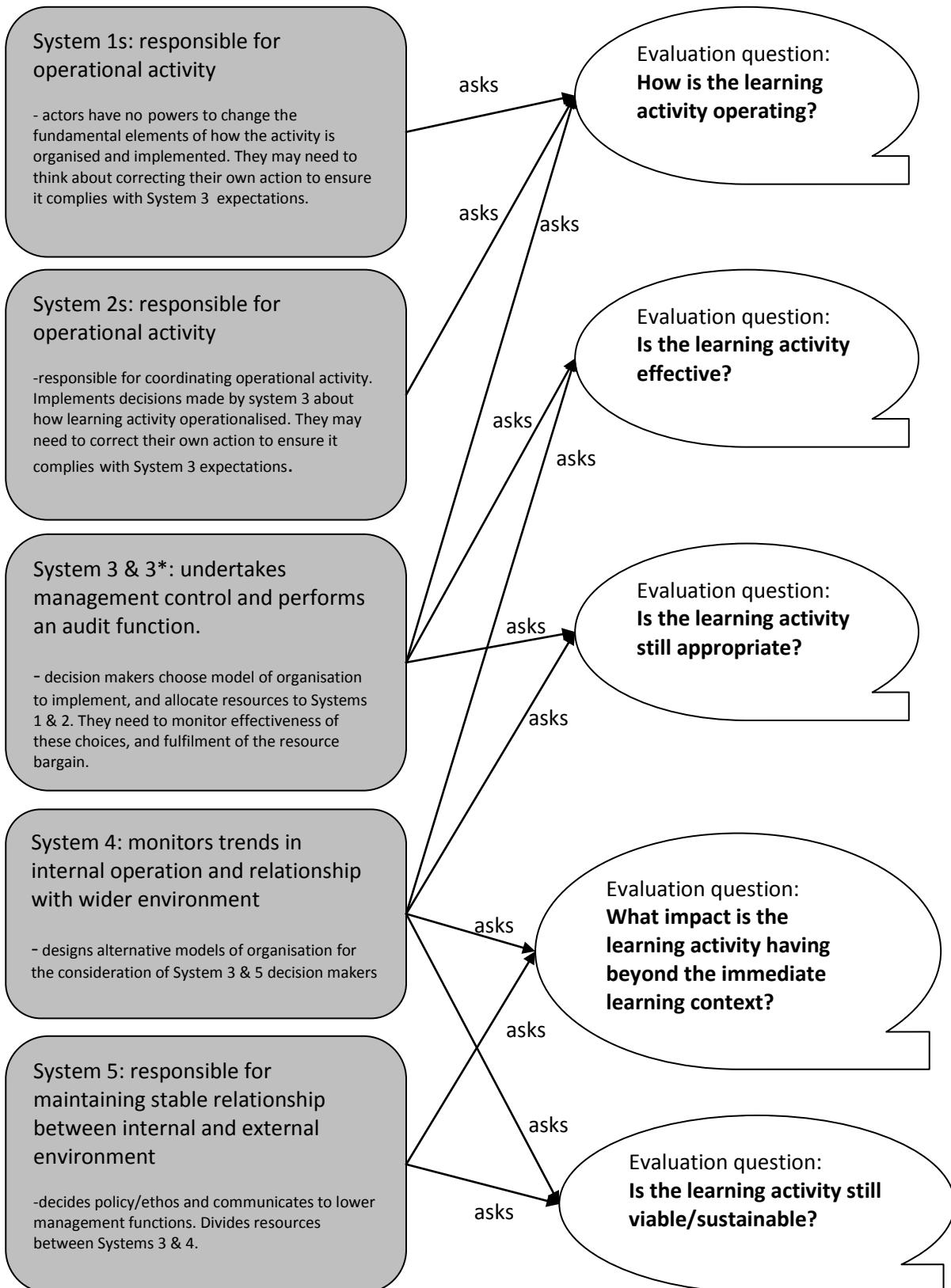
and actions of the project managers. Where these projects also form part of much broader programs of intervention, relevant information may also need to be collected at the project level to inform the decision and actions of program managers. The model provides concepts that help those designing evaluation to visualise these complex connections.

In terms of the informing the design of evaluation methodology, the VSM helps to clarify:

- where various stakeholders might fit into the model of organisation;
- their roles and relationships in the organisation;
- information flow between them to ensure the stability of the organisation.

The model is therefore helpful in pointing towards key evaluation questions that these different stakeholders will be interested in asking that will guide the collection and synthesis of evaluation data. Figure 4.10 (next page) summarises these interests. The figure also illustrates how the concept of redundancy translates to the evaluation inquiry, in that each of these questions is of interest to more than one of the different management functions.

Figure 4.10: Relationship between VSM management functions and their evaluation questions



4.7.3. Use of VSM to frame data generation and synthesis in the evaluation

Where section 4.7.2 discussed how the VSM was used to model feedback loops between stakeholders with different evaluation questions, this section explains how it was also used to model some of the more general issues relevant to answering these questions in technology supported learning.

The VSM suggests that stability of the conceptualised system-in-focus is achieved by a natural tendency towards convergence and compromise between the purpose of the system-in-focus and the purpose of the organisation conceptualised at the higher level of recursion. This depends on a process of negotiation, which Beer (1985) argues is the inevitable result of the viability of the System 1s. If Case 2 is taken as an illustration, then the learners (system 1s) can choose to opt out of the course to join a different course. The course leader can choose not to admit learners to the process, or to exclude some under certain conditions. There has to be negotiation between them for the course to survive. This process of negotiation involves information flow between the various stakeholders. The decision maker's amplifying communication and action reflects their strategy or 'theory of change' for achieving the intended purpose of the learning. Attenuating feedback provides information relevant to evaluating their implemented strategy and the progress with this purpose.

In addition to the concepts of variety, attenuation and amplification, Beer (1985) provides further concepts useful for understanding and modelling information flow across feedback loops. These are:

Channel capacity: Beer (1985) describes this as the quantity of data or information that can be exchanged across one of the communication channels in a specified amount of time. In order to be of value, reporting information (attenuation) needed to inform managers' action (amplification) must be timely. The channel capacity therefore needs to be appropriate for conveying the necessary information or data about variety. In the example of Case 2, learners needed to have the prior knowledge, skills and experience to enable them to engage in the designed learning activity and communicate with the other students and the course leader. Knowledge of Chemistry would be irrelevant for this purpose in this context. In order to be able to convey to the course leader what they have learnt through their independent study and group project work, students

must also be able to communicate this in their seminar discussions and assessment much more quickly and concisely than the actual learning process.

Transduction: Beer (1985) uses this concept to describe the effectiveness of communication across the communication channels. This depends on communication being interpreted by a recipient in the way intended by the communicator. In practice this does not always happen, and is a potential cause of organisations not operating in the way intended. In organised learning activity, learners may be provided with a curriculum and some stated learning objectives, but these will be ineffective if they do not understand the information. Example choices that managers might face about maintaining stability in this situation would be whether to make information available in the different first languages of learners who would like to participate in the course, or whether to make the resources available in only one language, and admit only those learners able to communicate with this language.

Redundancy of communication/information: In order for organisations to learn and adapt to a changing environment interactions between operations and management must be dynamic and continuous. This depends on information flow being appropriately distributed between the different management systems (1-5), in the following way:

- (i) balance between the horizontal and vertical variety of the organisation. In organised learning activity, the horizontal variety is the variety generated by the bringing together of different learners involved in the group activity and caused by their collective learning activity in the learning environment. The vertical variety is the capability of management to match this through the coherent activity of the different management functions, and as a result of the redundancy between these management functions.
- (ii) appropriate balance between the variety handling capacity of systems 3 and 4, so that change is introduced at a rate that will not cause the organisation to become unstable.
- (iii) System 5 handling any residual variety that is not already being dealt with by the other managerial functions and to 'close the loop' of the logic of the model, so that it meets the self-referential criterion for a viable system. This is done by the other systems alerting system 5 if there is some problem with the organisation that they do not have requisite variety to handle.

Relevancy of communication/information: The theory discussed so far assumes that it is appropriate for management to handle *all possible* variety that is manifested by an operational

process. This is not the case. If the purpose of organised learning activity is to lead to some transformation in knowledge or skills of the learners, then some information about its variety may be of no relevance to this transformation. For example, in virtual learning environments, what the learners are wearing or look like may be irrelevant if the learners cannot see each other. This may not necessarily be the case in face-to-face learning activity where they may be influenced in their communications with each other based on their visual perceptions of identity. It is these kinds of judgments about relevancy or irrelevancy that need to be made. Attenuators and amplifiers must be relevant to the purpose of the system. Beer (1985) suggests that deciding relevant attenuators and amplifiers is not easy because the purpose of the system-in-focus is usually imposed from the organisation at the next highest level of recursion. This may lead to transduction problems in the communication and interpretation of this purpose, which means that the actions of those involved in implementing it, intentionally or unintentionally, may not be aligned with this purpose.

In order to develop methodology for technology supported learning it was necessary to generate and test some initial ideas about what feedback would be relevant to inform the different stakeholders' evaluation questions.

This was done by undertaking what Beer (1985) describes as 'homeostatic loop analysis' for the system in focus. He uses the term 'homeostatic loop' to describe the interaction involved in each 'system' relationship in the VSM . Each homeostatic loop is a means of conceptualising the negotiation on which the stability of the relationship depends. Feedback loops for Case 2 were therefore initially modelled using this approach. The modelling process was informed by documents produced by the course leader for Case 2 about his planned change initiative, and subsequent dialogue around this information. My interpretation of this was influenced by my (substantial) experience as a learner, some (limited) experience as a teacher, and theory explored in the literature review.

The models that were generated and tested in Case 2 are shown in figures 4.11a -e .

Figure 4.11a: Homeostatic loop analysis for interaction between systems 1-2 in organised learning activity

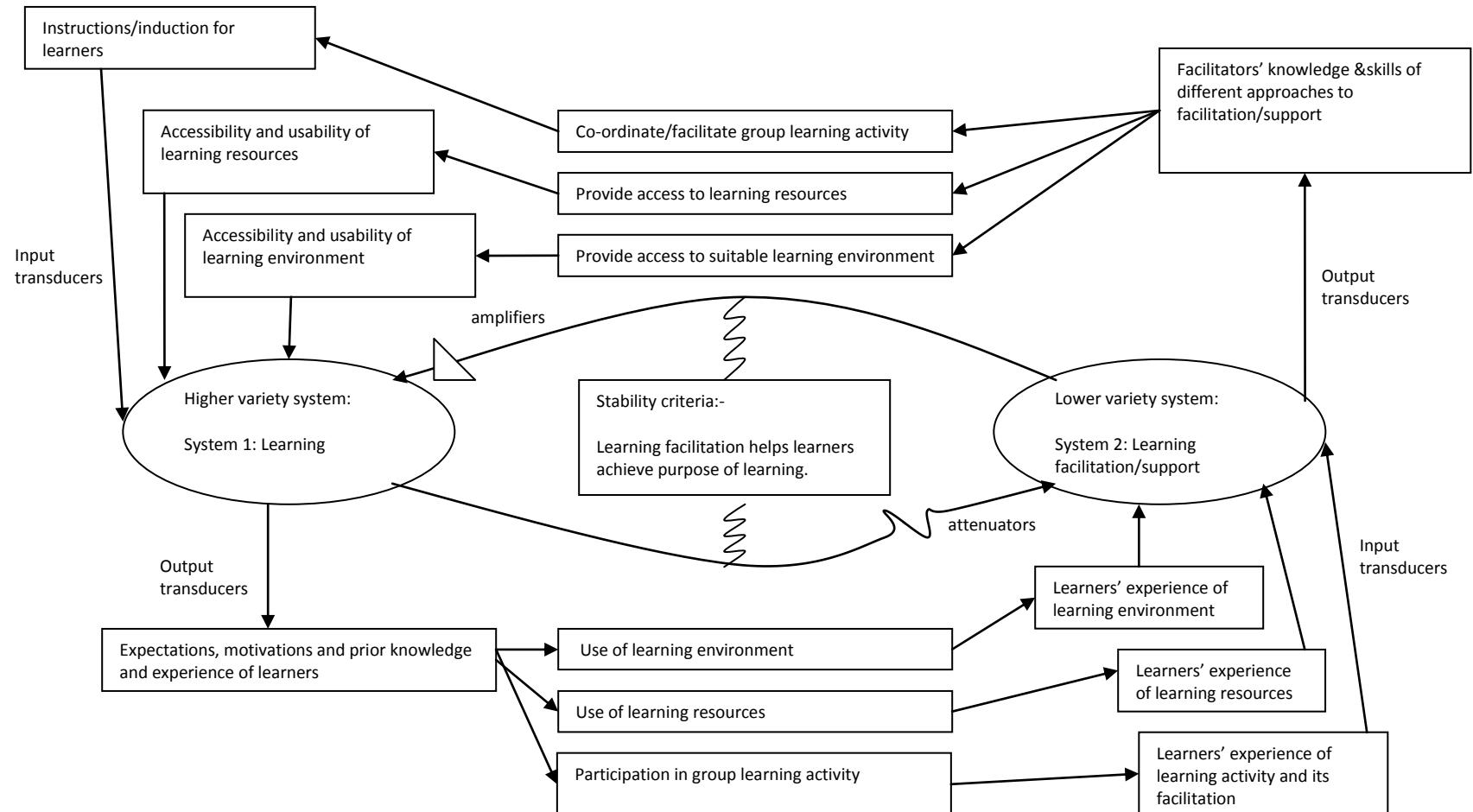


Figure 4.11b: Homeostatic loop analysis for interaction between systems 1-3 in organised learning activity

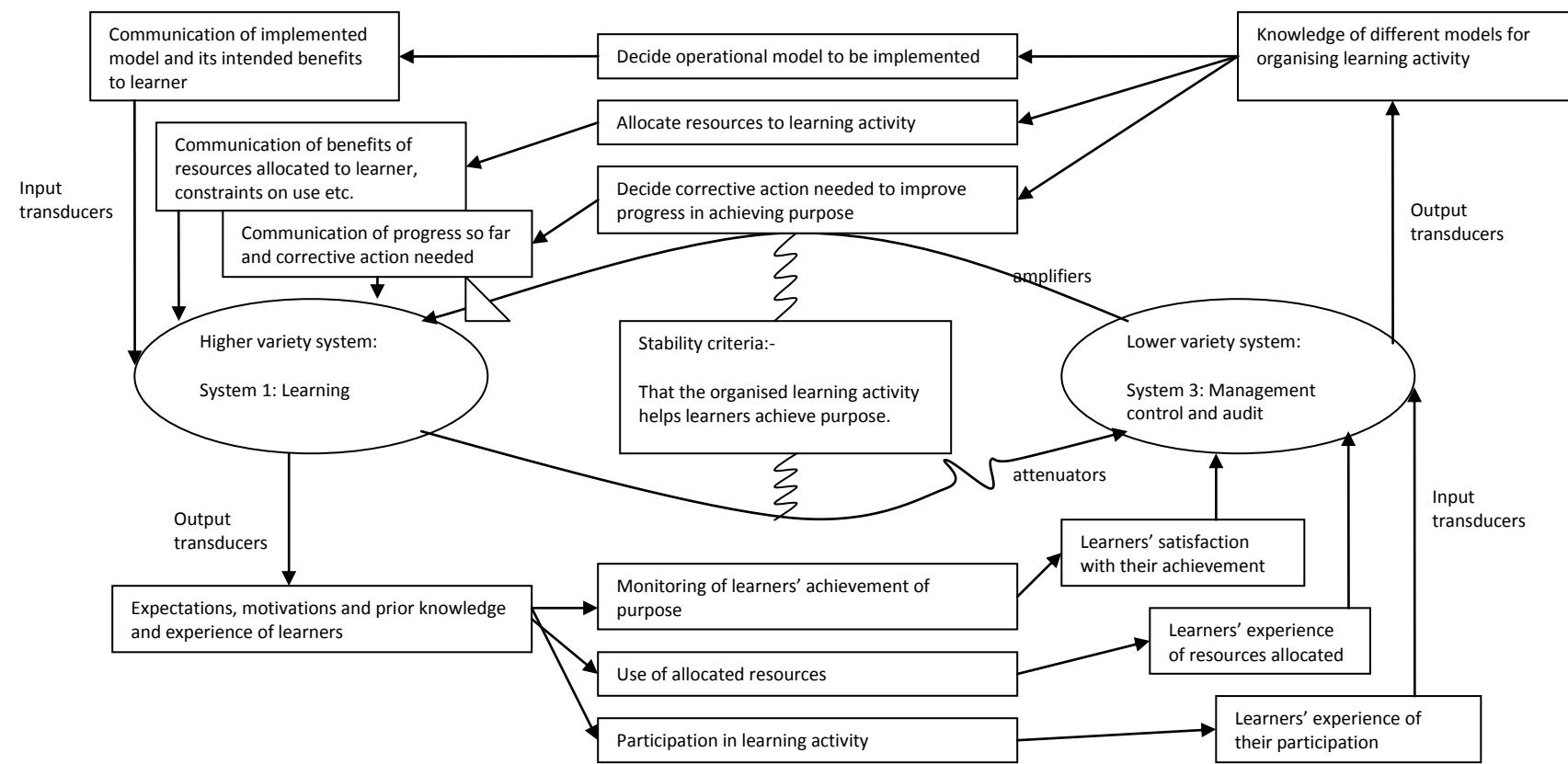


Figure 4.11c: Homeostatic loop analysis for interaction between systems 2-3 in organised learning activity

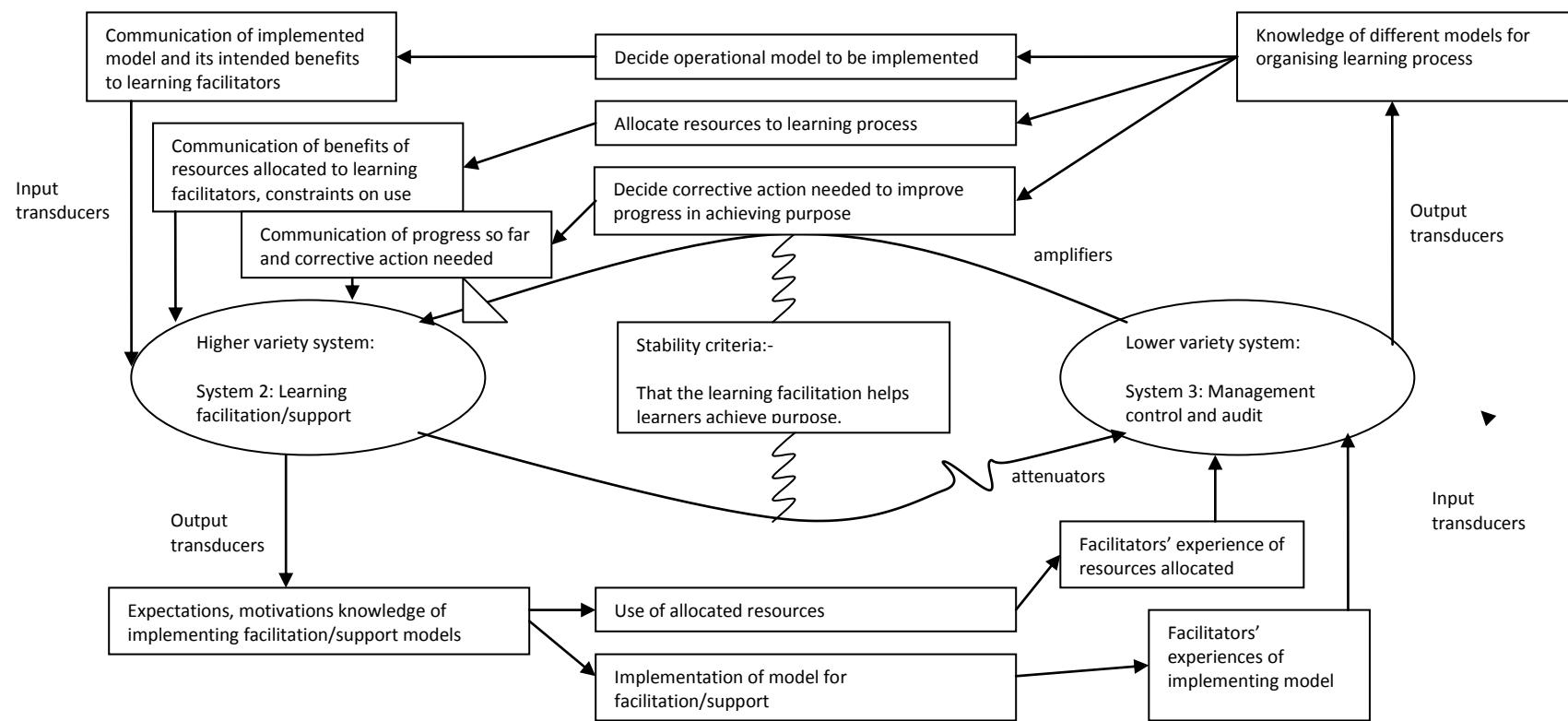


Figure 4.11d: Homeostatic loop analysis for interaction between systems 3-4 in organised learning activity

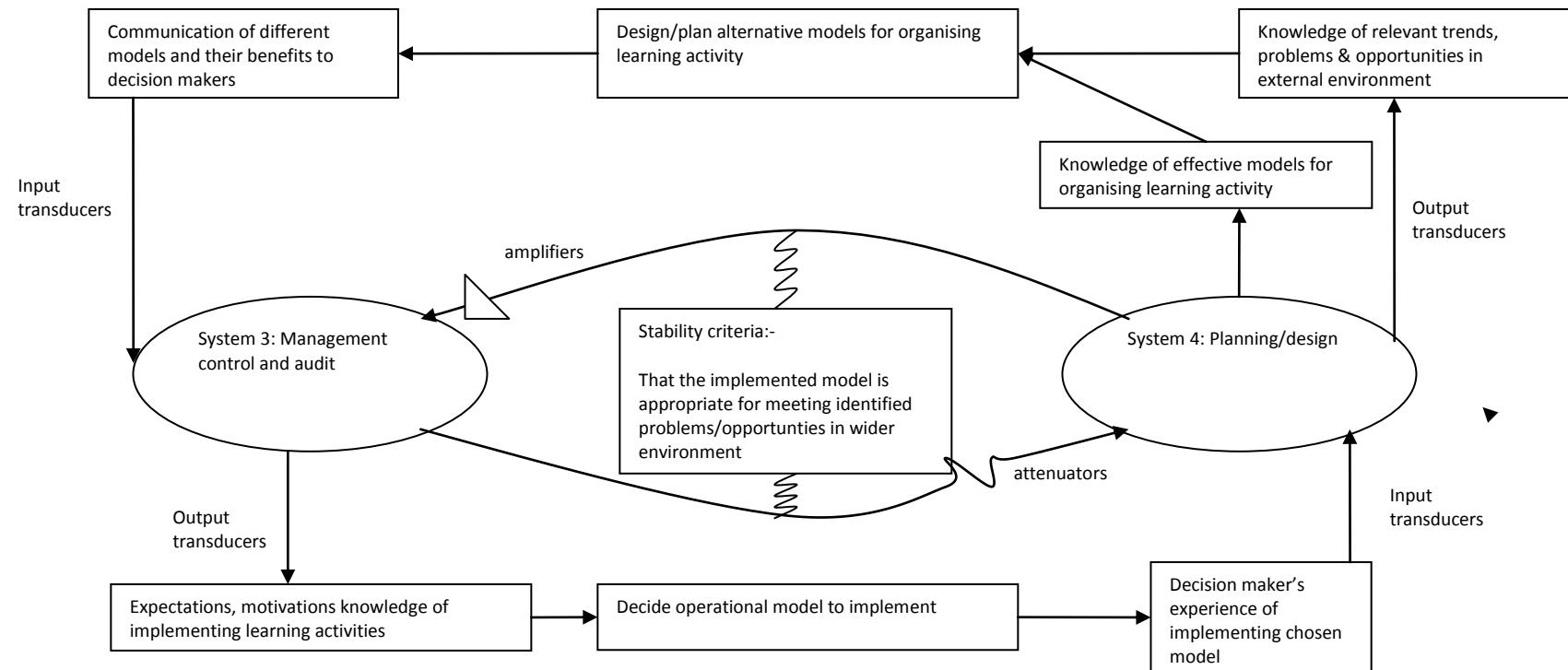
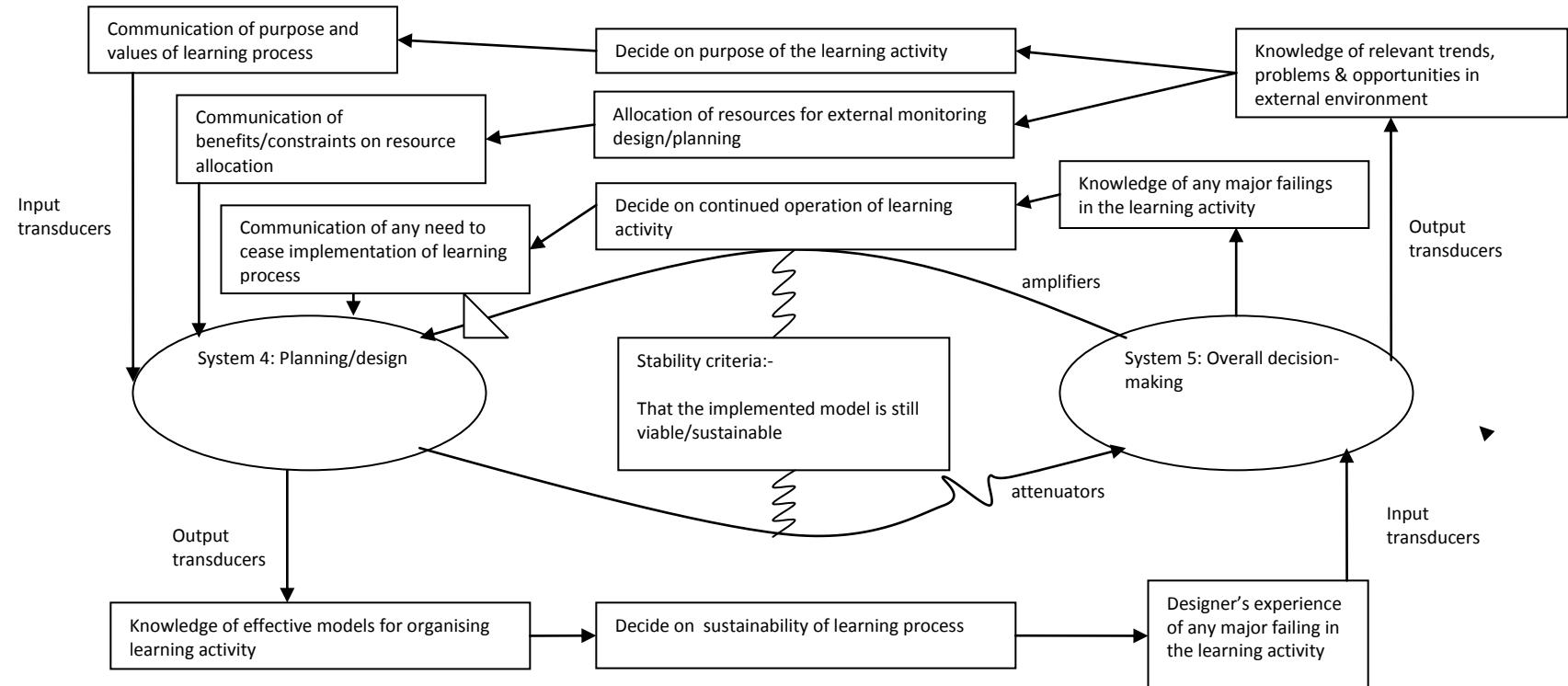


Figure 4.11e: Homeostatic loop analysis for interaction between systems 4-5 in organised learning activity



By conceptualising the stakeholders as fulfilling functions of the different VSM sub-systems it is possible to model how information might flow between these stakeholders. For example, an interpretation of this homeostatic loop analysis in figure 4.11a is that the action and communication of those facilitating the learning and providing the necessary support to learners is affected by their mental constructs of what is required and their own prior knowledge and skills. These are represented by the output transducers, effectively the facilitator's interpretations that inform the rationale for their communications and actions. The facilitator's communication and action is in turn interpreted by learners according to their individual expectations, motivations, knowledge and experience. These interpretations inform the learners' rationales for their activity. Information about their experiences of these actions is collected by learning facilitators and interpreted by them to inform their future interventions.

This homeostatic loop model was therefore useful in highlighting in relation to key stability criteria associated with stakeholders' questions about issues such as effectiveness, efficiency, impact, viability and sustainability:

- (i) whose communications and interpretations were important to explore;
- (ii) potential issues of relevancy about which data should be generated.

Table 4.2 summarises the key evaluation questions (derived from the different evaluation purposes associated with the different management functions of systems 1-5) and the information considered relevant to answering these questions derived from the homeostatic loop analysis of the system interactions.

Table 4.2: Relationship between evaluation questions and relevant feedback

Questions that guide inquiry into the stability of the 'system'	Sub-system interactions	From different stakeholder perspectives, information needed about....
How is the learning activity operating?	Between systems 1&2 and 1&3)	Prior knowledge and skills of learners, and their motivation and expectations, i.e. those issues relating to the relevancy of the purpose of the learning activity to learners' needs
		Learners' participation in and engagement with learning activity
		Learners' access to and use of resources (including facilitation, technology, other support)
		Learners' access to and interaction with the learning environment
	Between system 2&1	Learning facilitators' communication and action aimed at motivating and improving learner participation and engagement (with learning activity/resources/environment)

	Between systems 3&2 and 3&1	Communication to learning facilitators and learners about the learning design and allocation of resources for implementing it
		Feedback to learners about their progress and achievement and corrective action needed
		Feedback to learning facilitators about how their communications and actions could be improved to improve the learners' experience and achievement
Is the learning activity effective?	Between systems 1&3	Outcomes of learning activity (for learners)
		Factors in the implemented learning design that are positively and negatively affecting the learners' experience and achievement
	Between systems 2&3	Outcomes of learning activity (for learning facilitators)
		Factors affecting learning facilitators' abilities to undertake their role
		Influence of feedback to learning facilitators on the support for student learning and hence on their experience/achievement
	Between systems 1&3, 2&3, 3&4	Other outcomes, unintended outcomes
		Factors affecting learning management/other outcomes
	Between external and system 4	Influence of the activities beyond the immediate learning context
		Factors influencing this impact
Is the learning activity still appropriate?	Between systems 3&4, External &4,	Trends in how the learning design is experienced by participants, and the factors influencing this experience
		Trends in intended and unintended outcomes
		Trends in relevancy of the purpose to learners' needs (learners' motivations and expectations)
		Problems and opportunities both internal and external to the learning context
		Stakeholder perceptions about improvement needed to the learning design
Is the learning activity still viable/sustainable?	Between systems 3&5, 4&5	Resources allocated for learning process across all sub-activities
		Resources used
		Resources needed for the future operation of chosen learning design (with desirable and feasible improvements)
		Benefits being achieved for different stakeholders

This table provided a framework for guiding data generation and synthesis in the context of Case 2. Feedback from the course leader about the relevancy of the information generated by

the evaluation of this case was that “*I’m very impressed and I think you really get to the heart of the matter*”. It was concluded that the VSM had been useful in helping to model issues of relevancy to the evaluation, at least to the main decision maker for this case.

More detailed information about how it was used to design a data generation strategy for Case 2 is given in Appendix 2. The appendix also presents some of the data generated and its interpretation to justify the conclusion about the approach leading to relevant information. Although the modelling process proved useful for identifying some initial ideas about issues of relevancy for data generation in context, these ideas were later developed into a more useful framework for guiding data generation and synthesis (see section 4.7.4).

4.7.4. Using theories of change to integrate data generation and synthesis

In the discussion about learning and knowledge in Chapters 2 and 3 it was suggested that learning is the result of two interdependent processes of *analysis* and *integration* (Polanyi 1961, Ackoff 1981). Knowledge is developed as the focus of attention iteratively shifts between the detail of a subject of interest, and how this detail comprises the whole. Hence analysis “*proceeds from a recognition of a whole towards identification of its particulars*” and integration “*proceeds from the recognition of a group of presumed particulars towards the grasping of their relation as a whole*” (Polanyi 1961, p125).

Barton and Haslett (2007) differentiate these two processes by stating that “*Synthesis [] provides understanding of purpose by putting things into context while analysis provides explanations of how things work*” (Barton and Haslett 2007, p152). They also draw attention to an important role of systems thinking in theory building about change processes, that of framing the dialectic between analysis and synthesis (see also Ackoff 1981). The effective integration of these two processes has the potential to address some of the identified problems with existing theory-based evaluation, i.e. failure to develop any more than understanding of the implementation theory (prescriptive dimension). Particularly it has already been noted that the Theory of Change approach emphasises the role of a theory of change in framing analysis, at the expense of its role in synthesis (see section 2.5.5).

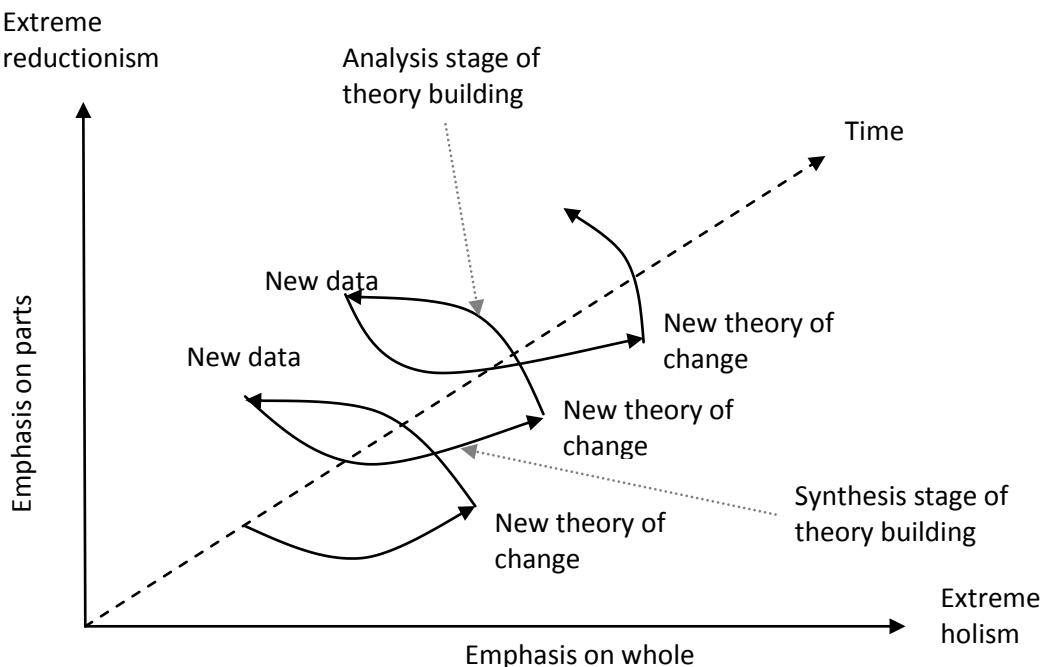
In the context of Case 2, the relationship between the evaluation questions and data/information used to answer these (as shown in table 4.2) was used as a ‘general’ framework to guide the generation and synthesis of data. This guided the contextual decisions about data generation and the synthesis of the data into some meaning about overall success of the project. However, this framework was not particularly usable for engaging stakeholders in discussions about the contextual data/information needed to help them understand the progress being made with their change strategies.

A process was therefore envisaged whereby systems modelling of practitioners' theories of change would provide a frame of reference for:

- (i) the reductionist stage of theory building. This guides data generation to explore the various perspectives on the components of a change strategy and their relationships.
- (ii) the integrative stage of theory building. This helps to endow meaning on the data in relation to the intended strategy.

This process is iterated with each implementation of an action research cycle, and is represented in figure 4.12.

Figure 4.12: The dialectic between analysis and synthesis (adapted from Barton and Haslett 2007)



Use of systemic logic model to represent a theory of change

One of the key problems for operationalising a systems methodology was how to visually represent stakeholders' theories of change:

- (i) to provide a frame of reference for the processes of data generation and synthesis;
- (ii) to make this frame of reference transparent to others, so that they are able to judge its relevancy to the context and the credibility of conclusions drawn from the inquiry.

In Chapter 2 the logic model was described as a tool intended to help stakeholders communicate about the boundary decisions being made in relation to the context of an evaluation, in particular to focus on intended outcomes and their relationship with activities, resources and other organisational influences considered necessary for generating outcomes relevant to the purpose of the activity. Table 4.3 highlights some of the benefits that proponents suggest can be derived from their use at different stages of evaluation activity (Kellogg Foundation, 2004).

Table 4.3: How logic models better position programs toward success (from Kellogg Foundation 2004)

Program elements	Criteria for program success (from Wholey <i>et al</i> 1994)	Benefits of program logic models (from Barley <i>et al</i> 1998)
Planning and design	Program goals and objectives, and important side effects are well defined ahead of time.	Finds gaps in the theory or logic of a program and works to resolve them.
	Program goals and objectives are both plausible and possible.	Builds a shared understanding of what the program is all about and how the parts work together.
Program implementation and management	Relevant, credible and useful performance data can be obtained.	Focuses attention of management on the most important connections between action and results.
Evaluation, communication and marketing	The intended users of the evaluation results have agreed on how they will use the information.	Provides a way to involve and engage stakeholders in the design, processes, and use of evaluation.

However, some of the criticisms of the original approach to logic modelling highlighted in Chapter 2 were the tendency to a linear representation of the impact of activities on outcomes and its rigid application, leading Rossi *et al* (2004) to recommend that those using it do not aim for perfection in the articulation, and that it be revisited regularly. Julian *et al* (1995) discussed how the model can be adapted to represent open systems by including a column to summarise the relevant wider contextual issues. Summarising Churchman's (1971) constructs in a similar kind of format, as shown in table 4.4, helps to highlight the relationship between these constructs and the fields used in the logic model adapted for use as a tool for reflection in this research, and shown in table 4.5.

Table 4.4: Summary of the anatomy of a conceptual system 'S' (interpretation from Churchman, 1971)

Current state of stability	Environment and resources	Component activities	Measures of performance	Purpose
Trends and relationships within the internal environment, and between the internal and external environment, which may influence the <i>designer's</i> alternative models of 'S'. Reducing uncertainty in the models relies on sufficient stability in the implemented organisation for a <i>process of inquiry</i> to identify trends and relationships.	The environment in which component activities take place, and which may exert conditions which enable or constrain the activities. It can also be changed by the activities. Resourcing activities is under the control of a <i>decision maker</i> .	Component activities which together achieve the purpose. How these are undertaken will depend on how the <i>actors</i> involved interpret their <i>purpose</i> , <i>client</i> and <i>measures of success</i> , and other influences on their motivation. This may also depend on the extent to which they are involved in negotiating the meaning of success for 'S'. Organising these activities is under the control of a <i>decision maker</i> , following the advice of the <i>designer</i> .	Assumptions about what constitutes progress in relation to the purpose. These are decided by the <i>decision maker</i> , following the advice of the <i>designer</i> . But other <i>stakeholders</i> , such as <i>actors</i> and <i>clients</i> may have different assumptions. The <i>decision maker</i> will also have control over the extent to which other stakeholders' assumptions are considered in their decision making process.	The transformation effected by the activities. This should meet the needs of <i>clients</i> . The actual transformation achieved may be different to that intended by the <i>decision maker</i> . This depends on the contribution of actors to the component activities.

Table 4.5: Logic model representation

Current situation/ Need for change	Resources/ Enablers	Activities	Outcomes	Longer term aspirations	Anticipated longer-term and wider impact

Using a logic model to describe a theory of change provides a summary of the narrative for the change process. It starts with a description of the rationale for change (what Ackoff (1981) considered as ‘threats and opportunities’). This may be driven by influences both from the internal and external environment. The far right hand column describes the intended transformation, or purpose of the activity in terms of the impact relationship with the wider environment. Working backwards from right to left are the longer term aspirations describing progress towards the longer term and wider impact, but not necessarily achievable in a defined period for intervention. The outcomes describe the expected change achievable by the end of a defined period of specified intervention activity. Hence these represent the different types of ‘ends planning’ that Ackoff (1981) stated were necessary in systemic planning processes, but which he thought were rarely seen in practice (see section 3.3.1). The activities, resources, and enablers are intended to describe the key components needed to achieve these outcomes (corresponding to the ‘means’ and resource planning referred to by Ackoff (1981)).

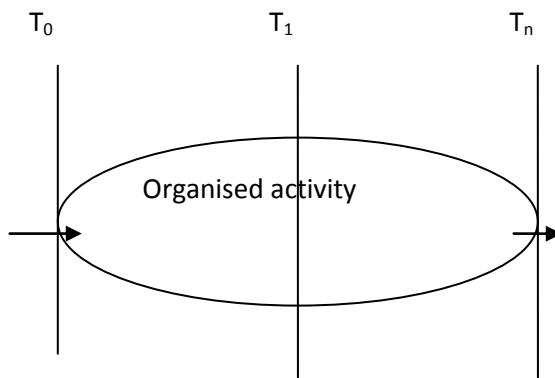
The theory of change representation is not intended to make assumptions about linear, unidirectional logic of action and its effect on outcomes or a 1:1:1 relationship between components. It is intended to be interpreted as representing a more complex relationship between components. For example, the availability of a particular resource may influence the ability to undertake one or more of the activities envisaged, and particular outcomes may be thought to be dependent on more than one of the activities being undertaken. The inquiry accepts that outcomes are influenced by the way these are organised together, and may be influenced by enablers and constraints from outside the immediate context. It is also assumed that the activities

will be having an impact on the wider internal and external environmental conditions, which will change the conditions in which the organised learning activity is operating. Exploring relationships different stakeholders perceive between these becomes the focus of the inquiry.

The terms ‘enablers and resources’ are used in the model to reflect its description of a strategy for *desirable* change. Developing a change strategy requires consideration of perceived barriers and constraints, but the workable strategy needs to consider how these will be overcome. There is no presumption that information generated by the inquiry will reflect that a factor *is* perceived to be positively influencing the process. Inclusion of the enabler in the logic model merely guides the inquiry towards exploration of the issue as a relevant influence.

The logic model can be used as a frame of reference at any conceptual stage in the inquiry to guide communication, action and reflection. It can also be adapted to inform future action on the basis of outcomes from the inquiry. For example, in figure 4.13, T_0 might represent the time at which an intervention is planned to address some identified need for change. At this stage a logic model would be developed which summarises the change strategy in a way that can guide the planning of activity and its evaluation. Evaluation of the intervention at T_1 would be concerned with the first iteration of the implementation, and might suggest a change in strategy. This would lead to further intervention and its evaluation between T_1 and T_2 , and so on for as many iterations of the action inquiry as desired to maintain progress with improving the strategy.

Figure 4.13: Temporal relationship between evaluation stages



The stages T_0 , T_1 and T_n are not to be confused with the temporal concepts represented by the ‘outcomes’, ‘longer-term-aspirations’, and ‘impact’ columns in the theory of change. For any iteration of a learning cycle, the ‘outcomes’ will always represent the immediate outcomes that

can be evaluated from the current iteration. The ‘longer-term-aspirations’, and ‘wider impact’ will always represent some desirable future state that it is not known whether it is possible to achieve at the current time. These were what Ackoff (1981) considered as the ideals or ethos guiding purposeful action and which Vickers (1965) considered as norms. These guide activity towards improvement, with heuristic inquiry providing information about whether progress is being made. The nature of this kind of heuristic inquiry is that it is only possible to make judgments about whether activity is making progress towards some distant aspired transformation. The purpose guiding activity may change with each iteration of the learning cycle, informed by the inquiry. As progress is made, what were previously expressed as longer-term aspirations may become intended outcomes.

Linking VSM with the logic model

Important to articulating the design of the methodology is how the approach was informed by the earlier development work using VSM and the framework in table 4.2. In order for the logic model components to guide the generation of information relevant it was necessary to focus on the issues identified in table 4.2 that had been tested in the context of Case 2. The framework in table 4.2 therefore informed the development of the discussion guide shown in table 4.6. This discussion guide was used to help stakeholders articulate a contextual systemic logic model of their theory of change for educational development work. In this context technology was considered one of many possible resources that could be used to support learning activity.

Table 4.6: Questions guiding development of a systemic logic model for educational development work

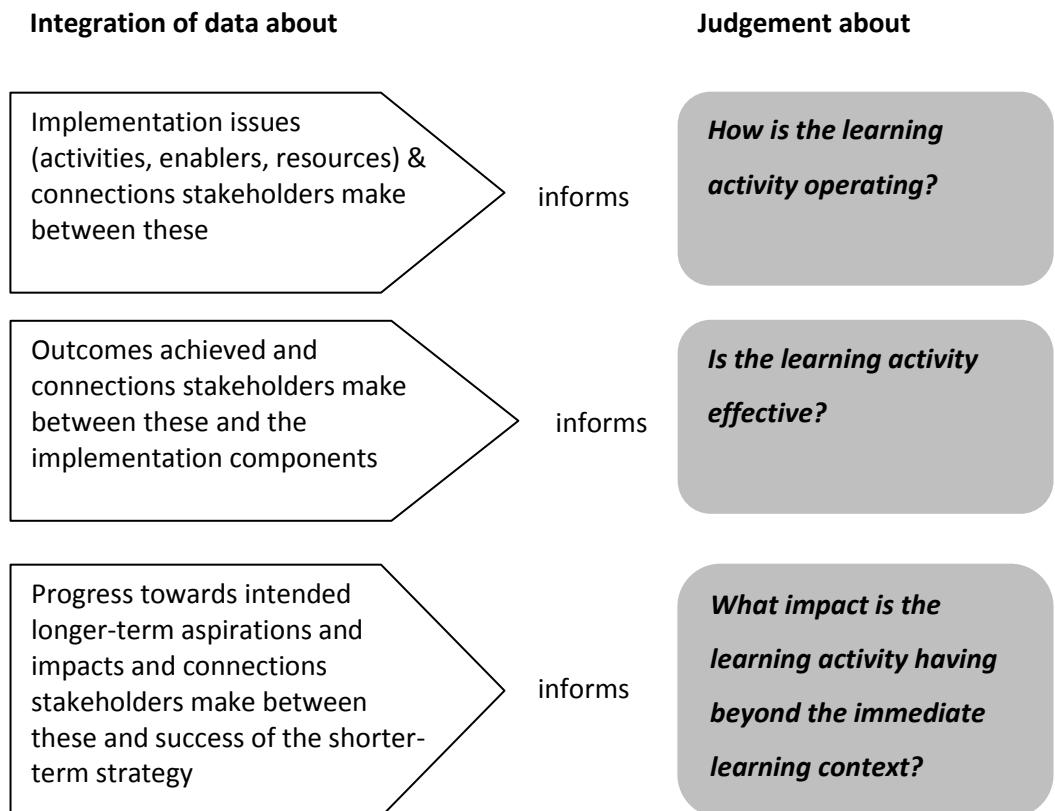
Rationale for Change	Resources/Enabling factors	Process	Desired project outcomes	Longer-term aspirations	Intended impact
What are the problems/opportunities for learners that the change intends to address? e.g. -learners' expectations of their learning experience or the knowledge and skills they will develop -others' expectations of knowledge learners will develop (employers, professional bodies, those admitting learners' to educational courses)	How will the learning be supported and resourced? e.g. -induction/training for learners -role and availability of learning resources (including technology) - learning environment (physical, virtual, socio-political) -other learning support	What action will be taken by whom to motivate learners to engage with the learning activity? e.g. - communication/action - integration of resources in learning process - use of space, technology etc - provision of feedback to learners on their progress and achievement	What do you envisage will be the learners' experience of the learning activity? e.g. - engagement and satisfaction -taking responsibility for their own learning -resources and activities helped learning -empowerment	What do you think will be the longer term benefits to learners who have participated in the learning activity? e.g. -improved learning experience in later courses - confidence in practice	How will your project have made a real difference for learners? e.g. -improvement of learners' engagement and achievement -their impact in wider environment
What are the problems and/or opportunities for learning facilitators that the change intends to address? e.g. - staff engagement - availability of resources - learning about established or emerging pedagogies or use of technologies	How will learning facilitation be supported and resourced? -personal/professional development -teaching resources (time, space, technology, books...) -reward & recognition -support from colleagues/managers	How do you expect learners will engage with the learning activity? e.g. - interaction with other learners, learning facilitators - access to and interaction with the learning environment - access to and use of learning resources - assessment for and of learning	What do you think will be the longer term outcomes for learning facilitation in this local context? e.g. - discipline knowledge and skills - transferable/generic skills	What will be the longer term outcomes that will lead to the expected impact? e.g. - raised profile of staff responsible for learning context - more effective and efficient use of organisational resources - experiential learning about transferable good practice	What do you anticipate will be the long term impact for learning facilitation? e.g. -improved practice/motivation -improved recognition and reward -experience/practice more rewarding -staff retention
What are the current problems and/or opportunities for managing the learning activity that the change could address? e.g. - strategic priorities -most effective/efficient use of resources	What do others need to do to make sure this support/resource is available? e.g. -develop learning resources -develop training/induction programme	What activities are required to achieve the other expected outcomes and impact? e.g. -sharing what is learnt from evaluating the change -networking -collaborative work -changes to organisational management practice	What will be the other outcomes outside the immediate learning activity? e.g. - contacts established - collaborative partnerships developed - publications - satisfaction of partners/other clients	How do you think the change will impact more widely on practice in the long term? e.g. - contribution to strategy at the higher level of recursion in the organisation - practices or resources adopted more widely	What do you anticipate will be the other longer term impact? e.g. - on reputation of organisation for quality of its professional development/education - on recruitment of facilitators/learners into the organisation - on change in organisational policy, procedure, regulation
Why do you think this strategy will work? e.g. -influenced by theory -influenced by practice models -influenced by own or others' previous experience -influenced by advice from others	What support or conditions are needed to enable activities to be undertaken that will lead to other outcomes and impact? e.g. - any intended organisational support - funding/resources - policies, procedures, regulations, protocols		How are these outcomes connected with higher level strategy?		

Using the systemic logic model in the generation and synthesis of data

A full illustration of how this process was implemented in context is given in Chapter 5, using Case 3. However, in summary, a process was envisaged whereby:

- For each component of the logic model, relevant data/information and its sources are identified;
- Once the data/information needed has been identified, appropriate methods for generating this can be decided. Specific methods are therefore not prescribed but are contingent on the data needed, and contextual conditions that might enable or constrain access to this data.
- Once data has been generated it can be integrated as suggested in figure 4.14 to answer the stakeholders' evaluation questions about the implemented change strategy.

Figure 4.14: Integration of data about logic model components to answer evaluation questions



4.7.5. Consideration of power and conflict

The logic model as it is has been described so far suggests it is constructed entirely from the designer/decision maker's perspective of the learning activity, i.e. those that will be designing and implementing the development work associated with an educational development strategy. It also suggests it guides data generation and synthesis without critically questioning this perspective. The aim of this section is to illustrate how Ulrich's (1983) Critical Systems Heuristics can be used as a framework to guide more critical reflection about the boundary judgements that the logic model represent. The questions direct those involved in the evaluation and decision making about the learning activity to focus more critically on the assumptions being made about the sources of motivation, control, expertise and legitimacy that underpin its design and implementation, and the extent to which these continue to be appropriate.

Using this framework for critical reflection and reflexion directed *at the learning activity* is what has been described so far as the **first order boundary critique**, and is intended to help highlight issues related to the ethicality of the activity being evaluated. This process itself is not intended to eliminate issues of power and conflict. As has been suggested in the literature review, their impacts are not necessarily all negative, particularly in a learning situation. However, the process is intended to raise awareness of these issues and their impacts to inform the decision making process towards improved ethicality. For example, questions that this level of critique might generate concern the extent to which other stakeholders, (not just the designer/decision maker) have an input into the design and decision making for the change strategy prior to its implementation, and the impact of the inclusion/exclusion of particular stakeholders on the learning activity and its outcomes.

One of the core arguments of this thesis is that evaluation users also need to be critically self-aware of how the *evaluation activity* is socially constructed, and hence the implications of this for what is learnt from it. This means that the CSH are equally valuable if used in **second order boundary critique** by directing the questions at the evaluation activity.

Examples of issues that these questions might help to highlight in the evaluation, are: the assumptions on which the designer has based the methodology; the process of engaging stakeholders, including how/when/by whom debate was closed off; which stakeholders have been engaged in the evaluation and their role; the willingness of stakeholders to participate. It was a

particular concern of Gregory (W. 2000) that existing systems methodology did not adequately address this latter question.

As with the first order boundary critique, there is no assumption that using this framework in inquiry will eliminate issues of power and conflict. Its purpose is to raise awareness of these issues, and it can guide those responsible for designing/decision making about the evaluation towards improving the ethicality of their inquiry.

4.7.6. Action research in the case studies

It has been so far argued that the evaluation of each case should be considered as a process of participative action inquiry, with systems thinking bringing rigour to the conceptual stages of the inquiry in way described in the earlier sections of this chapter.

The aim of this section is to explain how this action research might be organised in terms of specific thinking and action stages.

Stage 1: The evaluator attempts to clarify potential stakeholders and their roles and relationships.

This involves making boundary judgements about who the stakeholders are/ought to be. The extent to which this is informed by others may depend on context. First and second order boundary critique is applied here to the boundary judgements about which stakeholders *ought to* provide sources of motivation, control, expertise and legitimacy for the technology supported learning activity *and* the evaluation activity.

Examples of judgements being made at this stage, and hence subject to critique, are:

- (i) The evaluator may conceptualise their own role as designer for the evaluation activity. If they have been commissioned to undertake the evaluation by the client, this may be the only role they occupy. The extent to which they have decision making responsibility for the evaluation may depend on negotiation with the client about their expected role.
- (ii) The primary client will be the user of the information constructed from the evaluation inquiry. It is likely that they are the decision maker for the learning activity being evaluated.

- (iii) If the evaluator is self-evaluating some change in their own practice, then they may consider themselves as occupying the roles of decision maker and client for the evaluation, and designer and decision maker for the activity being evaluated.

Stage 2: The evaluator negotiates with the client and decision maker for the evaluation about its purpose and the role of other stakeholders in the process.

This stage involves making boundary judgements about the general approach to the evaluation. Having made some decisions about the stakeholders in the evaluation, CSH are used to question second order boundary judgements about their interests *in the evaluation*. Since this stage is a design stage, the questions are also used here in the ‘ought’ mode.

What *ought to be* the purpose of the evaluation such that it is serving the interests of the client?

What *ought to be* the criteria on which the *evaluation methodology* is being judged?

What *ought to be* the component activities within the control of the decision maker *for the evaluation*?

What conditions and resources influencing (either positively or negatively) the operation of the evaluation *ought to be* outside the control of the decision maker?

What kind of information/knowledge/expertise *ought to be* guiding the *evaluation methodology*?

What *ought to be* the designer’s assumptions underpinning the *evaluation methodology*?

To what extent and how *ought* wider stakeholders to have control over their own interests *in the evaluation*?

Whose ‘worldview’ or perspective *ought to be* underpinning the *evaluation methodology*?

A potential disadvantage of Ulrich’s questions is that they may steer thinking towards there being only one client for the evaluation. The discussion of VSM has helped to clarify that there are often multiple clients. Once the assumptions about these clients have been clarified in Stage 1, then Stage 2 can begin to focus on the concerns and issues likely to be relevant to these stakeholders.

This research assumes that the primary purpose of the evaluation is change management of technology supported learning. This involves learning about the impact of a change strategy to inform managers’ decisions and actions to improve. But there may well be other secondary purposes, such as providing accountability to those funding an innovation in technology supported learning, or evaluating some expected contribution to a higher level strategy, or a need to seek greater commitment from participant actors. Beer’s VSM has helped to clarify the generic

questions that will be of interest to the likely different stakeholders in the evaluation i.e. those questions about the operation, effectiveness, efficiency, sustainability and implications for change.

Decisions about the role of stakeholders concern issues such as whose theories of change are relevant to planning and judging the success of the learning activity, how they should be involved, and whose perspective is privileged in the design chosen to implement. None of these decisions are prescribed. Finding an approach that works is one of the questions that the research must address.

A decision that also follows from decisions about stakeholders and their interests is how and when evaluation finding will be shared with them.

Stage 3: The evaluator works with relevant stakeholders to help them articulate their theory of change.

This is expressed in the form of a systemic logic model which forms the basis for data generation and synthesis, and the ‘first order’ boundary critique. In this design stage the focus is also on the relevant *ought* questions from CSH, but this time *about the learning activity* that will be evaluated. This will also guide their reflection on what is learnt from the evaluation and its implications for further change, including judgements about the purpose of the learning and the role for technology in supporting the learning. In order to develop theory about process it has already been argued that insight is needed not only into ‘what’ and ‘how’, but also ‘why’. The evaluator therefore needs insight into stakeholders’:

- (i) theories about ‘what’ and ‘how’ change will occur, in terms of its purpose, relationship with the wider environment, activities and resources needed to achieve this purpose.
- (ii) assumptions that underpin their theories.

In terms of gaining insight into stakeholders’ theories of change, the questions summarised in table 4.6 can be used. Generating answers to these questions may involve dialogue with stakeholders, or the questions may be directed to existing planning documents about the change initiative. If documents are used, the questions will help to identify missing information about the change strategy which needs to be collected through further dialogue with stakeholders. The evaluators use the resulting logic model to check their interpretation of the intended change

strategy with stakeholders, and to explain how this will be used with the core evaluation questions to guide data generation, synthesis, and reflection.

If several individuals or groups are involved they may not necessarily be in agreement about the change strategy. Inevitably someone will have to make the decision about whose perspective is privileged in the logic model that will guide the evaluation. Inclusion of one perspective in the model will still guide data generation about *different perspectives* of the implemented activity. However, decisions about what is included or excluded from the model could have an influence. The second order boundary critique applied at Stage 2 helps to focus on how these decision ought to be made and whose perspective should be privileged, and the second order boundary critique applied at stage 7 helps to develop critical awareness of the potential impact of these decisions on what is learnt from the evaluation.

In terms of the assumptions underpinning stakeholders' theories, this may be informed by existing practitioner experience, from the previous experience of those involved, consultation with colleagues who have relevant experience, evaluation reports or published information about similar practice initiatives and the lessons learnt.

If evaluation is intended to make a wider contribution to knowledge, perhaps leading to research publications, then it needs to be positioned within existing theory and be theoretically informed. The theory building process therefore requires engaging with existing relevant theory to help develop the rationale for the change. The evaluator may have a role here in making these connections with wider learning, and evaluating their contribution forms part of the second order boundary critique applied at Stage 2 (in the *ought* mode) and Stage 7 (in the *is* mode).

Stage 4: The evaluator and relevant stakeholders plan how evaluation data will be generated.

The logic model developed in Stage 3, the core stakeholder evaluation questions, and knowledge of resources available to undertake the evaluation guide decisions about:

- (i) what data can be feasibly generated. Some data may already be available through existing inquiry or monitoring processes, but access may need to be negotiated.
- (ii) whose perspective is relevant, and any ethical considerations regarding their involvement.
- (iii) what methods will be used for exploring these perspectives.

- (iv) who will take responsibility for data generation. Considerations may be who will have sufficient contextual understanding to ask appropriate questions or record relevant observations, yet still be sufficiently independent to avoid introducing bias.
- (v) the timing of data generation to ensure appropriate information is available to inform decisions about change at the time these decisions have to be made. This may depend on issues such as when the stakeholders will have sufficient experience of change to give appropriate feedback, when is convenient to stakeholders and evaluator, and any deadlines set for when future decisions about change need to be made.
- (vi) the sequence of data generation may also be important. If the ‘designer’ and ‘decision maker’ are undertaken by separate individuals then it is important that the evaluator, in addition to seeking insight into the decision maker’s experiences of the organised learning activity, also seeks their interpretation of other data generated, such as learner feedback. This helps the evaluator to understand the decision maker’s rationale for further change in the learning design

There are several potential advantages to planning the evaluation before implementing the chosen model. Firstly, planning the evaluation helps to focus more clearly on the purpose of the organised learning activity, and may help in refining the change strategy before it is implemented. It follows that if evaluation is a key activity in change management, this depends on generating information at the right time to help in the decision making process. Planning early maximises the opportunity to generate appropriate data that will inform this decision making process.

These are not easy decisions to make, and will be dependent on each context. These decisions, and the process of making them, are therefore also subject to second order boundary critique applied in Stage 7.

Stage 5: Implementing the chosen model and generating evaluation data.

Here the decision maker makes specific choices about implementation. These may not necessarily be aligned with the planned strategy. This will depend on the feasibility of implementing in practice the intended change strategy developed in Stage 2. This may be enabled or constrained in practice by the actual resources available (personnel, technology, time, money etc) and the social, cultural, political, environmental, technological, regulatory environment into which the change is

to be introduced *at the time of implementation*. Operational decisions will include those about the specific target group of learners, how learning resources will be produced, the people responsible for making particular interventions in the learning activity and its management, what development they might need to undertake their roles, and the detailed timetable for change.

The evaluator may or may not be involved in all of the primary data generation activity. However, it is important that s/he keeps a record of experiences relevant to the second order boundary critique. They may also need to help others involved in primary data generation to reflect on and be reflexive about these experiences. These may relate to issues such as access to data sources, skill in framing questions, relationship and/or interaction with informants, time and other resources available for data generation and synthesis.

Stage 6: *The evaluator synthesises and reflects on the meaning of data generated.*

This involves using the data generated from different perspectives to make some interpretation of what each perspective considers to be successful or unsuccessful outcomes, and the connections they make between these and the different components of the change process. These perspectives are then compared to make informed judgments which help to answer the evaluation questions and integrate data into meaningful information about ‘success’ for the learning activity. Reflection here is in the ‘*is*’ mode, specifically directed at implementation of the learning activity that is the focus of the current cycle of evaluation activity. It is guided by the issues of relevancy summarised in the logic model developed in Stage 3 and the questions of interest to the decision makers about the operation and effectiveness of the implemented strategy (i.e. those deriving from the System 3 decision manager, if conceptualised using the VSM).

Second order boundary critique applied in Stage 7 will guide the evaluator to critically reflect on whose perspective about ‘success’ is being privileged in these evaluative judgments, and why this may be the case.

Stage 7: The evaluator and the designer/decision maker reflect on what has been learnt from the evaluation and its implications for further change

First order boundary critique

This involves questioning and developing a critical awareness of the implementation of the learning activity in the '*is*' mode in order to consider the implications for future implementations, i.e. what '*ought*' to be.

Dialogue with the designer/decision maker for the learning activity may take various forms, face-to-face- meetings, formal reporting, electronic communications, or a combination of these things. Engaging others in what has been learnt may also be an important part of the process of including a broader range of interested parties in the process of reflecting on transferable lessons learnt from the evaluation, and in encouraging wider learning and improving practice.

The evaluator may find that this dialogue is helped by different processes in different circumstances, and learning from second order boundary critique will help to make judgments about this, and how to improve it in future evaluation activity.

Issues for consideration include:

(i) Sustainability and viability

Making decisions about the sustainability and viability of the learning activity involves considering any issues that might suggest future implementations simply won't work in the longer term, regardless of how component activity is organised. This concerns the core boundary assumptions about the relationship of the learning activity with its wider environment. Whether this is considered viable or sustainable depends on the core judgements about the clients of the learning activity and the purpose in terms of intended benefits for them. This relationship with this wider environment also includes the resource allocation that originates from this wider environment, and other constraints that might affect the '*system in focus*'. Ulrich's (1983) CSH guide boundary critique at this stage by drawing on his questions about the sources of motivation and control for the learning activity.

Who *is/ought to be* the client or beneficiary of the learning activity?

What *is/ought to be* the purpose of the learning activity such that it is serving the interests of the client?

- Who *is/ought* to be the decision maker for the learning activity?
- What *are/ought* to be the component activities of the learning activity within the control of this decision maker?
- What conditions and resources influencing (either positively or negatively) the operation of the process *are/ought* to be outside the control of this decision maker?

One problematic issue regarding the use of CSH is that the questions developed by Ulrich do not differentiate between the different levels of decision making- systems 3 and 5 in the VSM. Beer's VSM helps to clarify that the question of viability and sustainability is one being *asked* by the decision maker in the role designated as System 5. The level of control therefore being *asked about* here is that at Level 3 of Beer's VSM.

Regarding information about the functionality of the model that needs to be reported to the 'System 5' manager, the core questions derived from Beer are:

- Are there any major 'system' failures in the learning activity that suggest it is not viable?
- What resources are being used? How?
- What resource will be required in the future?

(ii) Appropriateness of the learning activity

Here the boundary critique needs to focus on the judgements being made about the organisation of the learning activity, to inform the consideration of alternative designs that might work better (be more effective) or work at least as effectively with more efficient use of resources. Beer's VSM helps to focus on a model whereby this design activity is undertaken by 'system 4. It involves comparing information about the effectiveness and efficiency of historical implementations of the learning activity, as well as monitoring the relationship with the wider environment. Not losing sight of the subjective nature of the concepts, of effectiveness, efficiency etc, the evaluative judgement triangulates data from a number of sources, including the different stakeholders involved. Example sub-questions that help this designer to seek information about the overall appropriateness of the design and hence implications for change are:

- What need for desirable change has been identified from feedback?
- Are the internal/external drivers still the same? What are the changes? How will these affect the learning design?
- Have there been any unintended outcomes, and what connections are stakeholders making between these and the implementation? What are the implications for change in

the learning design?

What change is actually feasible? (for example, with the resources available)

In terms of guiding more critical reflection on the judgements made about the learning design, here Ulrich's CSH focus on the sources of expertise influencing the learning design.

Who *is/ought* to be involved as the designer of the learning activity, by providing appropriate advice and support to the decision maker?

What kind of information/knowledge/expertise *is/ought to be* informing the design of the learning activity?

Where *does/ought* the designer seek the guarantee that their design for the learning activity will be implemented and be successful if judged by their designed criteria for success i.e. what are the designer's assumptions underpinning their design?

In addition, his questions about legitimacy help to focus on the consideration of other perspectives that might inform the design (not just the client, decision maker and designer roles that have been the focus of critique so far), and whether sufficient consideration has been given to the 'sweeping in' of more marginal perspectives that might be relevant to informing change.

Who *is/ought to be* the [other] relevant stakeholders involved and what *is/ought to be* their role?

To what extent and how *do/ought* these stakeholders have control over their own interests in the learning activity?

Who else's 'worldview' or perspective *is/ought* to be underpinning the design for the learning activity?

Second and third order boundary critique

Where the first order boundary critique focused reflection on boundary judgements made about the technology supported learning, this second order boundary critique focuses critical reflection on the boundary judgements made about the evaluation process and its relationship with the evaluand. This encourages consideration of the strengths and limitations of the data in supporting conclusions about the functionality of the learning activity and decisions about future change.

As in Stage 2, Ulrich's (1983) CSH questions are directed *at the evaluation and research processes* rather than the learning activity. At this stage his questions therefore become:

Who *ought to be* the client or beneficiary of the evaluation/research?

Who *ought to be* the decision maker(s) for these activities?

Who *ought to be* involved as the designer(s) of each of these, by providing appropriate advice and support to the decision maker(s)?

What is the purpose of the evaluation/research such that it is serving the interests of the client?

What are the criteria on which the methodology is being judged?

What are the component activities of the evaluation/research methodology within the control of its decision maker?

What conditions and resources influencing (either positively or negatively) the operation of the evaluation/research are outside the control of the decision maker?

What kind of information/knowledge/expertise is guiding the evaluation/research methodology?

What are the designer's assumptions underpinning the evaluation/research methodology?

To what extent do wider stakeholders have control over their own interests in the evaluation/research?

Whose 'worldview' or perspective is underpinning the evaluation/research methodology?

4.8. Summary

This chapter has articulated the case for using action research to improve knowledge about evaluation methodology for technology supported learning, and argued that rigour in the methodology involves integrating critical systems thinking into the conceptual stages of the inquiry. This involved drawing from different systems methodologies that are underpinned by a subjective epistemological paradigm, and Churchman's (1971) notion of 'system' as a social construct.

Beer's Viable Systems Model (1972, 1979) and his approach to diagnosing the system using homeostatic loop analysis (Beer 1985) were used to:

- (i) develop some clarity of thinking about the purpose of the evaluation and roles and relationships of stakeholders, leading to some generic evaluation questions to frame the evaluation;
- (ii) conceptually represent the hermeneutic interaction involved in learning activity to frame data generation, synthesis and critical reflection on how learning activity is being socially constructed.

Ulrich's (1983) Critical Systems Heuristics were used to derive questions to frame more critical reflection and reflexion on the ethicality of change management. However, in much of his work the focus of this 'boundary critique' is on the context of change, the evaluand. This chapter has argued that, as suggested by Midgley (2000), this critique also needs to be applied to the evaluation activity, and its relationship with the evaluand, to improve the rigour of a methodology that is argued to be 'critical'.

In addition to making the case for the conceptual underpinning of the methodology, a description was given of how these concepts might be translated in action research stages. The thesis progresses in Chapter 5 to illustrating how this approach was implemented in a single case.

Chapter 5. Implementation of the evaluation methodology

5.1. Introduction

The aim of this chapter is to illustrate how the evaluation design articulated in Chapter 4 was applied in a specific context of technology supported learning activity. The focus of this chapter is therefore on a case study, describing implementation of the methodology and what was learnt from the evaluation *about this case*. The learning relevant to making judgements about the value of the methodology and the wider contribution to theory about methodology is the focus of the subsequent discussion and conclusion in Chapters 6 and 7.

5.2. Background to the case study

Case 3 involved the evaluation of an educational development project funded from the same grant scheme as Case 2. The project involved a team of academic staff from different departments with one of them nominally being appointed project leader. Funding from the scheme was allocated for the development of e-learning materials intended to support learners' group learning activity. In terms of technology supported learning activity, this could be considered more of a 'blended' approach, where electronic tools and resources were intended to support face-to-face learning and teaching activities. There were also other sources of 'pump-prime' funding for the development work. The project team had used some of the funding from these various sources to appoint a project co-ordinator for the development work involved.

The learners' group learning activity was a multidisciplinary design project involving students from a range of disciplines associated with the built environment. This group work was to be embedded as a component of taught modules in one-year Masters courses and the 4th year of undergraduate professional degree programmes. These taught modules were based in different academic departments, and were developed and taught by different members of academic staff. The broader educational aims and content were therefore different for each module. Some of these members of staff formed the project team that had successfully bid for the grant funding.

This case was chosen as an example to include in the thesis because of its complexity in terms of the multiplicity of stakeholders. This presented a significant challenge for the stakeholders involved, and provided a rich context in which to apply some of the ideas about using systems thinking for evaluating technology supported learning. In particular the context lent itself to exploring its social dimensions.

The evaluation is discussed in relation to each of the action-inquiry stages of the methodology that are outlined in Chapter 4, section 4.7.6.

5.3. Stage 1

The evaluator attempts to clarify potential stakeholders and their roles and relationships.

5.3.1. First order boundary judgements– about the learning activity

This process was informed by the documents that the project team had put together to bid for the funding, and an initial discussion with the project leader. Systems constructs were applied to interpreting the roles and relationships implied by this information. Ulrich's (1983) questions from CSH guide more critical reflection on the assumptions being made about which stakeholders *ought to be* providing sources of motivation, control, expertise and legitimacy *for the technology supported learning activity* being evaluated. It is subsequent critical reflection on the information generated by the inquiry which compares these assumptions with the experience of the different stakeholders.

The information available at this stage was consistent with the students being considered the source of motivation for the educational development work, and hence primary client. It was they who would be involved in undertaking the learning activity and who stood to directly benefit from the learning. A wider group of stakeholders, or 'witnesses' that provided a source of legitimacy for the learning was their future employers. It was being assumed that they too would benefit from graduates' improved knowledge, skills and experience, if on graduating they were able to apply this learning to their future practice. Further extension of the boundary also swept-in, for example, stakeholders who may be affected by future building projects in which the graduates would be involved.

The sources of control and expertise were assumed to be the team of academic staff responsible for the educational development and leading the modules in which the multidisciplinary group project activity would be embedded. In the roles of 'designer' and 'decision maker', these individuals were responsible for developing and teaching these modules, as well as managing other staff teaching on their modules. In addition, a member of professional support staff also provided advice and support in respect of developing the e-learning materials.

5.3.2. Second order boundary judgements – about the evaluation

It is at this point that some *second order* boundary critique is also applied to help clarify the stakeholders who *ought to be* providing sources of motivation, control, expertise and legitimacy *for the evaluation*.

As a project funded from an institutional educational grant scheme, there were envisaged to be multiple clients for the evaluation. The complexity of this was discussed in relation to Case 2 in Chapter 4. In Case 3, the primary users and clients of the evaluation were envisaged to be

- (i) the University panel that had allocated funding to the project, since they needed the project team to demonstrate some accountability for how the funds had been used, and make some assessment of the impact of their project on improving teaching practice and the learning experience of students. Important to this panel was not necessarily ‘success’ of an educational development project in terms of achieving its original objectives, but what had been learnt from the project that could inform improvement in learning and teaching practice more widely and how this learning was being shared.
- (ii) the project team, who would need to make future decisions about how to manage the learning activity in order to ensure that the latter would be serving the interests of its clients (i.e. in the first instance, the students).

Wider stakeholders providing legitimacy to the evaluation were considered at this stage to be the sector agency providing funding to higher education institutions for educational development work. Their interest was in the impact their funding programme was making in improving teaching practice and the learning experience of students in the higher education sector. The wider academic community also stood to learn from any information generated that would have relevancy to improving teaching practice.

Part of the resource allocation awarded for the educational development work was support for the evaluation, to enable the contribution to wider organisational learning about good teaching practice. This support was provided in the form of my own time and ‘expertise’. Therefore, the underpinning assumption was that the evaluator would provide the source of ‘expertise’ i.e. fulfil the designer’s role for the evaluation. However, since the evaluation methodology is based on principles of participative action research, the main source of control for the evaluation was considered to be the project team. Hence it was intended that decisions about the evaluation

would be negotiated with the team, giving them control over issues such as access to the learning context, data generation methods, sources, and tools.

5.4. Stage 2

The evaluator negotiates with the client and decision maker for the evaluation about the evaluation purpose, approach, and the role of other stakeholders in the process.

Having clarified the assumptions or second order boundary judgements being made about the different stakeholders *in the evaluation*, the next stage involved clarifying the concerns and issues relevant to these stakeholders which would guide the evaluation. Involving the project leader in early discussions about these assumptions was intended to ensure that the evaluator did not rely solely on their own interpretation of written documents, but also provided opportunity to clarify some of the assumptions made by the project team about their learning design and their engagement with the funding scheme.

Using CSH to guide the design work, the primary concern about the motivation for the evaluation was guided by the question:

What ought to be the purpose of the evaluation such that it is serving the interests of the [evaluation] client?

The purpose for the different clients can be clarified by reference to the modelling undertaken using Beer's VSM, by considering where the different stakeholders in the evaluation might fit in the model, and hence the general evaluation questions in which they are most likely to be interested.

The project team who needed to make future decisions about how to manage the learning activity were considered equivalent to the System 3 managers conceptualised in the VSM. Their interest was in questions about operational activity, effectiveness and efficiency, and how these could be improved, i.e.:

**How is the learning activity operating?
Is the learning activity effective?
Is the learning activity still appropriate?**

Since they were also accountable to the funding panel for the resources allocated for the educational development work, they also needed to ensure the evaluation would generate information relevant to answering *its* questions. This was to be presented in a report to the panel's monitoring group.

The funding panel for the educational development work were considered to be at the next higher level of recursion. Since this funding was not the only source of resources for the learning activity, the panel did not have overall decision making control about its viability and whether it should cease. This was likely to be managers at the departmental level, who make decisions about whether it is viable to support the Level 3 project managers in their collaborative endeavour. However, although the funding panel were not strictly speaking equivalent to System 5 management in the VSM, they were interested in some of the same questions about the benefits and impact resulting from the use of resources allocated, and also learning about good practice in teaching and learning and its management. This was to inform wider practice. It therefore did have an interest in what had been learnt by the team about the operation, effectiveness and efficiency of the learning activity and the implications for change, but in addition:

**What impact is the learning activity having beyond the immediate learning context?
Is the learning activity still viable/sustainable?**

A further issue to consider about the motivation for the evaluation is guided by the question, adapted from CSH:

What ought to be the criteria on which evaluation of the process is being judged?

Assumptions about the criteria for the success of evaluation methodology are summarised in Chapter 6. These were the assumptions being tested by research using the case studies. In summary, these concerned clients of the evaluation believing that

- (i) they are appropriately involved. This depends on the approach taken to involving them.
- (ii) it informs their decision making. This depends on the evaluation being designed to answer their questions, already outlined.

At this stage, the concerns and issues for the designer and decision maker for the evaluation are about the overall approach to inquiry that will generate data and information to help to answer the questions of the clients of the evaluation. Reflection on the boundary judgements being made here are guided by the following questions, adapted from CSH:

What ought to be the component activities within the control of the decision maker for the evaluation?

What conditions and resources influencing (either positively or negatively) the operation of the evaluation ought to be outside the control of the decision maker?

What kind of information/knowledge/expertise ought to be guiding the evaluation methodology?

What ought to be the designer's assumptions underpinning the evaluation methodology?

As already explained, as designer for the evaluation, the intention was to work collaboratively with the teaching team, leaving them in overall decision making control. A process was envisaged whereby they would be given advice about potential evaluation questions (as rationalised earlier), the overall approach, data sources, methods, tools and timing of data generation, but leaving them with the final decisions. It was anticipated that a key factor in them being guided by this advice was how the rationale for the approach was communicated, and their interpretation of how this would serve their interests and the interests of other stakeholders in the technology supported learning activity and its evaluation.

In the initial planning meeting with the teaching team, the advised approach was explained using a draft logic model for the educational development project constructed from their bidding documents. This was used to explain how the evaluation would be designed around *their* planning and implementation of the project to answer *their* own evaluation questions about operation and effectiveness and inform *their* decisions about change. The rationale for the other questions concerning impact, sustainability and viability were also framed as being needed to demonstrate accountability for the educational development grant, and to improve future funding decisions and teaching practice more widely. The logic model and evaluation questions were presented as tools that would help frame data generation and synthesis and reflection on its meaning. The approach that would be taken to collaborating with them in undertaking the evaluation was also explained at this stage, i.e. clarifying the issues of relevancy in the logic model, providing them with advice on methods, timing and tools that could be used, but leaving them in overall decision making control of what would be implemented. The sharing of findings, how and to whom, was

also discussed at this point. Although there was a requirement for the project team to provide a written report to the monitoring group for the funding panel and to share learning more widely, the approach to the latter was not prescribed by the funders.

The other concern for the evaluation that needed to be decided at this stage was the role of other stakeholders, guided by the following questions derived from CSH:

To what extent and how ought the [wider] stakeholders have control over their own interests in the evaluation?

Who else's 'worldview' or perspective ought to be underpinning the design for the evaluation?

Discussion here largely centred on the extent to which learners' perspectives should be actively sought when developing the logic model of the change strategy that would frame decisions about the evaluation. As primary stakeholders in the technology supported learning activity being evaluated, the principles of participatory and emancipatory evaluation suggest that they *should* be involved. However, at the time of planning the evaluation it was not possible to identify students that would be involved in the project. The teaching team also thought that students without a direct interest in the project, or experience of a very similar learning experience as that intended, would not be able to contribute anything new to planning the learning activity or would not have the motivation to do so.

5.5. Stage 3

The evaluator works with relevant stakeholders to help them articulate their theory of change.

This stage of planning the evaluation involved helping the teaching team members for Case 3 to articulate the relevant aspects of *their* educational development strategy that would frame the data generation and synthesis, to provide information that would help to answer the evaluation questions. This meant developing a systemic logic model they thought to be relevant to representing their change strategy. The question of 'relevancy' was guided by the framework informed by the Viable Systems Model, using the questions now summarised in table 4.6. An initial model was drafted by using these questions to extract information from the original grant scheme bid documents. This also helped to identify if there was any information missing from the bid documents that might be relevant to understanding how the organised learning activity is socially constructed, and which would need to be clarified through discussion with the teaching team.

5.5.1. Stakeholder engagement process

It was difficult to schedule a single meeting to discuss the draft logic model with all of the team members in the time frame available for the evaluation planning, because of their different commitments. Instead, initial discussions took place in short meetings with key individuals from each department, to discuss the extent to which the logic model reflected their theory of change, and to discuss issues specific to integrating the multi-disciplinary design project with their own discipline and course. In each meeting the draft logic model was used to guide discussion about the planned strategy for the project and the issues that would be relevant to the evaluation. The logic model was presented to the team members as a framework that would be used to guide decisions about data generation and synthesis, and their reflection on the meaning of data. The purpose of the evaluation, and the evaluation questions and general approach, were also reiterated when engaging with stakeholders at this point, as outlined in Stage 2 (Section 5.4).

At this stage it was not assumed that there would be agreement about the strategy, although there was fairly close agreement because these teaching team members had all been involved in putting together the original funding bid. A potential area of conflict identified was that the credit weighting of the assessment for the collaborative project work. This was different for the undergraduate and postgraduate students involved. This was mentioned in item 13 of the resulting logic model shown in table 5.1, so that it could be explored as an issue in the evaluation.

Table 5.1: Logic model for Case 3

Rationale for change	Resources/Enabling factors	Process	Desired project outcomes	Longer-term aspirations and intended impact
<p>1) Increasing legislation on sustainability, which needs to be addressed in the curriculum</p> <p>2) Students often do not engage with social issues in their learning in engineering disciplines -social issues not currently addressed in teaching</p> <p>3) Employers find graduates ill-equipped for multi-disciplinary team work</p>	<p>4) Project team collaborate to design multi-disciplinary learning experience for students that is relevant to practice in construction design disciplines - assessed group design project - introductory programme including site visit</p> <p>5) Project team collaborate to develop learning resources in VLE comprising a case study of an authentic development site -images and maps -perceptions of different stakeholders in development site</p> <p>6) Support required from educational technologists for development of the VLE resources -videos, image database, and their embedding in VLE</p> <p>7) Electronic resources need to be accessible and usable by students</p> <p>8) Copyright needed for reproduction and inclusion of appropriate material</p> <p>9) Access to development site is required</p> <p>10) Additional resources required -space for multi-disciplinary activity -cash for site visit & visiting speakers</p>	<p>11) Teaching team integrate electronic resources into level 4 sustainability modules in participating departments - prior to interaction programme integration approach unique to each department</p> <p>12) Teaching team motivate students and facilitate learning activity -engagement with introductory multi-disciplinary programme, multi-disciplinary team project work and VLE learning resources.</p> <p>13) Students undertake discipline specific learning activity, multi-disciplinary introductory programme and collaborative group work -student groups prepare a poster and presentation - contribution of poster & presentation to assessment & overall degree mark may be different for each department</p> <p>14) Students use VLE resources to support their learning -presentation engaging -helps group project work</p> <p>15) Project team share their experience and learning from the project more widely</p>	<p>16) Students engaged with learning activity -enabled them to contribute -perceived meaningful to future practice</p> <p>17) Students achieve intended educational outcomes:- -awareness of sustainable development issues - ability to think more holistically about a design problem - skills in designing for sustainability -knowledge and awareness of different perspectives (inc. stakeholders) and contributions different disciplines - awareness of issues of multi-disciplinary team-working</p> <p>18) Good practice and transferable knowledge is developed in participating departments about: -use of e-learning resources -team approach to teaching -new and more active approaches to learning and teaching - introduction of sustainability concepts into the curriculum - multi-disciplinary approaches to sustainable development</p>	<p>19) Other departments also adopt resources and become involved in multi-disciplinary approach</p> <p>20) Graduates in construction design disciplines have improved range of employability skills</p> <p>21) Innovative approaches to teaching and learning adopted elsewhere in departmental curricula</p> <p>22) A collaborative learning community is fostered across construction design disciplines in the University</p>

5.5.2. Boundary judgements made about the change strategy

Articulating these judgements now represented in the logic model (table 5.1) was guided by the questions from table 4.6.

Rationale for the project

Question:

What are the problems/opportunities for learners that the change intends to address?

The project team considered the educational development work important due to increasing legislation for sustainable construction design in order to improve society's capacity to address the climate change threat. Sustainability was not coherently being embedded in existing curricula for the built environment disciplines. In addition, they were not taking into adequate consideration the social dimensions of building design work. These were not just those arising from attempting to meet the diverse needs and expectations of different stakeholders, but also those of working together in multidisciplinary teams to undertake design work.

Educational outcomes

Questions:

What do you envisage will be the learners' experience of the learning activity?

How do you intend for learners' knowledge and/or skills to be changed by the learning activity?

The educational aim was to introduce students to issues and experiences they would be likely to face in practice. A key issue was therefore that the students would recognise the relevancy of the learning experience to their future practice. The project team also planned to embed the principles of sustainable design into the curricula of a number of disciplines related to the built environment in order to improve students':-

- awareness of sustainable development issues (both in the urban and rural context);
- ability to think more holistically about a design problem;
- skills in designing for sustainability;
- knowledge and awareness of different perspectives and contributions of different design disciplines and stakeholders in development projects;
- awareness of issues surrounding working in a multidisciplinary team on an authentic project.

Longer-term aspirations and intended impact for learners

Questions:

What do you think will be the longer term benefits to learners who have participated in the learning activity?

How will your project have made a real difference for learners?

The intended impact of the project on students' experience and learning was therefore improvement in their employability through learning relevant to their future practice as design professionals.

Process

Questions:

What action will be taken by whom to motivate learners to engage with the learning activity?

How do you expect learners will engage with the learning activity?

The project team envisaged a process whereby they would:-

- engage students in working collaboratively in multidisciplinary teams on a sustainable design project;
- use a real development site as a basis for the collaborative design project.

A key issue for the implementation of this strategy was how often and when teams should come together for scheduled and facilitated interaction to help them progress their project work. This was constrained by the timetable arrangements for each module. It was planned that students would work together in their multi-disciplinary teams on specific activities over 3 interaction days. This activity was aimed at facilitating their development of a sustainable design of the development site.

Potential issues relating to power and conflict that were identified in the early discussions about this strategy were that:

- (i) the assessment weighting of the collaborative design project in the overall module mark was not the same for all students.
- (ii) there were unequal numbers of students enrolled from each participating module. This meant that the representation from each of the disciplines in each of the teams would not be balanced.
- (iii) there was a very small group of postgraduate students from a course in one of the departments (Discipline 4 in the data recorded in Appendix 3, section 5.7). It was not possible

to integrate them into teams unless the teams became very large. A decision was made to set them up as a separate team of ‘consultants’ to the other teams.

Resources and enablers

Questions:

How will the learning be supported and resourced?

What do others need to do to make sure this support/resource is available?

One of the complications anticipated was that students’ previous knowledge of sustainable design concepts would be variable depending on the extent to which they had been introduced to them earlier in their degree programmes in the context of their own discipline. An introductory programme of events was designed to introduce students to the specific project context and brief, and to ensure they would all have the same opportunity to engage with theory to at least a minimum threshold level and to think about some of the issues from a broader perspective than they had so far encountered within the context of their own discipline.

This multidisciplinary programme of lectures would therefore introduce students to:-

- (i) sustainable design issues beyond the traditional boundaries of their discipline;
- (ii) the context of their design projects, specifically the physical location of the urban development site, and the different stakeholder viewpoints about the development (their vision, hopes and concerns etc).

In the first year the project was to be implemented, the introductory programme was planned to commence with a visit to the development site, followed by 3 days of lectures, with contributions from all participating departments and external guest speakers.

Grant funding was allocated to support the associated development work and the development of electronic resources to capture the various dimensions of the urban development site which would be used as a context for the students’ design projects. The purpose of these electronic resources was to provide students with insight into a real urban development site, and to facilitate group analysis of the site and inform their design work. These resources provided a more convenient and efficient way for students to access the physical and social dimensions of the site. They consisted of a range of authentic documents such as urban development planning documents, videos and maps of the site, and videos of interviews in which different stakeholders articulated their perspectives. These were intended to supplement the insight provided by the site

visit. Once developed, they were intended to be used with different groups of students for a number of years.

Normal practice was also for each module to have its own virtual learning environment. However, the teaching team decided to create a single virtual learning environment for the project work. This was to ensure consistency in students' access to the material.

Other activities and their outcomes and impact

Questions:

What will be the other outcomes outside the immediate learning activity?

What activities are required to achieve the other expected outcomes and impact?

What support or conditions are needed to enable activities to be undertaken that will lead to other outcomes and impact?

Although it was not a primary intended outcome of the project, the project team envisaged that working together in this way in their educational development work and teaching would help to foster closer working relationships, and a more collaborative learning community across the building environment disciplines.

A condition of the funding was that the team share their learning from the project more widely to contribute to developing good teaching practice, although at the time of developing the strategy the project team did not have a fixed plan for how they would do this. One of their aspirations from sharing their learning was that it would encourage other disciplines within the University and associated with the built environment to become involved in the learning and teaching activity.

5.6. Stage 4

The evaluator and relevant stakeholders plan how evaluation data will be generated.

This stage involved using the logic model developed in table 5.1 to plan the generation of data for a multi-perspective and interpretive exploration of stakeholders' experiences of the learning activity. Subsequent decisions about the choice of specific methods and tools were negotiated with the project team members, using drafts of questionnaires and discussion guides to help them evaluate their relevance to generating information useful to their decision making.

The first stage of planning data generation involved developing an evaluation matrix to indicate the data sources that could be triangulated to provide information relevant to each of the logic model components. This matrix is shown in table 5.2.

Table 5.2: Evaluation matrix for Case 3

Logical model component	Data Sources			
	Observation	Student Feedback	Feedback from Teaching Team	Other
4) Project team collaborate to design multi-disciplinary learning experience for students that is relevant to practice in construction design disciplines	✓		✓	
5) Project team collaborate to develop learning resources in VLE comprising a case study of an authentic development site	✓		✓	
6) Support required from educational technologists for development of the VLE resources	✓		✓	✓ Ed Tech Specialist
7) Electronic resources need to be accessible and usable by students	✓	✓	✓	
8) Copyright needed for reproduction and inclusion of appropriate material			✓	
9) Access to development site is required		✓	✓	
10) Additional resources required			✓	
11) Teaching team integrate resources into level 4 sustainability modules in participating departments	✓		✓	
12) Teaching team motivate students and facilitate learning activity	✓	✓	✓	
13) Students undertake discipline specific learning activity, multi-disciplinary introductory programme and collaborative group work	✓	✓	✓	
14) Students use VLE resources to support their learning	✓	✓	✓	
15) Project team share their experience and learning from the project more widely	✓		✓	
16) Students engaged with learning activity		✓	✓	
17) Students achieve intended educational outcomes		✓	✓	
18) Good practice and transferable knowledge is developed in participating departments			✓	
19) Other departments also adopt resources and become involved in multi-disciplinary approach			✓	
20) Graduates in construction design disciplines have improved range of employability skills		✓	✓	✓ Sheffield city

				council rep
21) Innovative approaches to teaching and learning adopted elsewhere in departmental curricula			✓	
22) A collaborative learning community is fostered across construction design disciplines		✓	✓	

It can be seen from the matrix that not all actors' perspectives were considered relevant to all components of the model. For example, both staff and student perspectives were relevant for providing information about student engagement and achievement of educational outcomes and the factors influencing these. These are concerned with how students have experienced their learning and what they have learnt. Students would be required to demonstrate some of their learning in assessment, and provide feedback on their experience. The project team would be able to reflect on this assessment and student feedback in relation to their own perceptions of student engagement and learning as influenced from their direct observations and experiences of their interactions with students. However, students' insight into the transformation of the knowledge and practice of the academic staff involved in the project team (component 18) may be somewhat limited. Students *might* be able to offer an opinion about how engaged, enthusiastic, or skilled they felt staff were in facilitating learning activity, and how this influenced their learning and experience. They may also have an opinion on what practice they might like to see transferred to other courses. However, any insight into the *change* of practice would depend on the extent to which they had repeat experience of learning activity included in the design during the timescale of the evaluation.

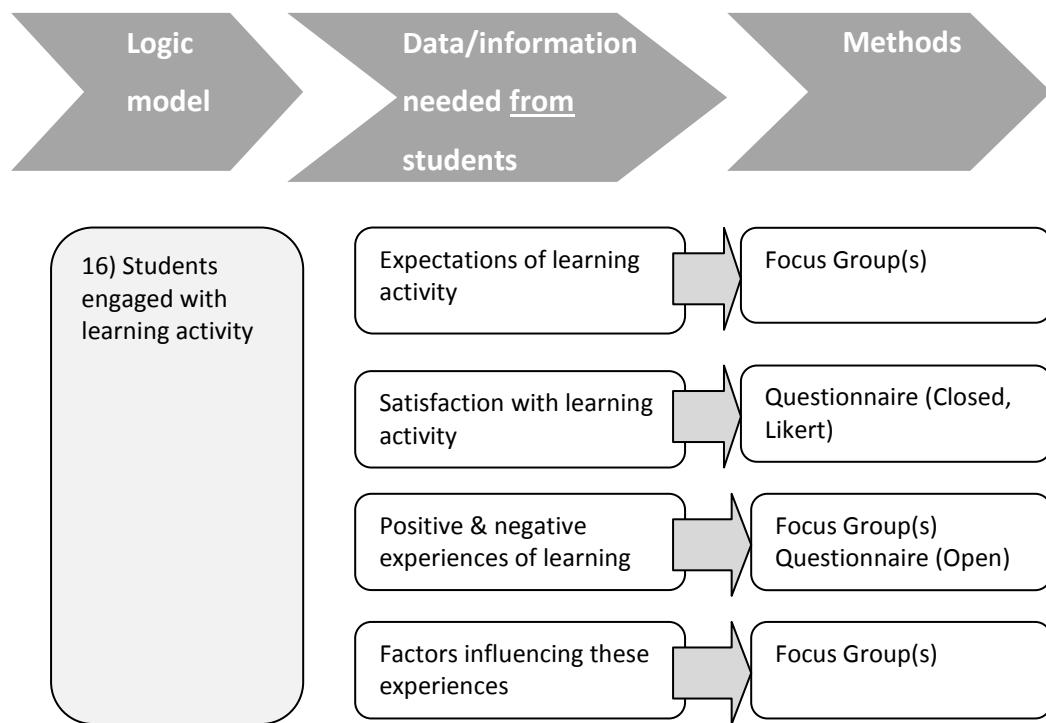
In the development of these matrices, 'observation' meant the evaluator's independent observation of learning activity. Examples were observations of tracking data available from the virtual learning environment, or contributions to its discussion board, or observations of how resources were introduced in class, or observation of learning activity undertaken in class. Data collected from students or staff members are based on their opinion, perceptions etc influenced by *their* direct experience and observations and how they made sense of these. It is in this sense in which the data generation takes a multi-perspective approach.

The evaluation matrix was then used to guide decisions about specific data and information needed and methods of generating these. They may be either quantitative or qualitative. Data generation methods are appropriate and contingent to the data and information considered relevant to the evaluation. For example, a relative measure of student satisfaction or opinion

could be collected using Likert scale questions, but rich, qualitative information about students' experiences is also relevant to help explain or qualify responses or to allow for issues to emerge.

Figure 5.1 shows the relationship between the logic model and decisions about specific data needed and methods relevant to generating these.

Figure 5.1: Relationship between logic model, data and methods



In addition, data generation was also guided by the overarching evaluation questions used to guide the synthesis and reflection process. These were those questions derived from consideration of the Viable Systems Model about the operation, effectiveness, appropriateness, impact and sustainability of the learning activity. This helped to focus the data generation process to explore with data sources the connections they were inferring between the different components of the activity, and their rationales for these connections. For example, in terms of effectiveness, the connections made between learning activity and the educational outcomes achieved by students.

A full outline of the data generation plan for case 3 is provided in Appendix 3, Section 1. Regarding the justification for the decisions about methods for Case 3, a questionnaire was thought to be

important to provide every student with the opportunity to provide anonymous feedback, and to gauge some relative measure of the strength of opinion with respect to key elements of the implemented learning activity. The questionnaires that were used to collect student feedback are included in Appendix 3, section 2. Because of the complexity of the initiative, it was also believed necessary to supplement this data with richer qualitative data, to allow exploration of students' accounts of their experiences, and their rationales for these accounts, in an open way. It was anticipated that this would allow for outcomes and connections not considered in the original change strategy to emerge. There was insufficient resource allocated for project evaluation to undertake in depth interviews, hence focus groups were considered to be the most cost effective approach to generating this data. The discussion guides prepared before the focus groups are also included in Appendix 3, section 2.

It was planned to explore the project team members' reflections on their own experience in relation to the student feedback in a discussion meeting to be held after the student feedback had been collected and synthesised and been made available to the team members to consider. It was anticipated that this would provide insight into their interpretation of students' feedback, and how this interpretation might influence their decisions about future implementation of the learning activity. The discussion guide prepared for this meeting can also be found in Appendix 3, section 2.

From a critical perspective, Midgley (2000) highlighted the importance of sweeping in wider perspectives from stakeholders who might provide more marginal views and stimulate more critical reflection on the interpretations being placed on the situation by those closer to it. In the context of Case 3, relevant perspectives that could be accessed to facilitate this wider critical questioning were those of:

- the visiting professor for one of the departments, whose permanent position was with a high profile construction company, and
- a member of Sheffield City Council, who was to attend the judging panel for the design presentations on the final interaction day.

It was originally planned to collect their views by telephone or email.

5.7. Stage 5

Implementing the chosen model and generating evaluation data.

The learning activity was fully evaluated in the first year that it was implemented with students in the Spring of 2007. At this time there were 67 students registered for the modules participating in the multi-disciplinary project. Further evaluation was also undertaken in the Spring of 2008. This latter inquiry focused on those issues that were found to be problematic in the first iteration, and explored some of the issues around the longer-term and wider impact. A significant change between these implementations was that the number of students involved in the multi-disciplinary project increased from 67 to around 100. Within the existing course design the impact was that the team sizes for the group work were increased from 7-8 to 13-14.

Distribution of the registered students and questionnaire respondents across the participating disciplines in 2007 is shown in Table 5.3

Table 5.3: Distribution of students across academic disciplines (2007)

	Registered students (Total n=67)	Questionnaire respondents (Total n=59)
Discipline 1- Module 1	11	5
Discipline 1- Module 2	1	4
Discipline 2	7	7
Discipline 3	25	21
Discipline 4	4	5
Discipline 5	19	16
Unknown		1

(Instances where no. of questionnaire respondents exceeds no. of students can only be explained by students being uncertain of the module code for the course and miscoding of their questionnaire.)

The aim was to have at least one student from each discipline in each team. However there was not an equal number of students from each discipline. The teaching team decided that a key determinant of group size was to be the number of students in the discipline with the smallest number of participants. In 2007 the 7 students from Discipline 2 was the determinant factor. Hence 63 students from Disciplines 1, 2, 3 and 5 were divided between 7 teams so that each team had one student from Discipline 2. Discipline 4 only had 4 registered students. This group was felt

to be too small to be a determinant of team size, as to ensure one of them per team would have made the team sizes too large. These 4 students were set up as a group of consultants on their own. Since this discipline expertise would not be available from within the other teams, the intention was that the other teams would seek expert advice from them as a group.

The core learning activity concerned student engagement in a collaborative sustainable design project. Before starting the project work, students were given the assessment brief for the project, and offered a series of introductory lectures about sustainable design issues, many of which were given by outside speakers. There was also an organised visit to the real urban development site which was to form the basis of their multidisciplinary team design projects.

The group work was facilitated over 3 interaction days in weeks 7-9 of the second 15-week semester in the academic year. This period was therefore interrupted by a three-week Easter break. During the interaction days students worked together in multi-disciplinary teams to construct a sustainable construction design for the context of a real urban development site. They were also required to make interim presentations about their progress to the teaching team. The purpose of the interim presentations was to enable the teaching team to give formative feedback to the student teams to help them develop their designs. The assessment took place on the final interaction day. This comprised a verbal presentation and poster articulating a design. As discussed in section 5.5.2, the assessment carried different weightings for the different disciplines involved in the project, and some of the students had other assessment components for the module in which the collaborative design project was embedded.

Students' feedback was collected on the final day of project activity, after they had presented their designs to the judging panel. In 2008, a shorter feedback questionnaire was used seeking only comments around broad themes (Appendix 3, Section 2 (iii)). In 2007, tracking data from the virtual learning environment was also analysed immediately prior to the focus group discussions so that any issues arising could be explored in them. Two focus group discussions were conducted. The first of these involved 8 students who had worked together as a team, the second involved 6 students who were from different teams. The rationale for the two different focus groups was that students might discuss their experience in different ways, depending on whether the discussion was with their own team members or not, due to the social dynamics within the groups.

The reflective discussion with the project team was scheduled for a few weeks after collecting student feedback, to give time for it to be summarised and circulated to the project team

members to consider. In 2007, two departmental stakeholders from outside the teaching team and the Visiting Professor also attended this discussion. Their role was to act as ‘critical friends’ to the team, providing an alternative perspective to those close to the project. This meant that only the Sheffield City Council member of the judging panel needed to be contacted by email for his feedback.

5.8.Stage 6

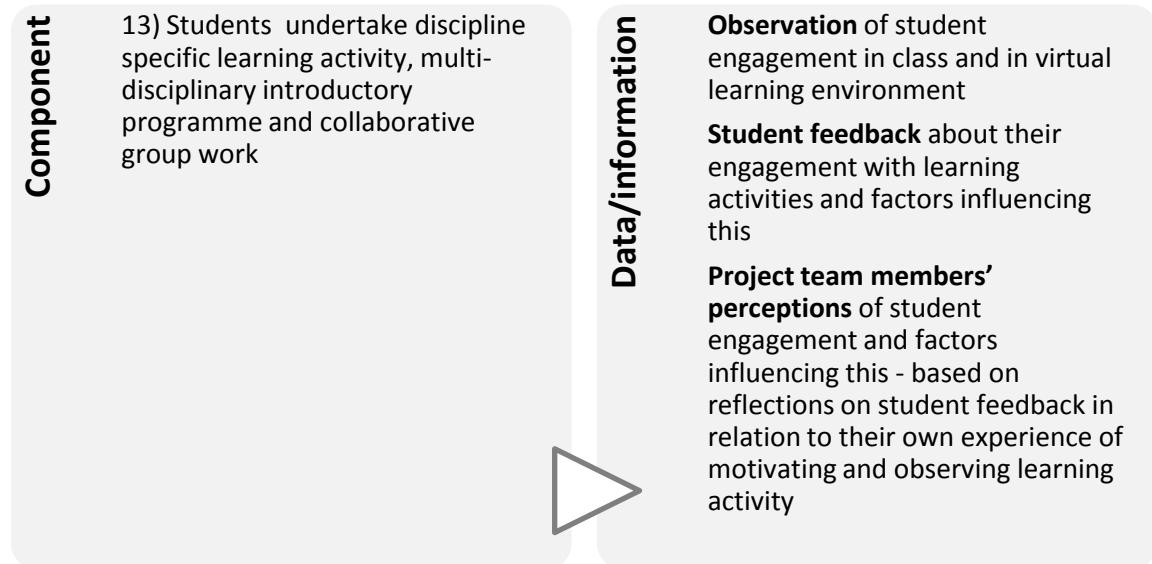
The evaluator synthesises and reflects on the meaning of data generated.

Of the 67 registered students participating in the multi-disciplinary project in 2007, 59 completed the feedback questionnaire and 14 students participated in the focus group discussions. In 2008, 70 students completed the much shorter feedback questionnaire. Questionnaire feedback, tracking data from students’ use of the electronic resources on the VLE, and transcripts of the focus group discussions, can be found in Appendix 3, section 3. The data is a mixture of qualitative and descriptive quantitative data. In the questionnaires, students were asked specific questions about the learning design, and asked to rate statements about it on a 5 point Likert scale. This scale placed 1 as the most negative and 5 as the most positive response. They were also provided with the opportunity to make freeform comments on questionnaires. This was synthesised with the feedback from the focus groups.

In 2007, 7 members of the teaching team participated in the reflective discussion, in addition to the two departmental stakeholders external to the team and the Visiting Professor. In 2008, 5 members of the teaching team participated in a reflective discussion. A transcript of the 2007 discussion can also be found in Appendix 3, section 3(v).

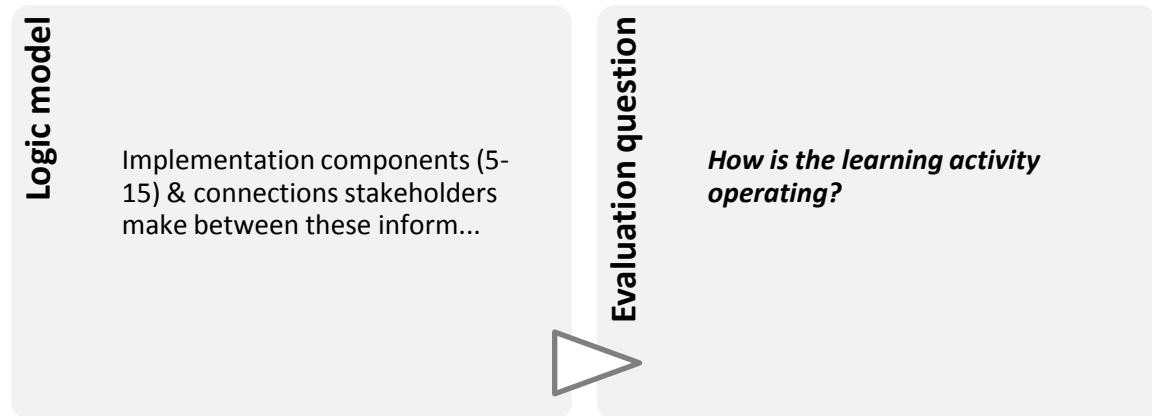
The systemic logic model (table 5.1) was used as a framework for synthesising and reflecting on the meaning of data in order to answer the core evaluation questions. Figure 5.2 illustrates how the data are triangulated to inform interpretation. The example shown is in relation to one component of the strategy, student engagement with learning activity.

Figure 5.2: Triangulation in the interpretation of data



5.8.1. Learning about the implementation and operation of the learning activity

This section summarises interpretation about the implementation of the learning activity, framed by the data about the implementation components of the logic model.



The sorts of questions that guide the synthesis and interpretation of data generated in context in relation to the operation of the learning activity are:

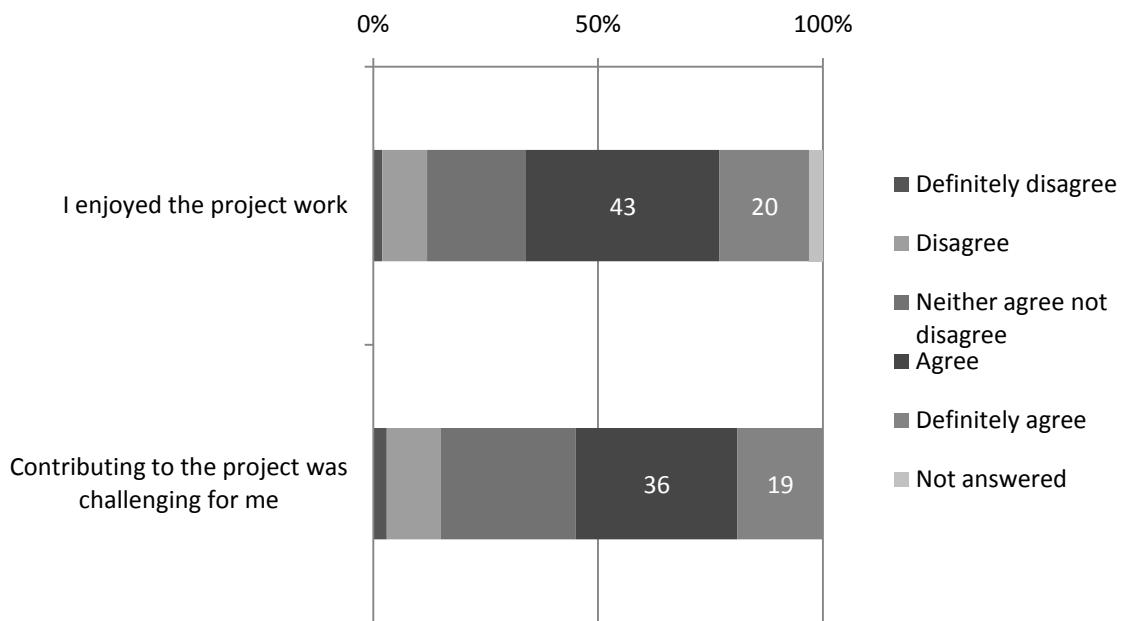
- How have the activities been undertaken? How is it different to that planned?*
- How have they been experienced by those involved?*
- What contextual factors do participants consider have helped or hindered their activity?*
- What rationale do participants give to explain how they have undertaken/engaged with activity?*

Project work in multidisciplinary teams

This was the core group activity intended to help the students achieve the educational aims.

Student opinion about the project work is reflected in data shown in Figure 5.3, showing how students rated statements about their enjoyment of the project work, and the extent to which they found it challenging. Strength of agreement progresses from left to right in the chart. This feedback was only marginally positive.

Figure 5.3: Project work



The questionnaire comments from 2007 and 2008, and the focus group discussions, provided a deeper insight into the reasons behind these ratings. There were many students who attributed their enjoyment of the project to the experience of working in multi-disciplinary teams.

Extracts from data: Student experience of working in multidisciplinary teams

"I enjoyed working with people from different disciplines. I would love for this to be done more often." (Student, 2007)

"Working with students from other departments has been long overdue." (Student, 2007)

"Enjoy working with students from other disciplines. Interesting to see how they went about understanding projects" (Student, 2007)

"Really fun to work with [Discipline 2s]." (Student, 2008)

"Working in a group, because ideas are highlighted that I wouldn't have thought of myself." (Student, 2008)

"Getting to know and interacting with people from other departments." (Student, 2008)

Another significant benefit that was recognised was the authenticity of the experience, provided by the opportunity to design for a real urban development site.

Extracts from data: Authenticity of project work

"Working on such a challenging, unique, important and large site." (Student, 2008)

"Investigating renewable energy schemes in a real environment." (Student, 2008)

"The good thing about it was that it was a real site which we had to handle." (Student, 2007)

Others enjoyed the challenge it presented and valued the opportunity it provided to do something more creative.

Extracts from data: Challenge and creativity involved in project work

"there was a lot of work involved with them [the presentations] but they were really good. They made you think quite a lot." (Student 2007)

"I enjoy being creative. Poster design was fun." (Student, 2008)

"I think the way they just encouraged us to just go crazy and be creative was a good thing." (Student, 2007)

"There were a couple of different takes on 'poster'. Some of them were 3D, which is quite interesting. Although they were a little hard to read. They put in little panels." (Teaching team member, 2007)

The most significant challenge was that presented by the team dynamics of the group work. Some of this was due to the usual problems that often arise with respect to team working e.g. personality clashes, differences in work ethic and willingness to contribute.

Extracts from data: General group dynamics

"Group politics resulted in a reserved attitude in leadership and negotiation." (Student, 2007)

"A certain member of the team put in little effort and rarely showed up. Hence there was more work for the rest of us." (Student, 2007)

These issues appeared to become more problematic in 2008 when the group sizes were increased from 7-9 to 12-14.

Extracts from data: Large group size in 2008

"Standard of work level from other courses was abysmal. With so many people it was too easy for people to sit in the background." (Student, 2008)

"In big groups time management can be a problem because everyone has other things to do." (Student, 2008)

"Too many people to work as a group and no accountability. This encouraged lateness and no work." (Student, 2008)

"The group was a bit large. Hard to give everyone work to do." (Student, 2008)

"It is very easy due to number of participants for individuals to get lost/disappear." (Student, 2008)

"Groups were too large. A lot of time was spent on making decisions." (Student, 2008)

However, there were some very particular problems associated with this learning activity, which students and staff attributed to the following influences.

(1) The diversity of the team members in terms of their different levels of previous knowledge and experience.

The majority (87%) of questionnaire respondents stated that they felt as *able* or *more able* to contribute to the project work than other members of their group, reflecting an overall confidence in the relevance of their previous knowledge and experience to making this contribution.

However, there were some negative student perceptions about the different skills, knowledge and experience that the disciplines brought to the group. The teaching team also thought there had been some difficulty involving the integration of the postgraduate students from Discipline 1 into the groups. Although the reasons for this at the time were not known, there was speculation that this had been due to their greater confidence and experience, as some had returned to study after spending a period in practice.

Extracts from data: Diversity in knowledge, skills and experience

"Such a programme requires arriving at decisions with a lot of discussions, but it is very difficult due to various restrictions of varying maturity levels." (Student 2007)

"I also feel that I had to spend a lot of time managing the group because there was a large difference in the understanding and knowledge in the whole group." (Student, 2007)

"In some particular groups, the [Discipline 1s] weren't very popular." (Teaching team member, 2007)

"Group work with different levels of academic backgrounds, i.e. mixing postgrads and undergrads. Had no problem with the flow of knowledge, but too much emphasis on group work with postgrads. OK with undergrads." (Student, 2008)

"And they are a lot more confident and a lot more experienced, the [Discipline 1s]. That leads them to take on a leading role. So there's this contradiction between their role in the group and the amount of time that they feel they feel it deserves really. And that leaves everyone else feeling a bit vulnerable." (Teaching team member, 2007)

(2) The different assessment weightings of the project for the different modules in which it was embedded.

The Discipline 1 postgraduate students' assessment for the project contributed only 10% to their module mark. For the undergraduate students the weighting of the project assessment was more, around 50% of their module mark. This led to different expectations about the contributions of each of the disciplines, which some groups found difficult to manage, and which caused conflict.

Extracts from data: Difference in assessment weighting

"The [Discipline 1s] students in our group sometimes objected to what we believe was a reasonable group contribution, leaving other members to take on more." (Student 2007)

"I think the difference in the way disciplines were assessed meant group members were pulling in different directions." (Student 2007)

"Major problems with people from other disciplines refusing to do their work. People were unclear on the percentage which the project was for them." (Student 2007)

"We had a problem in our group where the [Discipline 1] believed they were only doing a 10 credit module, so they literally told us they were unwilling to do any more work. They actually left it from the basic design stages to be developed by the [Discipline 3/5s]." (Student, 2007)

"It was lucky in my group that the [Discipline 1] was really good and did things all the way through." (Student, 2007)

"I would probably ensure that everyone was going to get the same marks for the project so you can expect the same amount of work from everyone." (Student, 2007)

"The project should be the same percentage for all group members to encourage fair contributions." (Student, 2007)

(3) Conflicting course requirements for some of the disciplines.

Because the project was embedded in different modules and different degree programs, this meant that for each of disciplines there were (often big) differences in their other work commitments outside the multidisciplinary group project work. For example, Discipline 3s had a dissertation to submit at around the same time.

Extracts from data: Difference in workload due to other study commitments

"Because group members from another discipline has other course commitments, I ended up having to produce a lot of the work, in addition to doing my report." (Student, 2007)

"The limited importance of the project during a stressful, critical time for final year students restricted the contributing effort for many." (Student, 2007)

"Had problems within group. Mainly other disciplines focusing on other projects and unwilling and sometimes even refusing to do any work. This led to the [Discipline 3/5s] doing a disproportionate amount of work." (Student, 2007)

"Struggled to complete work out of the interaction days at times due to other assessment commitments." (Student, 2007)

"Hard to organise because of the different courses, people having different obligations." (Student, 2008)

"I'm one of the people that really likes to get involved and definitely do my share, if not more, of the work. And I've not been able to do that because of the fact that we've had so much other stuff on." (Student, 2007)

(4) The roles that were expected of the different disciplines in the groups.

There was some guidance in project brief about Discipline 1s and 2s taking the lead in providing a design vision or 'Masterplan' for the design work. However, as one member of the teaching team pointed out:

"that didn't happen in the end. They all got together and they all started working together. There were just one or two students who said it would have been a good idea if they could have spent some time together initially to develop some overarching framework." (Teaching team member, 2007)

Students seemed to recognise the importance of this task of generating a design vision, and the dependency on the Discipline 1 and 2s in leading this. However, it has already been noted that some team members from Discipline 1 felt there was a limit to the time they could devote to the project because of its lower credit weighting in relation to their other work commitments. In some cases the Discipline 1 students wanted to be able to do more but felt constrained by the other team members. In another team, the other team members thought they were disadvantaged because their Discipline 1 team member ‘missed the point’ of the task. This dimension to the design of the group work was therefore also a source of conflict.

Extracts from data: Conflict involved in generating the design ‘vision’

“[Discipline 1s] should be allowed to design freely which wasn’t the case totally.” (Student, 2007)

“well it seems obvious that the [Discipline 1] comes in and takes the lead role and he defines the vision. But then if you’ve got the leader who simply misses the point or something like that, then you end up in a whole world of trouble because they can’t appreciatethis is the problem we had. They couldn’t appreciate the sustainability issue.” (Student, 2007)

“for the whole project [Discipline 1s] play an important role, because they need to prepare the Masterplan and the building as [??] and the part of [Discipline 3/5s] is to make it happen.” (Student, 2007)

“when our [Discipline 1] said ‘we are not going to do this, you get what we’ve done initially’, a block drawing, and you have to work to that. And that’s what we had pretty much from the outset. So without those skills, you are drawing on other disciplines to get to use those skills. But none of us had been trained on what they had initially done it on, so we couldn’t even improve it.” (Student, 2007)

Although there seemed to be clarity in the project design brief about the initial role of Discipline 1s and 2s, overall there was some lack of clarity about what was expected of the different disciplines in the group work.

Extracts from data: Lack of clarity about role of disciplines

"Most people not clear on which students were supposed to do what i.e. responsibilities for each course." (Student, 2007)

"Difficulty in understanding what was required of our discipline." (Student, 2007)

"More clearly outlined roles within the project for each degree so that appropriate amounts and types of work may be done." (Student, 2007)

"More structure is needed and roles of each discipline better defined from the start in order to make group work more productive." (Student, 2008)

This lack of clarity appeared to be central to the marginalisation of the Discipline 4 'consultants'. Because the decision to include them had been very late in the planning stage for the course, there had been nothing in the project brief that required the other teams to seek out the consultants. Their course leader stated that these students were not native English speakers (in both 2007 and 2008), and had fairly reticent personalities. This made it difficult for them to proactively engage with the other teams. Despite the teaching team being alerted to this issue in 2007, informing a decision to communicate to students more clearly the roles of the different disciplines in the process, this was not resolved by 2008. This is reflected in student comments such as:

Extracts from data: Marginalisation of Discipline 4s

"[Discipline 4s] had less knowledge than [Discipline 5s], were unhelpful and did not answer any questions. Unsure why they were there." (Student 2008)

"Groups wished for data that we had no access to i.e. flood heights, capacity of water/sewer networks." (Student 2008)

"Working with the 'consultants' who kept us waiting all week to answer our questions, then didn't answer them or provide any information, resulting in criticism at the formal presentation over the lack of water information." (Student 2008)

"I don't think they were very clear about their role. []They were fairly reticent characters, so for them to get in amongst all the groups ...and the groups didn't know each other either. It was quite daunting for them to do that. (Teaching team member, 2007)

(5) Difficulty in scheduling time for synchronous collaborative work.

This was due to the number of different disciplines, and hence teaching timetables, into which the work had to be integrated. The teaching team had expected that students would do additional work on their project at times other than the three scheduled interaction days. The Easter Vacation, which interrupted the interaction days, provided an opportunity for this. However, in many cases this did not happen. This came as some surprise to the teaching team. Their impression was one of students making insufficient effort or taking insufficient initiative to do this. From the students' perspective, there were issues related to students leaving Sheffield for the vacation, although there was some evidence that they were agreeing a division of responsibility to enable them to work separately on tasks.

Extracts from data: Difficulty scheduling collaboration outside interaction days

"Too few group meetings possible (timetable issues)." (Student, 2007)

"Times to meet up were often difficult with everyone's different workloads." (Student, 2007)

"I don't know about the other disciplines, but certainly in [Discipline 5] in weeks 7-9 they've got that module only and there's nothing else they have to do. [??] it really depends on whether everyone else is similarly available. If they weren't, then they may well have struggled to get time outside the interaction days." (Teaching team member, 2007)

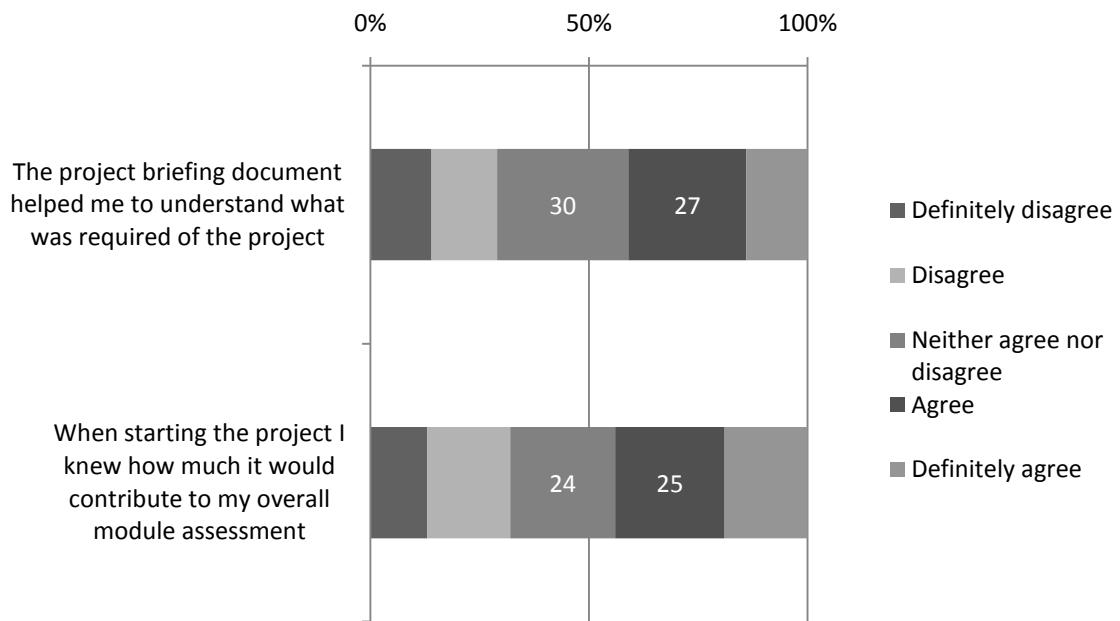
"This year they had that extra two weeks and not one of them said that they benefited from that extra time, which I thought they'd use. But they didn't. I think that if next year we make it quite clear that they make use of that two week period they might benefit." (Teaching team member, 2007)

"they phone each other on a Friday evening and say 'Lets go down the pub' and they all manage to get there. So they can do it.[] In other words, it's not impossible for them to do, but it didn't occur to them. I suppose we could forgive them that. But it does seem rather obvious, doesn't it?" (Teaching team member, 2007)

Assessment criteria and process

The assessment process and criteria were also outlined in the initial project briefing document. This involved creation of a poster outlining the group's sustainable design for the urban development site, and a verbal presentation of the poster to a judging panel. The questionnaire explored students' interpretation and experience of the assessment criteria and process through the Likert scale rated questions shown in figure 5.4 (again, strength of agreement increases from left to right in the chart).

Figure 5.4: Interpretation of assessment criteria and process



The distribution of responses shows that there was therefore mixed opinion about the clarity of assessment criteria and their communication, and the overall contribution of the assessment to their module mark.

In their questionnaire comments and focus group discussions, students stated that they found it difficult to interpret the project brief and other communications about what was required of them for the assessment. This largely concerned the extent to which their designs should be constrained or be more creative. Students complained that there were different communications at different times about what constraints to consider and how creative they should be.

Extracts from data: Lack of clarity about assessment criteria

"I think in a way they wanted us to be realistic but also have more creativity at the same time. Which that is really hard to balance." (Student 2007)

"It's not really clear how specific we are supposed to look at it, or how general, how wide the scope should be." (Student, 2007)

"[] but then at the last minute he says that you can broaden your creativity and do whatever you want." (Student 2007)

"We don't really understand what the jury are expecting from us. So that becomes another problem." (Student, 2007)

"Many people, even lecturers, were unsure what exactly was needed." (Student 2007)

"Clearer initial guidance at early stages as to what is required from individuals and the group as a whole in the assessments." (Student, 2007)

"I think we could have empowered them a bit more to be free." (Teaching team member, 2007)

"We were never clear I think. We were somewhere in the middle about freeing things up." (Teaching team member, 2007)

It was discussed earlier in the analysis that some students had enjoyed the opportunity to be creative. Others stated their need for explicit boundaries in line with what would be realistically expected of an authentic project, e.g. at least a budget. Comments from the teaching team suggested that these sorts of criteria were left implicit. They assumed students would explore and compare the economic implications of their design solutions compared to other potential design choices.

Extracts from data: Need for explicit boundaries

"you know they said about creativity, but realistically, there's economic issues to consider, and they didn't really bother with that." (Student, 2007)

"It would be really nice, as a project, if we have a budget, if they say 'respect this budget'." (Student, 2007)

"if it's not economically viable, is not worth building, is it? They just said ignore the economically viability of the area. And the development. Just go with your creative thinking." (Student, 2007)

"You could cost that particular solution and compare with another. And the groups didn't do that enough." (Teaching team member, 2007)

"It was something we did talk about a little within the actual groups themselves. It was restrictive in that we did give them [Development Group's] and [Planning Council's] vision and not explicitly, but implicitly constrained the project to that vision. And we talked about releasing them from that constraint." (Teaching team member, 2007)

There is no indication of the root cause of this, but students demonstrated in their discussion their own belief that the criteria that were being applied were not necessarily those made explicit by the teaching team. An example of this was their perception of how much effort they should put into using computer graphics and other software to make their work look of a professional standard.

Extracts from data: Implicit assessment criteria

"They always say 'Oh well, we aren't going to mark you on your computer skills', but you do get marked on your computer skills, you do get marked on how good it looks." (Student, 2007)

"If you're choosing a poster's that's going to be entered for a competition to win £1,100, you're not going to choose the poster that's got the best content but looks bad." (Student, 2007)

"everyone's been told that you're not meant to put that much effort into it. And I've said that 'well you're talking to me and I feel that the sort of level of work you're asking involves this amount of time and I simply don't believe that I'm working at GCSE level anymore." (Student, 2007)

"Some of them were better than others in terms of their layout and that kind of thing. But I don't think I was disappointed." (Teaching team member, 2007)

*"They **should** do them well." (Visiting Professor, 2007)*

Students from Discipline 5 also complained that they had not been told about requirements to complete other assessment components until just over a week before they were due, a few days before the presentation session. They also said they had been unclear about its contribution to the assessment.

Extracts from data: Lack of clarity about assessment requirements

"We thought we were completely devoted to just this one thing of producing the poster but the last week we were told [], we've got another submission for it which is a report, which would have been good to know from the start." (Student, 2007)

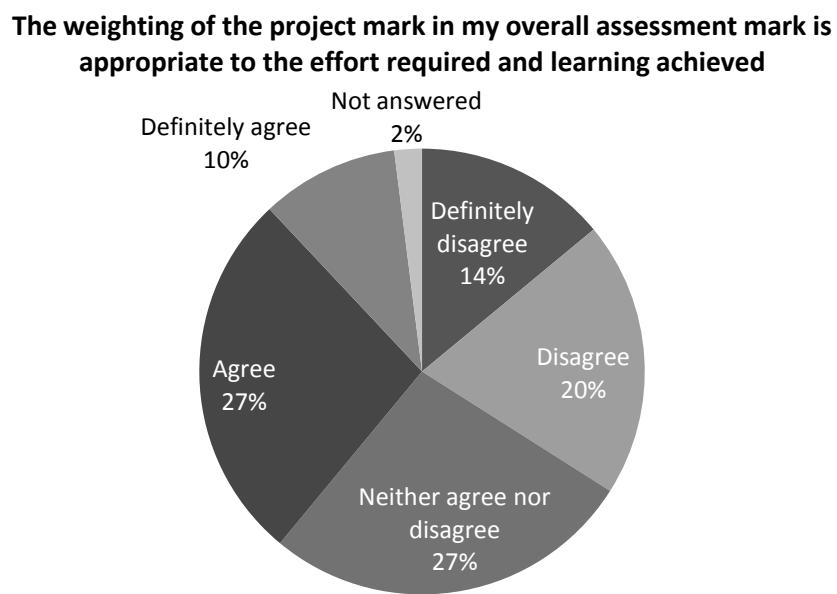
"We got email saying..it told us the weighting and then it said 'Oh, and so the [Discipline 5s] you also have to do a report, a 20 page report'. So while we were preparing for this poster and presentation we now have to do a 20 page report. It just came out of nowhere." (Student, 2007)

"Unsure generally on the weighting of our report to the presentation/interdisciplinary project." (Student, 2007)

"The [Discipline 5] students were only fully told how they were going to be assessed in the second week after work had already been done on the project. I think this is unacceptable." (Student, 2007)

There seemed to be a perception amongst many of the students that the amount of work involved for the project was more than they had expected and disproportionate to the weighting of the assessment of this component in the overall module (figure 5.5).

Figure 5.5: Proportionality of assessment weighting in relation to workload



Analysis of the responses to this question across the disciplines also showed variation in the mean Likert score for this question between the disciplines. For Discipline 1s the mean Likert scores were 1.75 and 2.80 for module 1 and 2 respectively, indicating their overall disagreement with the statement. These were the students for whom the project received a low credit rating in their module mark (10%). Discipline 3 students rated this question on average 2.80. These were the students who had heavy concurrent study commitments, and substantial additional assessment for their module. Discipline 5s and Discipline 4s rated this question on average much higher (3.31 and 4.00 respectively), therefore being more ready to agree with the proportionality of the weighting. Discipline 5s were the students who had no other study commitments at the time so did not experience any conflict in workload. Discipline 4 students were the small group of consultants who had trouble integrating. This will have been reflected in their workload. These explanations for the ratings only emerge by triangulating the questionnaire ratings with the qualitative questionnaire and focus group comments (see below, plus many that have been reported previously).

Extracts from data: Attitudes to assessment workload

"From a [Discipline 3] point of view, there's a lot of work previous to just this project. We had to do presentations and reports, and a website. That wasn't a lot of work in itself, but then added to this, it is quite a lot of work for the whole project. So maybe that's quite a high workload. But I think it's a really good module. I do. I think it's really good."
(Student, 2007)

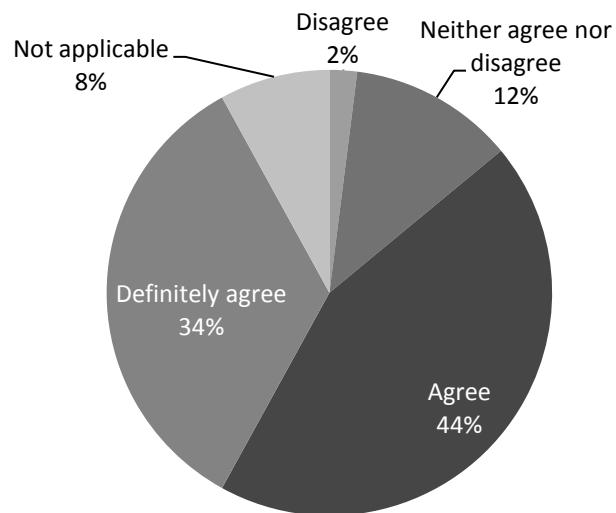
"I don't think it was really fair on the [Discipline 5s] because they've been the only people that have had the time to do the most work."
(Student, 2007)

Site visit

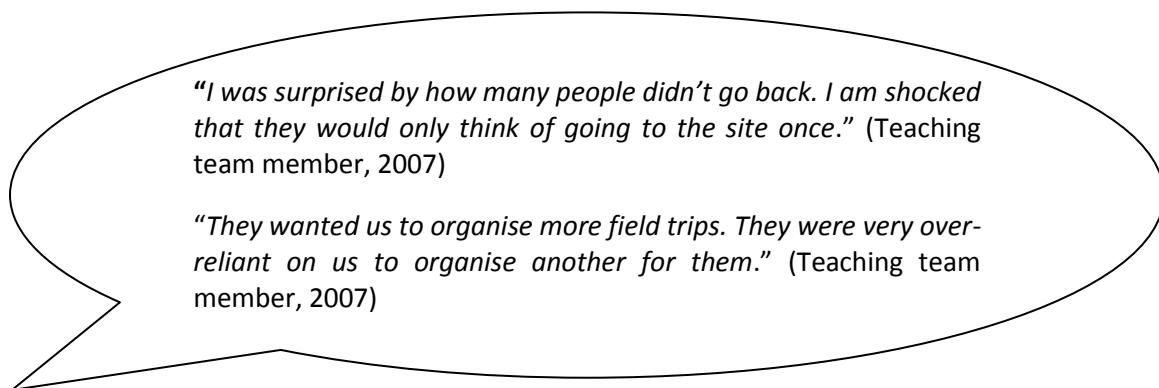
One aspect of the learning design that students were really positive about was the site visit. Those who went were largely in agreement that the opportunity to visit and explore the site had helped them to prepare for the project work. (See figure 5.6 for distribution of questionnaire responses).

Figure 5.6: Site visit

The site visit and project briefing provided a useful introduction to the development site



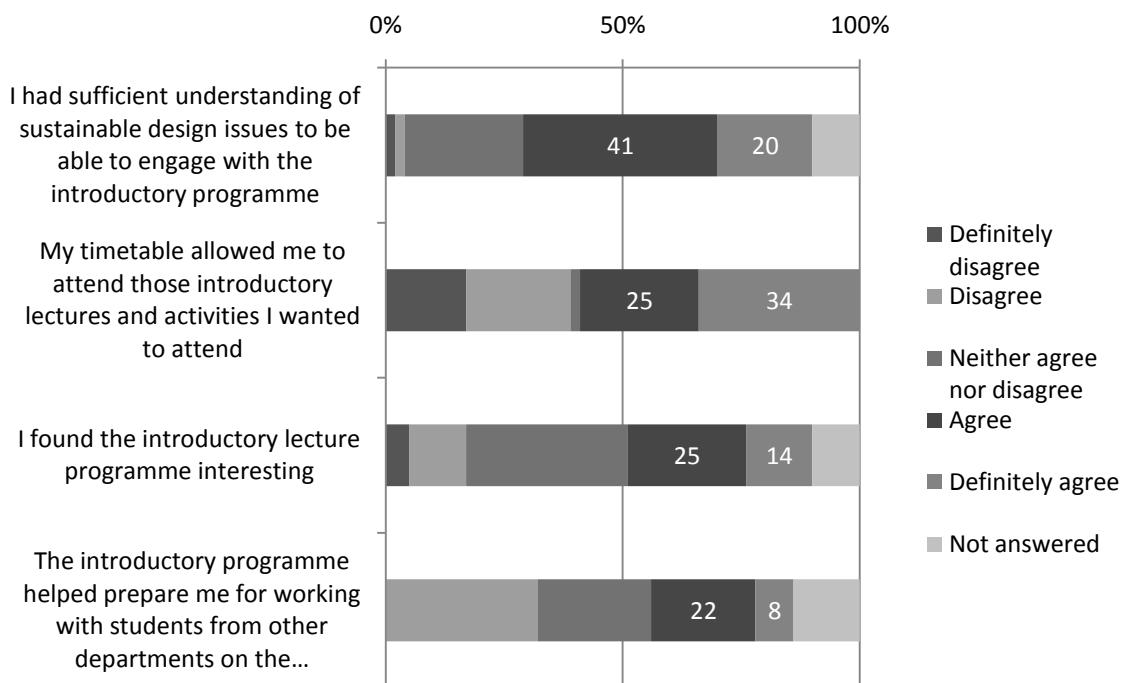
However, discussion in the student focus groups suggested that this had not been well attended. A member of the teaching team confirmed that attendance was “*about two-thirds*” of the participating students. The course leader for the Discipline 3 module offered the explanation that “*I actually had an assessment on that day that students had to do, that was part of my wider module.*” From the teaching team’s perspective, discussion shifted to the extent to which students should take some self-responsibility for experiences such as the site visit.



Introductory lectures

The specific questions and responses relating to the introductory lectures are shown in figure 5.7.

Figure 5.7: Introductory lectures



Despite the variation in knowledge and experience of the participating students, the majority of respondents to the 2007 questionnaire agreed that they “*had sufficient understanding of sustainable design issues to be able to engage with the introductory programme*”, suggesting that this had been pitched at the right level for most of the students.

However, 10% of these respondents marked this question as ‘not applicable’ or did not answer it, suggesting they did not attend. Rating of the statement “*my timetable allowed me to attend those introductory lectures and activities that I wanted to attend*” indicated that the lecture schedule clashed with other study commitments preventing attendance for a large proportion of the students.

This was confirmed by students’ comments in questionnaires and focus groups. One member of the teaching team pointed out that poor attendance in some of the introductory lectures had been partially affected by their location as it was some distance from the location of other lectures the Discipline 3 students’ were required to attend.

Extracts from data: Lecture attendance

“*some of the lectures are clashing with other courses. So we couldn’t attend the lectures for this project.*” (Student, 2007)

“*I couldn’t attend most of the lectures.*” (Student, 2007)

“*Organise so that everybody can make all the sessions.*” (Student, 2008)

“*I don’t think the location really helped our students, because they were having to go to other modules at the same time, and it wasn’t easy just to pop down there.*” (Teaching team member, 2007)

“*it’s not assessed. So there are plenty of students who are saying ‘if you are not going to test me on it, why should I?’*” (Teaching team member, 2007)

Of those who attended the lectures the responses were largely neutral about how interesting they found them, and only 30% agreed that they had helped them prepare for the work on the collaborative design project.

In contrast, the teaching team had a rather more positive impression of the impact of the lectures on the students who had attended. Typical comments from staff and students were:

Extracts from data: Lecture content

"Enjoyed learning about innovative building design, and the intro lectures are very interesting." (Student, 2007)

"If you did actually have time to go and sit in them then it kind of explains what different people's roles are." (Student, 2007)

"Initial lectures were pointless – We had members in our group from all other disciplines to give us information from their course, so why were lectures on these things necessary as well?" (Student, 2007)

"Most lectures gave good overview but it seemed unnecessary to attend lectures from own discipline." (Student, 2007)

"Some of the introductory lectures were of little use and repetitive." (Student, 2008)

Highlight = "Lectures from professionals within the industry." (Student, 2008)

"the ones that I saw were fantastic. And I tell you, [Name]'s talk about flooding caught their imagination like you would not believe." (Teaching team member, 2007)

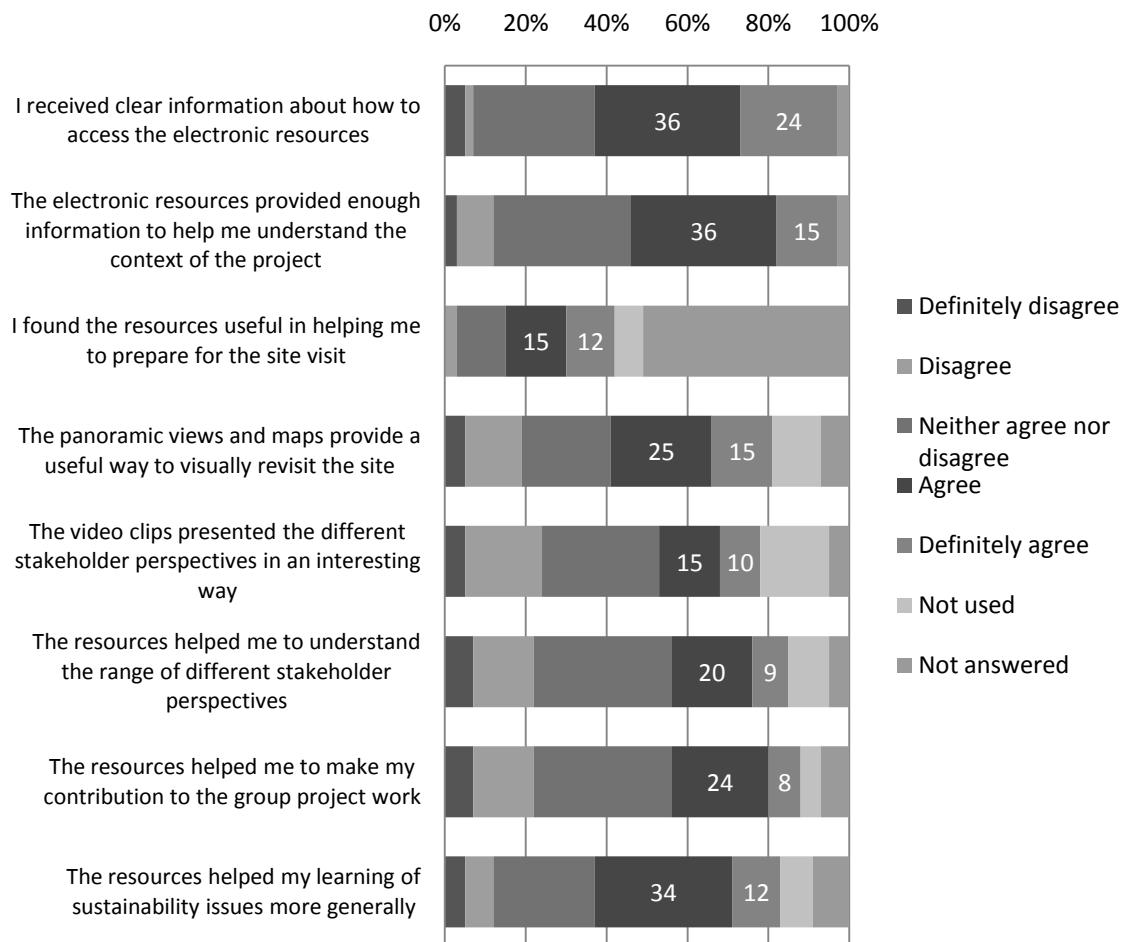
"I thought the lectures were excellent. They were really focussed on what they needed to know." (Teaching team member, 2007)

Electronic learning resources

The evaluation data also helped to highlight that, in 2007, the electronic resources were not used to support learning to the extent that the teaching team had hoped. The tracking data in the virtual learning environment suggested that these had been accessed and reasonably well-used by students (See Appendix 3 Section 3(vii)). 56 from the 59 questionnaire respondents (97%) also stated that they had used them and not experienced any problems in doing so. However, their ratings for the extent to which they actually helped them prepare for the site visit and do the project were only marginally positive. Figure 5.8 shows their responses to key statements about

the resources and their use, with the percentages of the students agreeing with the statement added to the chart.

Figure 5.8: Electronic learning resources



Comments from the focus groups and questionnaires revealed that students felt that there was really too much information in the e-learning environment to be helpful. Whilst the information about specific tools such as SPEAR (a model to guide the evaluation of sustainability) had been found to be useful, they thought there were too many planning regulations. There was some uncertainty about whether it was really necessary to consult all of this information to fulfil the project brief, and lack of clarity about what was required to meet the assessment criteria contributed to the difficulty in assessing what material was useful. Those students in the focus

groups stated that they had found the site visit more useful for setting the context and since they had taken their own digital photographs there was no real motivation to consult the electronic resources. However, some students had been unable to attend the site visit, which meant that these resources were essential if they did not take the opportunity to visit the site independently at a later date.

The only teaching team member who stated that the resources had been used in teaching sessions (rather than just signposted) was the member of staff who had been involved in their development.

Extracts from data: Electronic learning resources

"there was too much information on WebCT" ... "We didn't really know what to do with it." (Student, 2007)

"I think there was too much information about planning laws and things like that. I'm not sure exactly if we had to go through all that information and apply it to the design" (Student, 2007)

"Too much information [on WebCT] overwhelming." (Student, 2007)

"Very good resources, but there is too much information." (Student, 2007)

"There was too much information given (many documents explaining the same thing)." (Student, 2007)

"I think it can be narrowed down and say 'these are the key documents that you will have and they will be the guidelines as well'. Whereas now we cannot make sense of certain things." (Student, 2007)

"Programs were useful, like SPEAR. That's one program. I'd never used that before." (Student, 2007)

"We used them quite a bit for our previous presentation." (student, 2007)

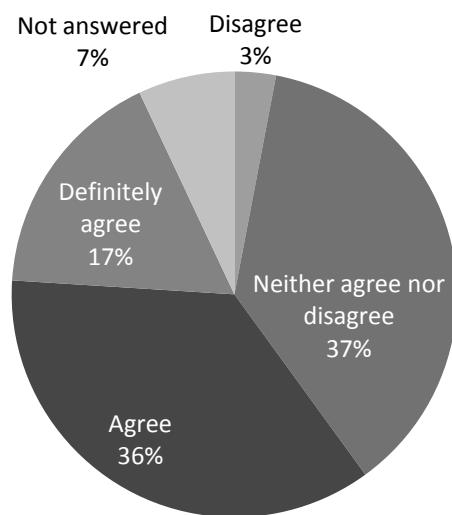
"I've actually been using them in lectures to explore the interdisciplinary project. I've a feeling that a lot of the students wouldn't have known too much about them." (Teaching team member, 2007)

Learning facilitation

In their 2007 questionnaire responses only 2 students indicated that they were overall dissatisfied with the support available from the teaching team (figure 5.9), although there were few comments from either the 2007 or 2008 questionnaire that were specifically positive about this support either.

Figure 5.9: Support from academic staff

My group was able to get appropriate advice and support from an academic member of staff when we needed it



In terms of the experience and learning of the teaching team, all of the team members stated that they had enjoyed their experience of being involved in the collaborative venture and learnt a lot from it, in particular in relation to:-

- how multidisciplinary group learning processes work;
- issues relating to the integration of a multidisciplinary programme into a discipline specific programme;
- issues relating to the communication and co-ordination required for an initiative of this scale and complexity, and the importance of a dedicated co-ordinator to progress the initiative. Partly because of these challenges it had already taken 4 years to progress the initiative to this stage.

They also felt the more general support they had provided had been useful for students.

Extracts from data: Teaching team members' experience of facilitation

"The interaction days were quite good. Sometimes the groups disappeared and we didn't see what dynamic was going on. But for the ones that stayed in the room they came, they asked questions that they needed to, so they were useful for them that there was somebody around to answer some questions." (Teaching team member, 2007)

"I really enjoyed the teaching. I'd like to have done a lot more, but I found that it required a huge amount of input. I did go along to a lot of the working days, because it helps you when you see their presentations. I would have liked to have spent a lot more, particularly the amount of time I've spent with them and how we worked." (Teaching team member, 2007)

"I think it's a great course. I've enjoyed being involved with it again. But it was a little bit frustrating because, working with our students who were working as though they were supposed to be a consultancy company. Just because they were on the edge of things." (Teaching team member, 2007)

"I think I got more learning out of it because [??] I've got an interest in group work. How they actually work together." (Teaching team member, 2007)

Most of the negative feedback from students related to the teaching team's communication about the aims and objectives of the learning activity and the assessment required.

Extracts from data: Poor communication of aims, objectives and assessment requirements

"Learning objectives and aims were not as clear as they could be."
(Student, 2008)

"We come back to the briefing there. Absolute mayhem, real mayhem. No clear intentions. Like you say, you haven't been let know what sort of work's expected." (Student, 2007)

"Given very poor information as to what was expected for the second presentation, leading to us not being able to present our work in the format that was required, leading to us not receiving any useful feedback." (Student, 2008)

"Lack of briefing of people assessing meeting 2 (told not to do Powerpoint and then expected to present our ideas from the front)."
(Student, 2008)

"Lack of guidance/framework for assessed work." (Student, 2008)

"Contrasting views in things from different lecturers." (Student, 2008)

"but in the beginning we were told we were doing..and then they changed their minds half-way through. I felt like saying 'well what do you want? Come on!'" (Student, 2007)

"We needed more info sooner." (Student, 2008)

Only one student acknowledged that this may well have been difficult for the teaching team in their first year, because of their lack of prior experience with this learning activity.

"Perhaps they didn't know themselves exactly what to expect from multi-disciplinary teams. Maybe next year, now they know what students can possibly achieve they'll have more of an idea..." (Student, 2007)

The teaching team accepted that at times they had been poor at communicating information to steer students through the learning activity.

Extracts from data: Poor communication of aims, objectives and assessment requirements (Teaching team perspective)

"There were various ways of solving issues at that site. Technical solutions, behaviour change, I'm not sure we pushed them, steered them enough until the end." (Teaching team member, 2007)

"We were inconsistent really." (Teaching team member, 2007)

"We did sort of switch canoes part way through the race." (Teaching team member, 2007)

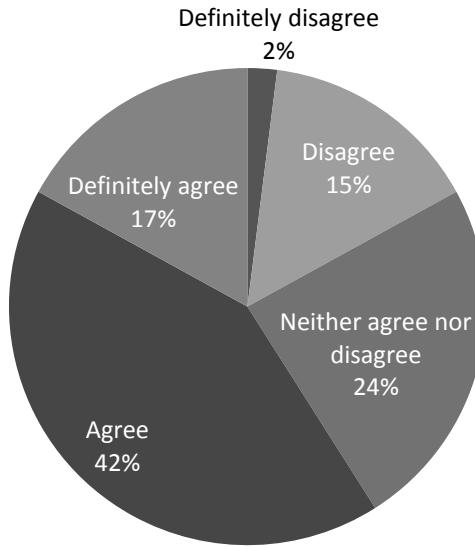
Co-ordination/Organisation

The teaching team's impression was that students were on the whole satisfied with the core elements of the design of the learning activity, but that the main source of dissatisfaction was a consequence of poor communication, and factors associated with co-ordinating and organising these activities. For example they had difficulty booking appropriate space for the introductory lectures and interaction. Problems with communicating the project aims and assessment requirements have already been discussed at length.

The students' rating of the statement "*the introductory programme and interaction days were well organised*" (figure 5.10) suggested that student impressions were perhaps not as bad as some of the comments or the team members' interpretations might suggest, with only 17% of respondents disagreeing with this statement.

Figure 5.10: Organisation of introductory programme and interaction days

The introductory programme and interaction days were well organised

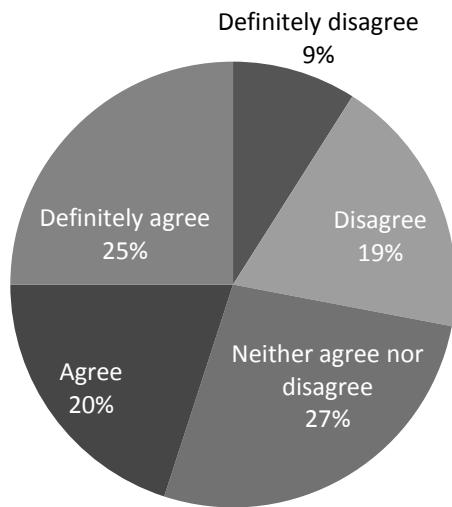


The students' feedback suggested that they were not actually unhappy with the environment in which the learning took place. What had been more problematic was the scheduling of introductory lectures, site visit and the project work to fit in with the timetables for all the different courses, and with their other study commitments.

It was difficult to satisfy such a diverse group with respect to the timing and duration of the activity. For example, there was a relatively even distribution of ratings with respect to the questionnaire statement "*The time allocated for the project was sufficient for the tasks to be completed effectively*" (figure 5.11). There were also many comments expressing an opinion that the duration of the learning activity was not long enough. This was also linked with the earlier observations that students had not taken up the opportunity to work together outside the interaction days to the extent that the teaching team had expected.

Figure 5.11: Adequacy of time allocated to complete project tasks

The time allocated for the project was sufficient for the tasks to be completed effectively



Extracts from data: Duration of the learning activity

"Timetable for the project is a little bit hectic. More time would be delightful..." (Student, 2008)

"At least 1 more week should have been incorporated to allow for a better produced end product." (Student, 2008)

"Time frame for the project was a bit too short, coupled with the fact that we had other modules to cope with." (Student 2008)

"as to the timetable, 3 days wasn't enough to approach the problems that came up." (Student, 2007)

"we had only a time-span of 2-3 weeks for the project. That's not really enough time." (Student, 2007)

"We had to rush as well to do everything. And everyone wanted to do it better, do it more professional, consider more issues." (Student, 2007)

"If that's the only day they're getting it together then they are not doing it right. We gave them three weeks!" (Teaching Team member, 2007)

Many of the comments regarding timing reflected students' concern with the conflict with other study commitments, and a desire to shift the project to avoid this conflict.

Extracts from data: Timing of the learning activity

"Should have been earlier in the academic year (start of term, not the end)." (Student, 2008)

"The timing was awful- put it in weeks 1-3!" (Student, 2008)

"The project should have started earlier in the semester." (Student, 2008)

"It would have been beneficial to undertake this course earlier in the degree programme –perhaps not to the same degree of detail, but it would have been help to learn about other disciplines from an earlier stage." (Student, 2008)

"The timing – we have dissertations to hand in next week." (Student, 2008)

"The best thing would be to move the whole module to the first semester, when everybody's not really busy with their dissertations." (Student, 2007)

"It was a bit awkward this year because we had the one week, and then the three weeks when they couldn't really talk to each other, and then the two weeks after Easter." (Teaching team member, 2007)

Some of the comments about the duration related specifically to the issue of group-forming, and how there was insufficient time allowed for this *and* to do the group work.

Extracts from data: Group forming

"but it [group forming] simply doesn't work in the time frame or the structure that's been given if you don't have the structure of group already." (Student, 2007)

"I think it's a bit rushed. I think we should have a day before. At least people will know which group they are." (Student, 2007)

"At least to know each other beforehand, rather than wasting the day getting to properly know each other." (Student, 2007)

"We could have used some of that time [lecture days] a bit more productively to introduce the groups, even if it was just half an hour. Because that's all it would take really, before the first interaction day." (Student, 2007)

5.8.2. Learning about the effectiveness of the learning activity

This section summarises and synthesis data generated about the outcome components of the logic model and the connections stakeholders make with these and the implementation. Consideration of this data helps in the assessment of the effectiveness of the learning activity.

Logic model

Outcome components (16-18) & connections stakeholders make between these and the implementation components (5-15)

Evaluation question

Has the learning activity been effective?



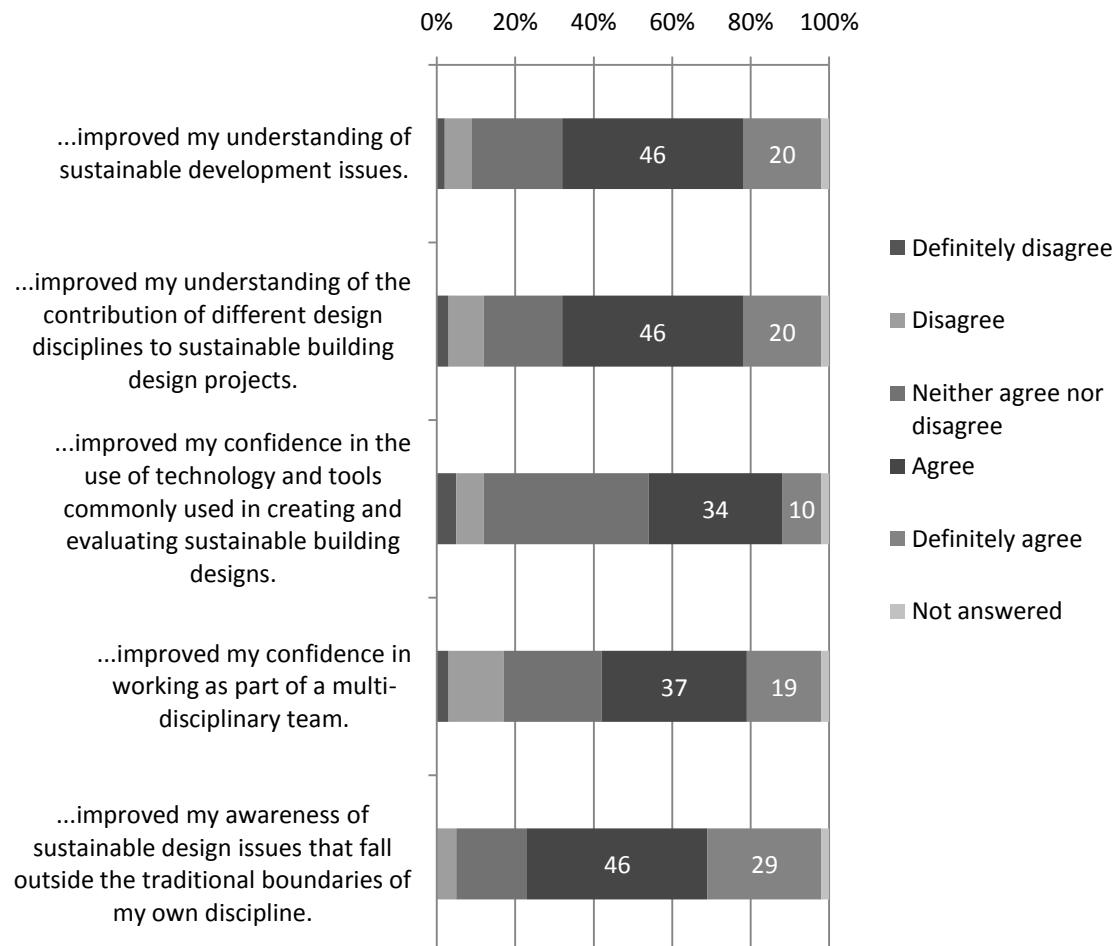
The sorts of questions that guide the synthesis and interpretation of data generated in context in relation to the effectiveness of the learning activity are:

*Have the different stakeholders experienced the outcomes and benefits intended for them?
Are the activities/enablers/resources perceived by stakeholders to be having a positive influence on achievement of these outcomes and benefits?
What has been learnt about what is working/not working?*

Students' perceptions of the learning activity overall were only marginally positively about the extent to which they thought the experience of working on the project had helped their learning (figure 5.12). They were most positive about the extent to which it had improved their awareness of sustainable design issues that fall outside the traditional boundaries of their own discipline, but least positive about the extent it had improved their confidence in using technology and tools commonly used in the design process.

Figure 5.12: Connection made between learning activity and learning

Taking part in this project has....



The theme of improving students' learning about sustainability was also reflected in the questionnaire comments. In addition, in both questionnaires and focus groups students talked

about how the experience helped them to develop or consolidate more general and transferable employability skills such as communication and IT skills.

Extracts from data: Student learning

"Increased awareness of sustainability outside construction aspects (i.e. social, economic sustainability.)" (Student, 2008)

"Learning about the sustainability issues and solutions in the UK, since I am an international student." (Student, 2008)

"Learn more sustainable issues not only from lectures but also from students of other courses." (Student, 2008)

"Gained knowledge of a wide range of problems faced by developers of sustainable 'communities'." (Student, 2008)

"Far more aware of the roles of the other disciplines which they may need to undertake." (Student 2007)

"Improved understanding of what other disciplines can contribute." (Student, 2008)

"Improve my teamwork and communication skills." (Student, 2007)

"Learned how to work as part of a team." (Student, 2007)

"Team work and presentation skills." (Student, 2008)

"Experience in giving presentations (increased confidence)." (Student, 2008)

What is particularly notable is that despite their frustrations with the group work, there was recognition that was aligned with the teaching team's perspective that it was central to the intended learning that they experience the tensions involved in working in multi-disciplinary teams.

Extracts from data: Learning about tensions in multi-disciplinary team working

"Learning to cope with the frustrations of team work." (Student, 2008)

"Taught me to listen more and respect other discipline views." (Student, 2007)

"I guess that's what we are meant to be learning i.e. this whole thing." (Student, 2007)

"in the reflective session we had afterwards they actually said maybe it's not about the disciplines themselves, it's about the people. I think that was something else that they learnt. Because they don't get those kinds of reactions or that sort of interest because of the different disciplines []. it's the different personalities involved. They learnt to work with different people." (Teaching team member, 2007)

The teaching team also thought that the learning activity had been effective in helping students achieve the intended learning. Team members were pleased with the quality of the designs that groups presented to the judging panel for assessment, particularly given the time constraints on the activity. The member of the judging panel from Sheffield City Council (2007) was also impressed with what the students had achieved in the time available to them, and thought the posters and presentations showed a good grasp of sustainability issues relevant to current design practice.

However, some of the teaching team thought the students presenting in 2007 could have done more to 'bring the site to life' and to convince the judging panel of the value of their designs by rationalising their design choices more explicitly, particularly in relation to how they fitted in within the wider context of the whole urban development site.

Extracts from data: Students' assessment outputs

"They didn't bring the site to life. It could have been a site anywhere."
(Teaching team member, 2007)

"I was a bit surprised that they didn't say well 'here's how we did it, and made this choice rather than doing x, y and z because we are confident the social benefits or the environmental benefits or the economic benefits – and we have calculated them and we can demonstrate the benefits in this way." (Teaching team member, 2007)

"I'd like to see more role play. To give them more of a sense that they are teams of consultants [] they have got to sell their ideas to us, whoever we are. I wasn't in the presentations, but I didn't get the impression that they were 'making a pitch' for their ideas and their ideals." (Teaching team member, 2007)

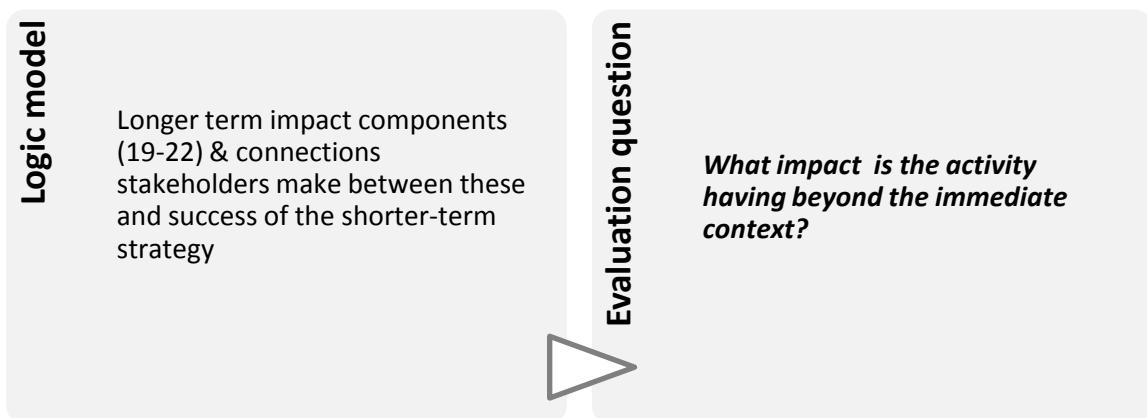
Instead, there was a tendency to focus on the technical details of implementation rather than the design vision. This meant that the presentations often came over as an academic presentation rather than a professional attempt to 'sell' a design based on its vision. Staff attributed this to a combination of factors. In the groups, students from two disciplines (3 and 5) outnumbered students from other disciplines. Discipline 1s and 2s, who had the possibility to influence the design vision the most, were in the minority in the teams, and Discipline 1s also had the lowest credit rating for their input into the process. The lead presenter may also have felt more comfortable presenting the design from the perspective of their own discipline. It was also suggested that students had become confused by what was required of the final presentations because the earlier formative presentations had required them to focus on the vision and their rationalisation for the choices made. As a consequence, they may have thought that their final presentation should be more focused on the specific site they had chosen, on the assumption that their idea was now acceptable as a design choice.

5.8.3. Learning about the other project activities, outcomes, and longer term impact

This section synthesises data generated about other activities and the longer term impact components of the logic model. For other activities, questions that need considered are similar to those targeted at the implementation of the core learning activity.

*How have the other activities been undertaken? How are they different to that planned?
How have they been experienced by those involved?
What contextual factors do participants consider have helped or hindered this activity?*

Connections stakeholders make between the shorter-term strategy and progress with the longer term intended outcomes help to answer the core evaluation question about the impact of the learning activity.



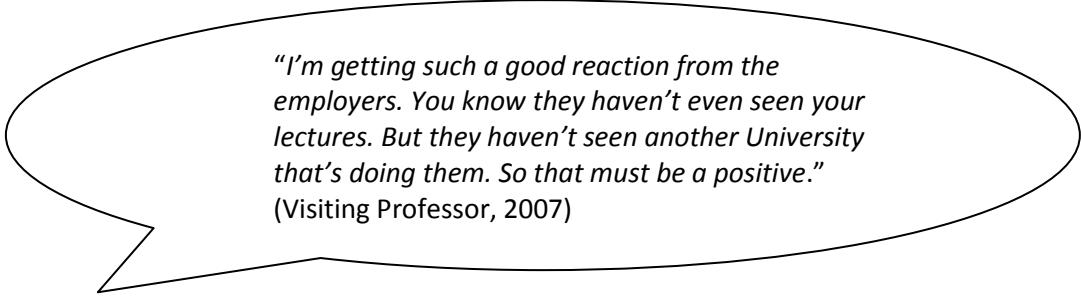
The sorts of questions that guide the synthesis and interpretation of data generated in context in relation to the impact of the learning activity are:

*What has been learnt that is of wider applicability or interest?
What information is there about progress towards the longer term intended impact?*

In terms of the other project activities and outcomes, this largely concerned the teaching team's sharing of their experience and learning from the collaborative teaching venture with the aim of (i) recruiting other collaborators to the venture, (ii) improving the working relationships between disciplines with an interest in the built environment and (iii) improving teaching practice more generally.

By 2008 the project team had made significant progress with sharing their learning both within the institution and outside (for example see Hughes and Hart 2007). Much of this shared learning related to how multi-disciplinary group learning processes work, and issues relating to their integration into a discipline-specific programme. The team also received recognition for its innovative approach in the form of a teaching award in 2007. In 2008, it was also still looking likely that a further discipline would be interested in joining the collaboration (see summary of discussion, Appendix 3, section 3(vi)).

Progress with the longer term and wider impact associated with the core student learning activity is illustrated by the visiting professor's comments that her external contacts in industry were already showing great interest in employing the graduates from the course because of the authentic nature of the project work.



"I'm getting such a good reaction from the employers. You know they haven't even seen your lectures. But they haven't seen another University that's doing them. So that must be a positive."
(Visiting Professor, 2007)

5.9. Stage 7

The evaluator and the designer/decision maker reflect on what has been learnt from the evaluation and its implications for further change

5.9.1. First order boundary critique: of the learning activity

The focus here is on critical reflection on the boundary judgements made about the learning activity. This involves considering what has been learnt about the implemented learning activity (or 'is' mode) that has implications for decisions about future implementation (the 'ought' mode).

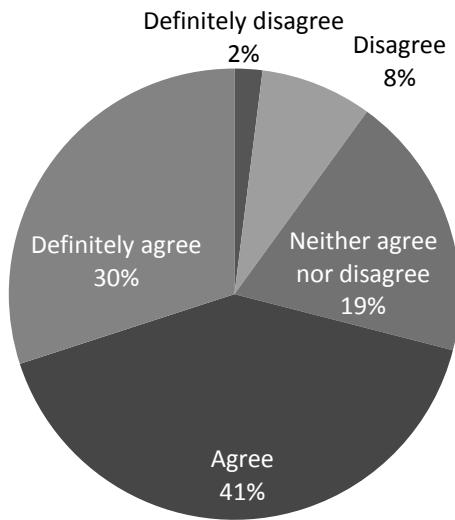
Sustainability and viability of the approach

The focus here is on the relationship of the 'system in focus' with its wider environment. Core questions from CSH are about the purpose and client of the learning activity that guarantee its continuity. The outcomes and impact therefore need to be relevant to these clients. In Case 3 the primary clients were considered to be students who are intended to immediately benefit from the learning activity, with longer term clients being those employers and wider society that might stand to benefit from the knowledge and skills developed by these students.

The data collected during the evaluation suggests that students very much considered themselves as 'clients' of the activity, undertaking learning that would benefit them in the longer term. In 2007, strength of opinion about this issue was explored through questionnaire statements requiring Likert scale rating. The distributions of responses are shown in figure 5.13.

Figure 5.13: Relevancy of project to future employment

Taking part in this project has been relevant to the kinds of situations I think I will face in my future work



However, comments from the 2007 and 2008 questionnaires, and discussion in the focus groups give more insight into the value the students placed on the learning experience, in terms of providing them with key employability skills and preparing them for their future careers. This relevancy was perceived in relation to both the multi-disciplinary dimension to the project, and its importance in raising their awareness of sustainability issues, particularly outside the boundaries of their own discipline, and developing their skills in sustainable design. Illustrative comments were:

Extracts from data: Relevancy of learning to students

"But that's the best part of the module. You are coming now to the [job] market and you've got to work in a big company, and it's multi-disciplinary, the company, and you don't know how to communicate because you never learnt this. With this module it helps you to have an image of how a team works" (Student, 2007)

"If you think about the point of a degree, it's to get you ready for the business world. I think it's absolutely essential. You just learn so much. I mean you can sit and look at your notes and revise for an exam, do an exam, and forget about it after a month, but with this []— you'll remember it when you go into a job." (Student, 2007)

"The thing that I learnt as well with sustainability is that it's not just the architect or the engineer's role to make sure everything is sustainable, everyone has to take part in it. Everyone has to think 'sustainable'. (Student, 2007)

"It teaches team work which will be important later in professional life." (Student, 2008)

"Learning and working with other disciplines, which will help me in my career." (Student, 2008)

"Experienced what it would be like having to work in a real company." (Student, 2008)

"Working with other people because in future when we went to work in office we will have to work with different people, so it was really good experience for me." (Student, 2008)

"I think a lot of people in our year are now looking into going into building services as a career, and it incorporates quite a few issues that you will experience when you go into that industry as well" (Student, 2007)

Both the visiting professor and the judge from Sheffield City Council (in 2007) also thought the approach highly relevant to introducing students to issues and experiences that they will face in practice. In particular, the visiting professor reported that her external contacts in industry were already showing great interest in making contact with graduates from the course with a view to

future employment, because of the authentic nature of the project work. There was also the interest being shown from other academic departments to join the initiative.

Extracts from data: Relevancy of learning to employers

"I've spoken to other people apart from [Company name], and you know if you are putting out graduates like this, this year, with this experience, they will be at the top of the list to get jobs." (Visiting Professor, 2007)

"I've been asked to get them students who will work in either Britain or Canada. [] They are biting my arm off to get them to come and see them." (Visiting Professor, 2007)

"Our graduates get jobs, but with this course you're 'the golden child'." (Teaching team member, 2007)

"What's interesting as well, is that a lot of our students, our top students, are going on to work in building services. And I've never seen this happen before." (Teaching team member, 2007)

In terms of the sources of control that might affect the sustainability and viability of the learning activity, the key concern here is who occupies the role of [System 3] 'decision maker' and whether this is working. Here the teaching team had a 'core' team of decisions makers. These were the module leaders responsible for each of the modules based in the participating departments. Strategic decisions about the organisation of the learning activity were made through periodic meetings (three times per year). From my observations of three of these meetings, it did appear that everyone was willing to contribute and had a voice in the decision making. Perhaps one of the issues that emerged from the data about this case, is the length of time it took to make a decision. This is a common issue for approaches that attempt to involve more people. As was stated in the reflective discussion (Appendix 3, Section 3 (v)), the educational development work had taken 4 years from inception through to completing the first implementation of the learning activity. An example of the impact on operational activity is that there were some problems associated with the booking of rooms being made quite late in comparison with other courses, such that the most suitable space for the learning activity was not available. This could also be linked to decisions being made later than should ideally be the case.

In terms of the availability of resources required for the operation of the learning activity, and the extent to which they were within the control of these decision makers, there were a number of issues relating to this.

The first was that the team had been reliant to some extent in the first couple of years on some pump-prime funding granted for the initial educational development work. This had enabled them to appoint a dedicated co-ordinator to help with the operational decision making and co-ordination, and had funded the expenses incurred by visiting lecturers, costs of transporting students to the urban development site on which the project was based, and the development of the electronic resources. This funding would no longer be available for 2009. Sustainability of some of this activity in the long-term was partially being addressed by video recording lectures so that they could be accessed from the virtual learning environment and viewed at any time by students. The electronic resources were also expected to be re-usable for 2009. However, the team considered that the co-ordinator post was essential for the continued success of the learning activity, particularly given the problems with communication and co-ordination already identified. The evaluation in 2008 also identified that some students were already commenting that the real site on which students had to base their designs was becoming overdeveloped. The team thought that a new site would need to be found for 2010, which would also mean that a new set of electronic resources would need to be developed. All of these issues illustrated that for the multi-disciplinary project to remain sustainable in its current form, the teaching team would need to seek alternative sources of funding. During the reflective discussion in 2008, several potential sources were identified.

Other issues that had the potential to impact the sustainability of the learning activity were:

- the experience of the teaching team members was that the learning activity used a lot of teaching resource. Whilst the experience had been enjoyable, and there was a desire to do more, it was not feasible to dedicate more hours to this activity than was allowed for in standard workload allocation models in each of the participating departments, because of other commitments.
- the increase in student numbers associated with further disciplines becoming involved would make it more difficult to find appropriate space for the lectures and collaborative work and to co-ordinate timetable slots to maximise students' chances of attending introductory lectures.

Implications for change

This section involves consideration of what has been learnt from the inquiry into the appropriateness of the implemented learning activity that could inform decisions about change. First order boundary critique guided by CSH requires critically questioning the role of stakeholders in the learning activity and the extent to which they have control over their interests. It also directs critique of the role of the ‘designer’ in modelling change, and this process of modelling change.

Despite the students’ mixed feedback about some of the elements of the implemented learning activity, overall the data suggests that students’ perceptions are aligned with the designer/decision makers’ perspective that they are the main client for the activity and they understand and value purpose and outcomes in terms of the experience and learning with which it provides them. This is reflected by comments such as:

Extracts from data: Overall satisfaction of students

“In terms of the actual course though, what they’ve actually provided for us has been really good. It’s really different to anything else we’ve done.” (Student, 2007)

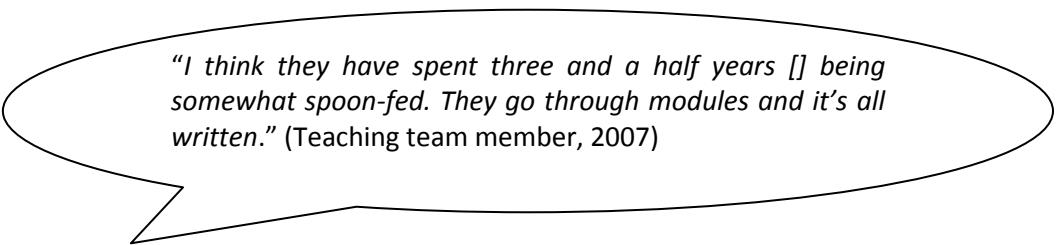
“I’m quite happy with the way it all turned out. In the end.” (Student, 2007)

“Most of the negatives come out of how hard it is to organise it, when to have it, and how long to spend on it. And a lot of these negatives are things that students moan about all the time, in lots of other modules.” (Teaching team member, 2007)

The qualitative data provides insight into the quantitative measures of their opinion of the course, and this suggests that they *did* experience fundamental features of the pedagogical design positively, but the factors which counterbalanced this and generated negative feedback were related to co-ordination and communication issues, and issues specific to integrating the approach into the discipline specific modules.

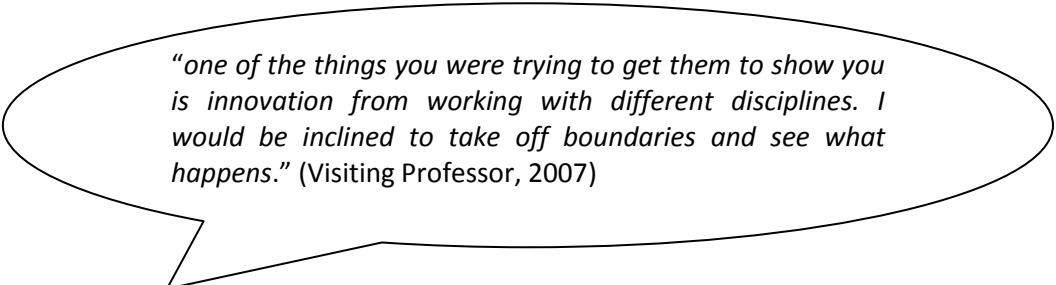
The teaching team reported that they had found it a challenge to implement their model of the learning activity due to the complexities of bringing together a teaching team and students from so many departments.

They agreed that they had perhaps not done enough to make students confident in making more creative design choices, and had perhaps given inconsistent messages to students about their expectations. However, they also felt that some of the negative feedback stemmed from students' over reliance on staff for guidance, having previously been 'spoon-fed' in the earlier part of their programmes.



"I think they have spent three and a half years [] being somewhat spoon-fed. They go through modules and it's all written." (Teaching team member, 2007)

The Visiting Professor in the role of 'critical friend' regarding the evaluation and design of the course suggested:



"one of the things you were trying to get them to show you is innovation from working with different disciplines. I would be inclined to take off boundaries and see what happens." (Visiting Professor, 2007)

This informed the team's decision to improve the clarity of the project brief for 2008, to make more explicit the creativity expected of students and to remove some of the constraints that were in the initial brief. They also intended to emphasise students' roles and responsibilities for their own learning.

Extracts from data: Improvement in communication

"It could definitely be sharpened up and made more positive and explicit next year." (Teaching team member, 2007)

"I think we did send out some mixed messages. But we can obviously learn from that and improve it next year." (Teaching team member, 2007)

"I think it does need to be made more explicit what their role is. I don't know if it needs to be directed though." (Teaching team member, 2007)

From students' positive comments, it was also clear that their engagement with the learning activity was leading to the intended learning, and that this was valued. However, due the many frustrations students voiced about their engagement with the group work, the teaching team learnt that they needed to communicate more effectively the centrality and value of the group working experience to the learning, despite the inevitable challenges it presents. This would involve more explicit encouragement of students to reflect on these challenges and what is learnt from them.

Much of the earlier discussion about the data reflects that the teaching team were very aware of the issues relating to power and conflict in the learning activity, and that some of these were a product of the learning design and the decisions taken about operationalising it, i.e. the dominance of the Discipline 3/5s' perspectives because of their greater numbers, the power of Discipline 1/2s in generating the overall design vision and hence the reliance of other students on this, and the marginalisation of the Discipline 4s.

Although the teaching team considered that it "*would be a significant improvement if [Discipline 1s] were embedded more to make sure they were pulling their weight*" (Teaching team member, 2007), they felt that this was one issue that could not be changed because of the relationship of the group project with the content and structure of each of the wider module.

With respect to the dominance of particular disciplines in the group work, the team thought it was unrealistic to expect that there would ever be equal numbers of students from each discipline participating so that the power balance of the disciplines in each team would be more equally

distributed. They also thought that this imbalance in power also reflected some of the real experience of practice that was intended by the learning activity.

Student's recommendations to introduce peer assessment as a solution to the power and workload differentials (see extracts of data below) were not particularly popular with the teaching team in 2007. This was not least because it was felt that 'power' could also be exerted in this process.

Extracts from data: Peer assessment

"I really think we should have had a peer assessment of group members." (Student 2007)

"Include peer assessment." (Student, 2007)

"Use peer review to create fairness amongst students." (Student, 2008)

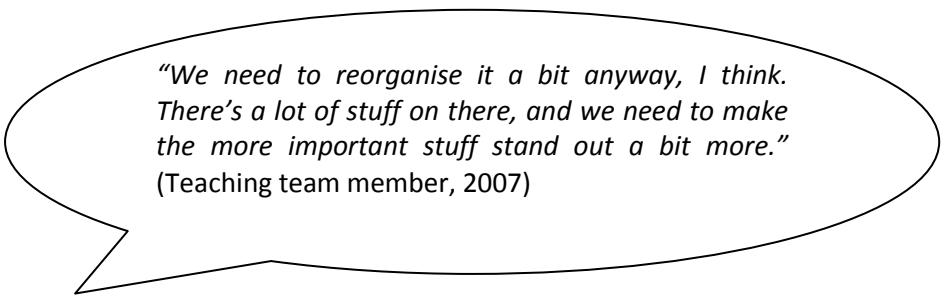
"I think maybe a peer review would be quite useful. I've always thought it was a rubbish idea like in our [discipline] groups because everyone gives each other [good marks] because you feel guilty." (Student, 2007)

"Classic group dynamics is that there is always going to be a leader and there's always going to be followers. The followers don't necessarily 'chip-in' less (certainly in terms of intellectual input). And yet Peer Assessment often reflects the hierarchy in the group itself, because the leaders drive that issue as much as anything else. There's good and bad of Peer Assessment, and am wary of it because of that. Especially in a group where there's 8 or 9, there will always be 2 or 3 on the fringe. They won't get rated as high because they won't stand up for themselves." (Teaching team member, 2007)

Their proposed approach to managing the instability being caused by this was to improve communication to the students at the start of the course about the expected roles and contributions of the disciplines, in particular the Discipline 4 students who had been marginalised, and the relationship of these with the credit rating of the group work in the different modules, i.e. to 'manage expectations', or in systems terms to improve amplification to align student interpretation with the intention behind the learning design. However, as many of these issues

were reiterated in student feedback in 2008, the team decided that they may need to consider introducing some form of peer assessment in 2009.

There were two significant issues that the team felt it needed to consider in order to improve the integration of the electronic learning resources with the introductory programme, site visit and group work. Firstly, there was lack of clarity amongst the students about the purpose of the e-learning resources in supporting the learning activity and helping them to achieve the intended learning. The second is illuminated by the concept of *channel capacity* in the Viable Systems Model, leading to a diagnosis that inappropriate assumptions were made in the learning design about the channel capacity with respect to students' interaction with these resources. Lack of clarity about what was required to fulfil the project brief and meet the assessment criteria also contributed to their difficulty in assessing what material was going to be most useful from all of that available. This also resonates with Mintzberg's findings (1975) about managers' use of information systems. This information was interpreted by the teaching team to mean that they needed to re-organise the electronic resources available in the virtual learning environment and provide clearer signals (amplifiers) about when and in what way particular resources might be helpful.



*"We need to reorganise it a bit anyway, I think.
There's a lot of stuff on there, and we need to make
the more important stuff stand out a bit more."*
(Teaching team member, 2007)

With respect to some of the student's objections to the timing of the project work, the teaching team did not consider it feasible to move it to Semester 1, because Discipline 1 had a prerequisite module in Semester 1. It was also pointed out that Discipline 5 students had undertaken sustainable design projects in Semester 1 in previous years, although not on an interdisciplinary basis, and the timing had not been universally popular. There was therefore no guarantee that changing the timing would suit the majority of students.

"Last year in [Discipline 5] this ran in weeks 13-15, and 'to a man' they weren't satisfied with that at all – running it late with the exam period. Not popular at all. At least from my end they were much happier this year." (Teaching team member, 2007)

However, they did accept the students' opinion that that there had perhaps been too little time for teams to form properly before the important work commenced and intended to explore ways in which more time for this could be built into the start of the project work.

"I take the point that we should get them together a little earlier so that they are in their groups, and maybe they can do the [site] trip having had at least a day beforehand." (Teaching team member, 2007)

In terms of additional areas they had identified requiring improvement, these were:-

- that a strategy was needed to encourage students to engage more with the development site, and to consider their own design in relation to the site as a whole.
- it was also thought that the project brief needed to be clearer in terms of the purpose of the presentation and the role students were taking on in this process.

5.9.2. Second order boundary critique: of the evaluation

Critical reflection here is concerned with reflecting on the experience of implementing the designed *evaluation activity* as outlined in stages Stages 1-4, and the implications of this for interpreting the data and informing change in any future evaluation activity of this kind. This is the learning resulting from this research about the evaluation methodology that informs theory development about improved methodology.

The process is framed by Ulrich's (1983) CSH directed at the implemented evaluation in the *is* mode, to critique this in relation to the evaluation designed in the *ought* mode in the earlier stages of the action-inquiry.

Purpose of the evaluation and roles and relationships of stakeholders

The critique here focuses on the boundary judgements being made about the clients, decision maker, designer, and other stakeholders in the evaluation, and their interests and role in the evaluation process.

For Case 3 the assumption was that the evaluator (myself) would take on the design role for the evaluation, working collaboratively with the project team members as clients and decision makers for the evaluation. As decision makers for the learning activity, the evaluation was intended to benefit them by informing their design and implementation decisions for this learning activity. This meant that the students, although the primary clients of the learning activity, were not being considered as primary clients of the evaluation, despite the impact that any decisions arising from the evaluation would have on them in terms of implementation of the learning activity. The other main client for the evaluation was considered the funding panel for the grant scheme, to whom the project team were accountable for the resources allocated for their educational development work.

My reflection on working collaboratively with the project team members to evaluate Case 3 in the way described in Chapter 5 is that they *did* consider themselves to be the primary client of the evaluation. In terms of the intended benefit, this is stated in component 12 of the logic model in table 6.1 (*Stakeholders in the evaluation of technology supported learning activity have an improved understanding of how and why a change strategy is working in practice, and are able to make informed decisions about change*). The project leader confirmed that the evaluation had indeed “*helped a lot for next year*” and that it had resulted in “*a huge amount of very useful detail. We'll certainly be using it to improve the project next year*” (Project leader, 2007).

In addition to informing their implementation and design decisions, additional benefits they talked about (see Appendix 3, section 3(vi)) were:

- (i) it would help them to make a case for additional funding to continue with some of the development work and to ensure continuity of some of the activity that was valued by the students;
- (ii) it would be helpful in convincing other departments to join the collaboration, as it was credible and convincing in terms of its conclusions;

- (iii) the independent input to the evaluation meant that potential funders or collaborators were less likely to perceive the evaluation as biased towards the interpretation of the teaching team.

From my own perspective as evaluator for Case 3, my experience was that I had the full co-operation and support of the team members in the evaluation activity, for example in developing the logic model, organising data generation, attending the teaching team meetings to discuss the team members' reflections on the meaning of data. Despite making it clear that they had overall responsibility for decision making with respect to the evaluation, they invariably accepted my advice about the approach, and methods and tools for data generation. It could therefore be argued that I had considerable power in influencing decisions about the evaluation. Another issue, was that although they had been given control over decision making, since I was accountable to managers elsewhere for my time, they did not have unlimited access to my time as a resource. Hence if the team had made any decisions about action that could not be undertaken within this resource, they would have had to find alternative means of resourcing the activity. This also somewhat limited their 'power' in the evaluation process, in that they did not have ultimate control over the resource for the evaluation. What is significant here is that in this case these things were not a source or product of conflict. My interpretation of this is that it was a result of the level of trust developed in the relationship. Although this can be partially influenced by the nature of the interaction on a personal level, this is also something that is influenced by the approach and the extent that it is aligned with the evaluation clients' needs and expectations. This trust was further demonstrated by the team inviting me to participate in sharing learning at conferences and in the writing of academic papers (e.g. Hughes and Hart 2007, Hart *et al* 2009a) and to assist with further evaluation in the future (iterated evaluation in 2008).

Although students were not involved in design and decision making about the evaluation, they did engage willingly, and indeed enthusiastically, in the case of the focus groups. The questionnaire response rate was good and the qualitative data was useful for providing insight into their experience of the learning activity. This suggests that despite not being involved participatively in the evaluation design, they did perceive themselves to be indirectly clients of the evaluation, or they accepted their responsibility in improving the experience of the next 'clients' of the learning activity – those students who would take the course in the following year. Hence communication to them about the purpose of the evaluation and their role in it was effective. This is in contrast to the experience in Case 1, where lecturers' comments, and their drop out from interviews,

indicated that they were engaging in the process in order to fulfil minimum contractual obligations.

At the time of completing the evaluation of Case 3, there had been no evaluation of the higher level grant scheme. It was therefore impossible to know if the approach to evaluation of individual projects was beginning to lead to improved decision making at the higher level strategy. However, there was no negative feedback from the grant scheme's monitoring group about the quality of the report in terms of meeting its expectations.

Development of logic model to frame data generation and synthesis

Decisions about *what* was relevant to include in the logic model were largely influenced by the team members' own thinking about the learning activity. However, my judgment and experience in the modelling process *did* influence my interpretation of their communication of their theory of change through the bidding documents and subsequent dialogue. The questions about issues of relevancy derived from the VSD homeostatic loop analysis (table 4.6) were helpful in developing the model and enabling gaps in information available about the strategy to be identified.

Engaging stakeholders

The involvement of students in designing the learning activity might have helped the teaching team to pre-empt the impact of the different credit weighting of the assessment of the project. Had students had the opportunity to make explicit the potential negative impact this was likely to have on their actions, the teaching team could have designed communication or action into the process at an early stage to minimise this effect.

As client for the evaluation, it could be argued that the funding panel for the grant scheme should also have had some input in the development of the logic model, to ensure that the project strategy was aligned with the aims and ethos of the grant scheme. However, since the panel had decided to fund the project, then it had already been satisfied that the project strategy as outlined in the bid documents fitted with these aims. Their opportunity to negotiate with the project team about their core strategy for the project was at this bidding stage. There remains the question of whether a logic model would be useful way of articulating the change strategy at this stage. However, this not tested in the cases. My instinct is that project leaders would need support from an evaluator with the skills to do this, and until resource is allocated for a project this support is not available.

A further group not yet mentioned includes those involved in developing the electronic resources. They were given the opportunity to comment on the logic model of the teaching team's theory of change. This enabled me to explore with them their interpretation of the purpose and role of technology. Any difference in interpretation with that of the teaching team could then be clarified prior to implementation and evaluation. However, in Case 3 there was good alignment of interpretation based on previous dialogue that had informed the development work.

Engaging the team in dialogue framed by the logic model and evaluation questions derived from the Viable Systems Model provided the team with the opportunity to discuss and agree the focus of the inquiry prior to it commencing. I also think it helped to develop trust about the data generation process, since this framework made the purpose of proposed methods and tools transparent.

5.10. Conclusions

The interpretation and synthesis of data is thought to justify a conclusion that the fundamental pedagogical approach designed by the project team was positively experienced by students, was effective in helping students achieve the intended educational outcomes, and students considered these to be relevant to their future employability and experience outside the educational context.

The evaluation enabled a number of areas for potential improvement in the learning design to be identified, but these were primarily related to co-ordination of the approach in the way that it is embedded in the different disciplines (e.g. timing of events, relative assessment weightings) and its communication to students (e.g. clarity of roles, responsibilities, requirements). More specifically relating to the electronic resources, their integration with the multidisciplinary collaborative project activity needed to be improved by (i) providing clearer communication of their purpose and when they might be useful and (ii) reorganising their presentation in the VLE so that students could find and make use of materials when needed.

The evaluation was also positively experienced by evaluation stakeholders, who found it relevant and valuable value in helping their own decision making, as well as being a useful source of independent judgement that they could use to provide accountability for allocated funding and to support negotiations for future funding.

The case has been included as an illustration of how to implement the designed evaluation methodology articulated in Chapter 4, and how this leads to information relevant to answering stakeholders' evaluation questions. The discussion following in Chapter 6 is about what has been

learnt from this and other case studies that can inform the development of evaluation theory and hence future evaluation practice.

Chapter 6. Discussion

6.1. Introduction

This chapter discusses what has been learnt from the action research in the case studies, in particular about the use of critical systems thinking in the evaluation of technology supported learning. This is essentially the meta-evaluation intended to contribute to theory development about evaluation methodology. The discussion is framed by third order boundary critique of the action research across multiple cases. As with the other levels of boundary critique, Ulrich's CSH can be applied to boundary judgements made about the research, which are summarised in the logic model in table 6.1.

The underpinning rationale for and assumptions about the research in the *ought* mode are those articulated in detail Chapters 1-4. The purpose of this section is therefore to reflect on what has been learnt from the research following implementation (in the *is* mode) in terms of its purpose and making progress with the intended research outcomes, and to be critically reflexive about how research activity and the roles and relationships of those involved have influenced these outcomes. This leads to the conclusions about the wider contribution of the research to theory, summarised in Chapter 7, and a critical reflection on the limitations of the research and implications for further work in Chapter 8.

Table 6.1: Logic model of the research process

(i) Rationale for change	(ii) Resources/enabling factors	(iii) Process	(iv) Outcomes	(v) Anticipated longer term and wider impact
<p>1) Limited understanding about effective practice models for technology supported learning</p> <p>2) Need for evaluation methodology that develops understanding of the complexity of organised learning activity and the role of technology in it</p> <ul style="list-style-type: none"> -how the process is socially constructed -of connections between different levels of strategy -of relationship between evaluator, evaluation and evaluand <p>3) Systems methodologies are designed to explore complexity, but there are few examples of real cases in which systems thinking has been used to evaluate the complexity of technology supported learning</p> <p>4) There has been very little empirical research into the '<i>evaluation of evaluation</i>' to support the development of generalisable principles of evaluation practice</p>	<p>5) Researcher must have access to evaluate suitable cases as a consequence of day-to-day practice</p> <ul style="list-style-type: none"> - depends on collaborative relationship with those responsible for change in organised learning activity -depends on co-operation of other stakeholders in the evaluation -sufficient variety and similarity in cases for learning relevant to research question <p>6) Researcher must develop appropriate knowledge and skills to develop and implement evaluation methodology</p> <ul style="list-style-type: none"> - informed by theory and practice literature and previous practice experience; - includes principles for systemic modelling of learning activity 	<p>7) Researcher designs evaluation methodology drawing on systems theory</p> <p>8) Researcher (as evaluator), works with stakeholders in the evaluation of technology supported learning activity</p> <ul style="list-style-type: none"> -planning and undertaking relevant data collection -comparing systems models of theories of change and their implementation in practice <p>9) Researcher (as evaluator) reports learning and implications for further change and improvement that emerge from the evaluation to stakeholders</p> <p>10) Researcher applies the same modelling principles to the inquiry about the evaluation methodology</p> <p>11) Researcher writes material for publication and sharing thinking with others</p> <ul style="list-style-type: none"> -thesis and papers -conference participation 	<p>12) Stakeholders in the evaluation of technology supported learning activity have an improved understanding of how and why a change strategy is working in practice, and are able to make informed decisions about change</p> <p>13) Participants in the learning activity have a better understanding of the rationale for change, and their own role in this</p> <p>14) Researcher develops understanding about the application of the evaluation methodology in practice, and the added value of using systems thinking, and makes changes to the methodology on an informed basis</p> <p>15) Researcher develops understanding about how to present ideas to practitioners to help them to develop the capacity to undertake their own evaluation of organised learning activity</p>	<p>16) Participants in the learning activity value the evaluation for its role in improvement, and fully engage with it</p> <p>17) Practitioners develop understanding of and capability in evaluation approaches that inform their understanding of how technology supported learning activity is socially constructed</p> <p>17) Methodology is more widely adopted by practitioners</p> <p>18) Evaluation approach leads to continual improvement of practice models for technology supported learning activity</p>

6.2. Progress with research outcomes

The original intended outcomes for the research are articulated in column (iv), outcomes, of table 6.1. These are expressed as intended benefits for different stakeholders. In particular, Patton (1986) highlighted that the key benefits for stakeholders should be that it answers their evaluation questions, leading to a concrete and immediate effect on their decisions and actions.

The research does appear to be developing an evaluation methodology that *is* serving the purpose of the roles of designer and decision maker for the technology supported learning activity. In all of the cases those undertaking these roles were satisfied that the evaluation had resulted in information that helped them understand how the learning activity was working towards achieving the intended purpose of the activity in terms of benefits for learners. This helped them to identify and make decisions about relevant improvement action and the allocation of resources.

In terms of meeting the accountability requirements of decision makers at the next level of recursion, the learning from Cases 2 and 3 did meet the requirements of the monitoring panel for the grant scheme from which funding was obtained in terms of generating organisational knowledge about good practice, but it was too early to make any judgement about the extent to which this information was used to inform and have an impact on higher level organisational strategy e.g. decisions about future funding of educational development work.

The question of whether the evaluation is serving the interests of learners as the clients of the organised learning activity is also difficult to answer. This is because, in most of the cases, only one iteration of evaluation was undertaken. It was therefore not possible to get any sense of trend in improvement from the perspective of learners. This would need to be assessed over several iterations of inquiry. However, it is certainly designed to be, by focusing attention on the perceived benefits for the learners and how these are achieved. Decision makers in the case studies have indicated that student feedback is influencing their decisions for further change to the design and implementation of the learning activity, and there was some evidence of this being translated into action in the example of Case 3.

One indication of the extent to which learners perceive the evaluation to be of benefit to them is their engagement in the process. A longer term intention of improving the methodology was therefore improved learner engagement in the evaluation process. It was not intended that any real assessment of this could be made within the timescale of the research. As Gregory (W. 2000) pointed out, engagement depends on motivation to engage, and she raises questions about how

this can be practically achieved. An important consideration for the evaluation was having strategies to encourage learners' participation in the evaluation, at least in providing feedback. However, it was expected that learner engagement would improve if they experienced multiple cases of the evaluation and began to see some benefit in terms of overall improvement in their learning experiences. Case 1 was unique amongst the case studies used in the research, in that the learning activity was intended to consist of the same membership for a prolonged period (3+ years), and these learners therefore had some prospect of being the beneficiaries of changes informed by the evaluation. However, at this stage of the research the evaluation methodology was in its early stages, and as discussed in Chapter 4, there were political factors at play in the EU project which had a negative impact on participants' motivation. All the subsequent cases were educational courses lasting only one semester. There was therefore no immediate benefit to the students involved in the evaluation. Students that would be affected by future change were a different group of, as yet, unidentified individuals. It was therefore more difficult to anticipate any improvement in student engagement without any embedding of improved evaluation methodology in the wider organisation.

6.3. Research activity – action research in multiple cases

A further intended outcome of the research was improvement in the researcher's understanding of how to implement the evaluation methodology and how/why this leads to the various outcomes for its stakeholders. This depends on making connections between the action research activity in the evaluation case studies (column (iii) of table 6.1) and other contextual factors for the research (e.g. column (ii) of table 6.1).

- (i) **Deciding stakeholder roles and relationships and evaluation purpose:** In terms of roles and relationships in the evaluation planning, participative approaches advocate the inclusion of all relevant stakeholders in the planning process, not just as data sources. The value of using the term 'stakeholder' in the evaluation as intended by Stake's original definition ('*persons or groups that are put at risk by the evaluation*' (Guba and Lincoln 1989, p40)) has recently been called into question (discussion at UK Evaluation Society Conference, 2007). This was because who will be affected is still someone's subjective perspective, and indeed this may not be known until the purpose and scope of the process being evaluated and its evaluation is properly defined. Someone has to make the decision, and therefore has the power to influence who is included and excluded from the process. This suggests not all 'stakeholders' could necessarily be involved at the outset.

VSM allows for a more meaningful way to think about different groups involved in the evaluation in terms of their roles, responsibilities, and relationships in these processes. CSH provides the framework to guide critical consideration of the implication of these when designing the evaluation. Experience during the research has also been that even where there is an aspiration to include the obvious stakeholders, finding meaningful ways in which to do this at the stage of designing a change initiative and its evaluation is not always possible. In most of the case studies, the target learners that would be affected by the learning design were not known. In some cases the learning design was for a new course for which there were no previous learners from which to even seek feedback about the proposed approach.

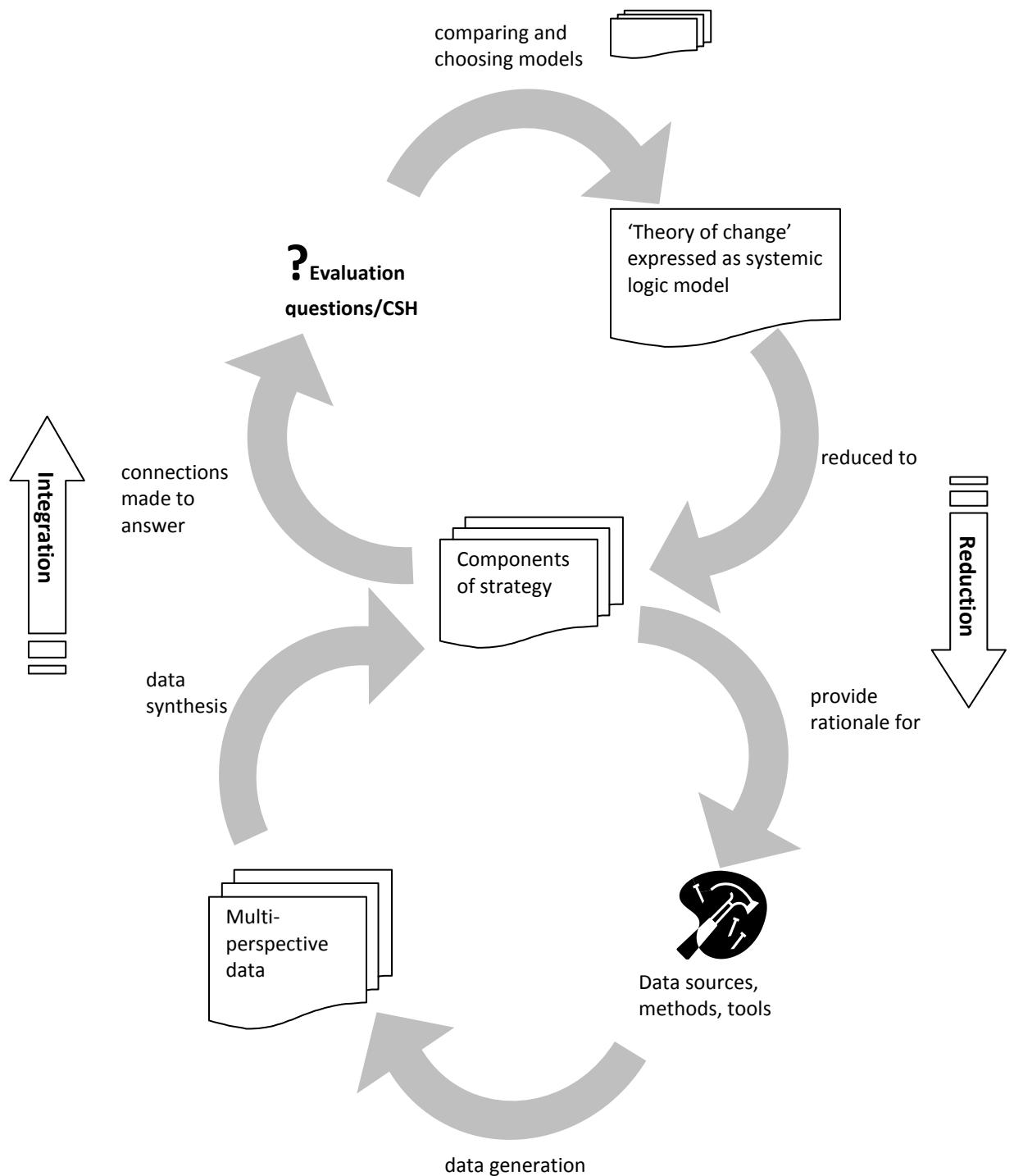
- (ii) **Use of conceptual frameworks in evaluation planning:** Those designer/decision makers who have engaged in the planning process using the generic questions derived from the VSM and a systemic logic model have provided feedback that they see their value in helping them to clarify the scope of their change strategy, as well as focusing the evaluation on issues that they consider relevant to their own development work and decision making and to meeting their accountability responsibilities to other stakeholders. This makes a connection with Vygotsky's (1978) ideas about learning being dependent on the use of signs and tools. He thought they enabled preparation for future activity through their use in planning, developing order, and attempting to guide behaviour, as well as enabling the reflection on and articulation of experience. However, the meaning of these signs and tools must be negotiated between those collaborating in their use, and this process of negotiation will affect the interpretation of each party involved in the collaboration about their meaning. Saunders *et al* (2005) considered representations of theories of change working for practitioners because they act as bridging tools during change, providing *provisional stability* to help the change agent conceptualise a dynamic process during transitional periods of change. This also resonates with Beer's (1972) example of walking up a hill to explain heuristic improvement. To assess the progress made, at various points in the journey some stock must be taken of the current position in relation to the previous position and the intended destination. Using the systemic logic model in the conceptual stages of making change, planning implementation and its evaluation, provides a means of comparing these positions for dynamic processes.

There is general agreement in the literature about systems practice that representations of the context of interest need to be "*transparent and relevant to participants*" (White and Taket 1997, p392-3). The main advantages of using the logic model in the planning stages were

advocated to be that it helps to build a shared understanding of what the program is all about and how the parts work together, as well as helping to explore gaps in the theory or logic of a program.

Using the logic model in the planning stages of the evaluation was useful for reducing the inquiry into manageable components, but without losing sight of the relationship between these components and how they are integrated to make the whole. It helped guide interpretive data generation to explore different stakeholder perspectives on the change strategy and their rationales for behaviour. Figure 6.1 attempts to represent the iterative relationship between these processes of reduction and integration in the conceptual stages of the methodology.

Figure 6.1: Relationship between reduction and integration in conceptual stages of methodology



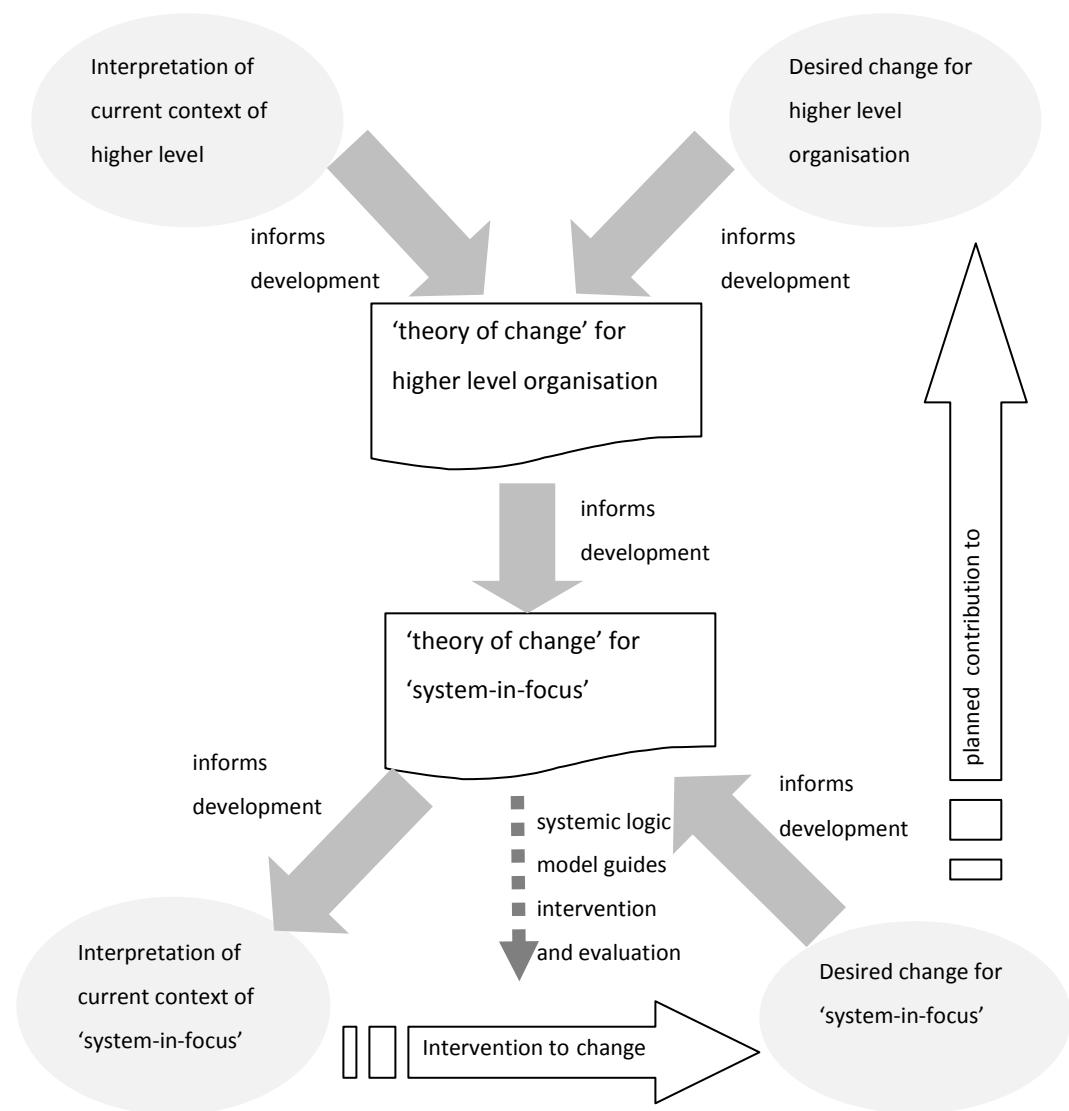
The homeostatic loop analysis derived from Beer's (1985) Viable Systems Diagnosis enabled a set of questions to be developed to help build the model around issues of relevancy (table 4.6). It is difficult to envisage how gaps in the designer/decision maker's model of their theory of change would otherwise be able to be explored without such a reference framework of relevancy issues that have been tried and tested in other cases, particularly if the facilitator of the evaluation does not have previous experiential knowledge of the type of activity being evaluated.

Since the logic model is a key tool framing the dialogue during the planning of data generation and synthesis, it is important that it concisely and clearly conveys the planned change strategy. It is important that the initial draft does not include so much detail that the key issues of relevancy to understanding the change process become obscured. Advice was also followed to improve the comprehensibility and readability of models by using "*simple language and sentences with clear subjects and objects*" (Davies 2004, p105), being clear about who would be undertaking activity, and who might be affected by it, clearly stating attributes or qualities that participants might be expected to associate with learning activity and resources, or connections they might make between activities, resources and outcomes.

Systems thinking about the organisation of activity also provided the key questions that helped to guide reflection on the meaning of data collected in relation to the whole strategy. It is the focusing in on the detail that tends to provide the information about 'what' and 'how' the process is operating, and the outcomes that are being achieved. The integrative dimension of the process is also needed to develop any real understanding of 'why' the process is operating in a particular way to lead to its outcomes.

- (iii) **Planning for different evaluation purposes:** The Viable Systems Model was particularly helpful for conceptualising the relationship between the learning activity that is the 'system-in-focus' for the evaluation and the organisation at the next level of recursion. Modelling theories of change as logic models with components that make the connection with the wider 'system' helps to generate information that is relevant to assessing progress towards the longer-term strategy (Ackoff 1981) and the contribution to higher level strategy. Figure 6.2 depicts how modelling theories of change at different levels of strategy, starting from the higher level conceptual 'whole', intends to improve the connection between different levels of strategy.

Figure 6.2: Relationship between models of theories of change for different levels of strategy
 (adapted from Hart *et al* (2009b))



The evaluation questions derived from modelling the evaluand as a viable system, and the issues of relevancy modelled for the different feedback loops in the model, helped to guide data generation relevant to informing evaluation of the higher level strategy of which the evaluand formed a component.

(iv) **Timing of the evaluation planning:** The evaluator needs to judge this appropriately to achieve balance between

- a. developing conceptual frameworks early enough so these also benefit decision makers in their implementation of the change strategy and so that evaluation is not something ‘done to’ stakeholders in ways that do not benefit them;
- b. developing frameworks that represent theories of change that are sufficiently well formulated and clearly articulated so that they are useful to framing the evaluation.

Many of the educational development projects that were evaluated, including that of Case 3, required specialist input to help design and develop e-learning resources and their integration with learning activity. This specialist input was not available until a bid for project resources had been successful. It was therefore too early to develop the logic model when ideas were not sufficiently clear about how it was technologically possible to implement the ideas in the original project bid. Once these ideas had been developed, there was little change between the designed strategy and its implementation. This point was therefore felt to be early enough, since the key determinant in the timing was that opportunities for data generation would not be missed. The risk from developing the logic model *after* developing the technology component was that those involved in producing this would not have a clear enough idea about the clients and purpose of the learning activity, and hence the purpose of technology in supporting the activity. This was mitigated in the case of Case 3 and the other educational development projects because the bid required a fully developed educational specification explaining the core assumptions underpinning the learning design, including the intended educational aims of the learning activity (i.e. its purpose in serving learners’ needs) and the role of the technology in supporting the learning activity.

- (v) **Collaborative working with designer/decision makers for the technology supported learning activity:** My experience of working as evaluator with designer/decision makers for the technology supported learning activity being evaluated has been positive. My interpretation of this experience is that this was influenced by the use of frameworks that at the outset helped to make transparent the evaluation purpose, how evaluation clients and others would benefit, and their decision making role in it. This helped to engender trust that the process would lead to information relevant to their needs. This was further helped when recommendations about data generation (methods, sources and tools) were consistent with being guided by these frameworks, particularly the systemic logic model summarising their own theory of change. This contrasts with Case 1, where despite negotiation about the evaluation criteria and process, connections between the evaluation and the change strategy were not made so

transparent. This problem was exacerbated because of the limited opportunity for open, face-to-face dialogue. In the later cases, the relationship of trust was further manifested in open and critically reflective dialogue about the data generated, teaching team members' own experiences, and the meaning of this for improvement of the learning activity. Although a further contributing factor here was that the individuals involved were particularly enthusiastic and motivated about the change they wanted to achieve. They therefore welcomed the opportunity to talk to someone about their experience and what they had learnt.

- (vi) **Motivating learner feedback:** Learners in the case studies were significant data sources for the evaluation. Motivating them to provide this data was therefore an important part of the evaluation strategy, since the success of the evaluation depended on the relevance, quantity and quality of this data. This was also a significant challenge in an environment where 'questionnaire fatigue' amongst university students was being increasingly reported. Increasing demands are being placed on them to complete large numbers of standardised questionnaires for internal and external quality assurance purposes. Several strategies were used to improve this motivation. Prior to collecting their feedback they were provided with clear information about the purpose of the evaluation, how and when conclusions would be used, and how they would be informed of these evaluation outcomes. Where possible, after completion of the evaluation, a summary of their feedback and the decisions that had been made as a consequence was also reported back to them with the intention of providing continuity with the feedback loops conceptualised in the modelling process. It was thought that they would be unlikely to spend the time needed to provide useful data if questionnaires were too long and difficult to complete, or conversely if the questions seemed superficial and irrelevant to leading to real improvement. Making choices about the prioritisation of questions to include in the questionnaire was more straightforward when a focus group was also being conducted, since any gaps in qualitative information needed could be picked up here. The process was also dependent on the course leaders' help in scheduling and recruiting participants in focus groups and distributing and collecting questionnaires. These were the individuals with whom the students had a relationship that was likely to influence their willingness to participate. Most of the cases resulted in good response rates in questionnaires, and animated dialogue in face-to-face focus group discussions. However, it was not really possible to conclude that this was a consequence of the designed strategy. This could also have been influenced by a number of other factors, such as the relationship with the course

leader and the extent the learners might want to ‘thank’ them for a good experience, or a desire to ‘let off steam’ about a poor experience.

(vii) **Critical reflection and reflexion:** CSH provided a useful framework to critique initial boundary judgements made, not just about the evaluand but also the evaluation and its relationship with the evaluand. It guides the questioning of the purposes and motivations of those involved in the evaluation and who has power in making these decisions, and can help reflection on issues that also may have affected the quality of the information provided, and how that might be improved upon in future. An illustration of how this helped in the research is in the context of case 1, where there was some evidence that stakeholders were ‘going through the motions’ to fulfil what was required of their contractual arrangements, which influenced their participation in the evaluation activity as well as the learning activity. Another example is where the relationship of the learners with the decision maker is questioned, to consider how this may have affected the learning experience *and* the feedback given about this. The role of ‘critical friend’ in “*widening dialogue beyond the boundary of those who are immediately identified as affected or involved*” (Midgley *et al* 1998, p470) was illustrated in Case 3 by the involvement of the visiting professor for the department in reflective discussion with the project team. This helped to question the project team’s core aims with the learning design, their own experiences and interpretations of the data, and the implications of this for decisions about improvement action.

6.4. Role of the evaluator

One of the criticisms of research that involves the researcher or evaluator as a participant in the context of inquiry, such as in ethnography and action research, is that it will lack credibility with respect to claims that the learning is of wider transferability. Whilst the intention with this type of research is not to be epistemologically objective, others looking to learn from the inquiry do have some expectation that the evaluator or researcher brings some degree of independence, ethicality and rigour to their judgment. Mason and Barnes (2007) suggest that the role of the evaluator can also be valuable in bringing together influences from different sources and introduce a perspective that is different to any individual stakeholder. They also highlight that there is considerable power in the hands of the evaluator in terms of their skill in facilitating the evaluation and the decisions they make in how to undertake this process, since this influences the engagement of participants in the process and the extent to which there is effective dialogue about change.

My own experience concurs with this latter view. At the start of the research process I would consider that I was not an experienced evaluator, and not one that had any experience of collaborative or participative evaluation. My knowledge of systems theory was zero, and I had little experience of using qualitative inquiry methods. It has been a steep learning curve to develop the knowledge and skills necessary to undertake the research and present it in this thesis, and I consider I still have a long way to go to develop the knowledge and skills of more experienced professional evaluators. However, as the research progressed, I was also able to bring to the dialogue with project leaders my experience of evaluation practice from other change initiatives, with theories about why particular actions had worked or not worked in them, and advice about the extent to which such practice might be transferable to their own initiative. I was also able to make connections across change initiatives. This was of value not only because these connections would inform the evaluation of the grant scheme, but also because I could talk with individual project leaders about how their change initiative might be similar to others in terms of what had been learnt and how this had informed further action and learning. In this way it was also possible to put individuals in touch with others in the learning and teaching community who might be able to help with their problem situation. In this sense, within a single organisation, the role is somewhat aligned with Wenger *et al's* (2002) concept of the knowledge broker in organisational learning processes. The evaluator role, as well as the methodology, can therefore be viewed as important in making both horizontal and vertical connections between different strategies.

I have found that using systems thinking has provided concepts that guide reflexivity into the role and relationship of the researcher or evaluator within the context of the activity being evaluated *and* the evaluation activity. For me, the value has been demonstrated in the following ways.

- Using Beer's (1972) Viable Systems Model helped me to develop clarity about my role in facilitating the evaluation for different purposes, and my relationship with other stakeholders such as the designer/decision maker for the evaluand and the client for the evaluation;
- Using Ulrich's (1983) critical systems heuristics has helped me to critically question the 'boundary judgments' I am making about the role (its purpose, process, resources etc) and how these are influenced by my previous knowledge, skills, learning, and factors in the wider environment in which I am working (availability of resources, expectations of my own managers, relationships with other actors etc). These are those factors which in some sense influence the legitimacy of my undertaking of the role.

- Systems thinking guides inquiry, using different methods to explore multiple perspectives within which to frame the evaluator's and researcher's perspective (e.g. direct observation, measures of opinion or satisfaction, rationale's for thinking, communication or behaviour). The various frameworks used therefore provided a systematic approach to undertaking the ethical responsibility expected from an evaluator in a facilitating role.

6.5. Summary

The discussion in this Chapter has focused on the meta-evaluation of the evaluation methodology developed from this research. In Chapter 2, a set of criteria for meta-evaluation were suggested, originating from Smith (1981). To reiterate, these were:

"Need: *Is there a need for this method of evaluation? Does it provide a unique approach or are there stronger critical competitors?*

Utility: *Does the method work, providing the knowledge and impact it was designed to produce?*

Acceptability: *Do evaluation practitioners seek out this approach to evaluations? Do the evaluation's clients value the products resulting from the use of this method?*

Compatibility: *Can the method be adapted or fit the context in which it was designed to be used? Is the method flexible with respect to situational constraints?*

Cost: *Are the resources, expertise and time required to use this method reasonable and generally available? Is the method marginally cost effective?*

Side effects: *Are the side effects of the use of this method generally well known and acceptable to most audiences?" (Smith 1981, p177)*

The summary here provides a brief assessment about what has been learnt from the research about these dimensions of the evaluation methodology.

The **need** for the methodology, due lack of existing appropriate methodology, was rationalised at length in Chapters 1 and 2. This was based on a need for evaluation methodology that could develop better understanding of how learning activity, and the role of technology in it, was socially constructed. Chapter 2 explored existing evaluation theory and concluded that there was no existing evaluation methodology that adequately addresses the complexity of organised human activity.

The **utility** of the methodology has been illustrated by the inclusion of an in depth case study, and additional case studies in the appendices, demonstrating how it led to knowledge that was found relevant and useful by the evaluation clients. This also goes some way to justifying the

acceptability of the methodology, although it has yet to be seen whether other practitioners will seek out the approach in the future. This would need to be the subject of further evaluation, following the wider sharing of learning and guidance about the methodology.

With respect to **compatibility**, the methodology was adaptable to various educational development initiatives, but again its adaptability to a wider range of technology supported learning contexts, e.g. knowledge management initiatives, would need to be subject to further research.

The justification of **cost** is a dimension that has been difficult to assess in the context of this research, and the criteria itself is not well articulated since what is reasonable and generally available is subjective and context dependent. In the contexts in which this research was undertaken the resource was available to those successfully bidding for it, but not generally available. Whether it is cost effective for organisations to fund this kind of support for evaluation more widely would depend on the longer term benefits achieved in relation to this cost. Since the methodology was used during only a relatively short period of time during this research, it is impossible to assess the longer term impact in relation to the cost.

There were no adverse **side-effects** emerging from the research, but again, these may become more apparent with longer-term use of the methodology.

Chapter 7. Conclusion

7.1. Introduction

The model of action research discussed in Chapter 4 highlights the importance of critical reflection and reflexion on observation and interpretation in the experiential learning cycle. It is the critical reflection and reflexion undertaken in Chapters 5 and 6 that informs conclusions drawn about the contributions to wider theory summarised in this chapter, and the limitations of the research and their implications for further research that are discussed in Chapter 8.

7.2. Contributions made to theory and practice

Contributions are summarised by reference to the boundary judgements made about gaps in knowledge identified through the review of existing literature in the early chapters of the thesis. Reflecting on these contributions has helped to reconsider and refine the core questions that the research has helped to answer. Throughout the thesis it has been argued that theory that improves our understanding of human activity is that which not only answers our questions not only about *what*, but also *how* and importantly *why*. This chapter therefore discusses the progress made with answering these questions about evaluation methodology for technology supported learning.

7.2.1. Why does systems thinking improve evaluation methodology for technology supported learning?

This question is concerned with why the evaluation methodology developed through this research should be considered transferrable to the general context of technology supported learning. This is the most important contribution made by the research. The contribution claimed addresses the following gap in knowledge identified by the background review of existing literature.

Identified gap in knowledge

There has been very little empirical research into the *evaluation of evaluation* to improve the theory about evaluation and that underpins evaluation practice (Smith 1993, Hanssen *et al* 1998). That which does exist concerns single case studies and/or validates existing approaches. It has been suggested that research is needed across multiple case studies (Smith 1993) to develop explanatory theory about what, how and why evaluation methodology works.

Contribution to theory

- Although only the most recent case in which the methodology has been developed is presented in the main body of this thesis, to illustrate its implementation and how it leads to information relevant to decision makers' change management decisions, the methodology has been developed through experiential learning using multiple cases. It therefore adds to the limited amount of empirical work across multiple cases, building theory to inform evaluation practice.
- The use of conceptual frameworks underpinned by systems theory enabled consistency and rigour to be built into the conceptual stages of the action research. This provides a sound foundation for experiential learning and a heuristic approach to improvement. This was aligned with Saunders *et al's* (2005) notion of the need for decision makers to have bridging tools that help them conceptualise some provisional stability in the change process in order for them to develop a mental model of the dynamic process of change.
- The research has demonstrated how the use of critical systems thinking in particular brings further rigour to the conceptual stages of inquiry through the processes of second and third order critique of boundary judgements made about the evaluation and research inquiries and through making this critique and resulting conclusions available for external critique and further challenge in respect of their intelligibility, propositional content, justification and sincerity. This shows how CST can be used to address some of the limitations of existing reflexive practice highlighted by Alvesson *et al* (2008), leading to research whereby "*some kind of tangible result should be demonstrated, such as ideas, concepts, challenges to conventional thinking, or suggestions for new research*" (Alvesson *et al* 2008, p495). In particular this critique can be applied to the decisions about combining concepts and practices from different systems methodologies, and the extent to which this works in practice.
- The research has also demonstrated how the use of critical systems thinking can be used to help the evaluator develop clarity about their role in the evaluation process as practitioner undertaking evaluation of a single case, and the relationship of this with their role as researcher in developing wider transferable knowledge about evaluation practice. This is facilitated by the multi-methodological approach and process of boundary critique. The use of

the VSM helps them to make an initial boundary judgement about their intended role in the management functions of ‘designer’ and ‘decision maker’ for the evaluation of the evaluand. CSH proves a framework for the second order boundary critique of how this is seen working in practice and has had impact on what is learnt from the case, and how this might be improved in future practice and in other cases.

Contribution to practice

- The research provides an exemplar for how action research, informed by systems theory, can be undertaken in multiple case studies to experientially improve theory about evaluation methodology. In particular it illustrates how critical systems thinking can be applied to improving methodology, and in so doing addresses the criticism made by Tsoukas (1993a,b) that many of the proponents of CST offer little in the way of exemplars of its application in practice. This, of course, would be disputed by many in the CST community (see for example Midgley *et al* 1998). In this research, CSH has also been used to frame ‘third order’ boundary critique to bring rigour to the conceptual stages of being critically reflective and reflexive about the research and its implications for theory, practice, and future research (this latter is articulated in Chapter 8).

7.2.2. What systems methodology works *for whom* in the evaluation of technology supported learning?

This question is answered by consideration of the extent to which the following gaps in knowledge have been addressed. These gaps are concerned with the outcomes and output of the research in terms evaluation methodology that is usable and useful for practitioners, resulting in learning that is *used* to inform their planning and decision making. The contribution to knowledge about methodology concerns the ‘what’ dimensions, i.e.

1. “*when an evaluation should be done, [if at all]*
2. *what the purpose of the evaluation should be,*
3. *what roles the evaluator ought to play,*
4. *what types of questions should be asked,*
5. *what design will be used, and*
6. *what activities will be carried out to facilitate use.”*

(Shadish *et al*, 1991, p58)

Identified gaps in knowledge

- There is limited understanding about effective practice models for technology supported learning.
- Methodological guidance is needed to help practitioners understand the complexity of how technology supported learning is socially constructed.
- Systems thinking is an approach to exploring complexity, but there are few examples of real cases in which it has been used to evaluate technology supported learning, and none that have been informed by critical systems thinking.
- Methodology needs to lead to prescriptive *and* descriptive theory about action to ensure future action is informed by an appropriate underpinning rationale.

These gaps have therefore been addressed by:

Contributions to Theory

- The research is unique in that it is the only work so far that has implemented meta-evaluation of the use of critical systems thinking in the evaluation of technology supported learning. It also adds to only a small number of cases where systems thinking has been applied to this context. The early chapters (2-4) provide the theoretical underpinning which justifies the methodological design, and starts from the assumption that learning is socially constructed human activity.
- The methodology chapter (4) also explains what steps a practitioner needs to take in the systemic evaluation of technology supported learning. These steps are time related in that there is a logical relationship that integrates conceptual and action stages, with the conceptual stages making use of frameworks informed by systems theory (use of systemic logic model, questions to develop this, CSH, stakeholder evaluation questions).
- The integration of conceptual and action stages that been tested in practice, and have been demonstrated to leads to information found relevant and useful by practitioners responsible for planning and implementing technology supported learning activity.

Contributions to practice

- The in-depth case study illustrates what to do when implementing the methodology in practice, which comprises the prescriptive dimension of the methodology.
- The rich description of what was learnt from the evaluation, in terms of both the first and second order boundary critique, is what enables the practitioner to make their own judgement about the relevancy and usefulness of the methodology in the case study, and its transferability to their own practice contexts. This, together with the underpinning theoretical rationale, provides the descriptive element which helps to explain how and why the methodology is appropriate.

7.2.3. How does systemic evaluation lead to improved understanding of what, how and why change strategies work or do not work to lead to more informed judgment about improvement action?

The gaps explored by this question are concerned with *process* that contributes to the success of the evaluation methodology in the technology supported learning contexts to which it has been applied. These gaps are:

Identified gaps in knowledge

- Existing evaluation theories offer some useful ideas about using participatively developed theories of change to frame iterative action-inquiry to lead to continual improvement of the context of evaluation. However, these evaluation theories have been criticised for their inadequacy in handling complexity, particularly in their consideration of:
 - relationship between activities, outcomes and context;
 - role of power and conflict;
 - relationship between strategy being evaluated and wider strategy
 - relationship between evaluation, evaluator and evaluand.
- To be useful to practitioners, methodology needs to inquire not only into *what* works but also *why and how*.

Contribution to theory

- The research has shown how components of systems theory and practice can be drawn on to improve evaluation methodology for technology supported learning. This contrasts with the

notion that whole system methodologies should be used in combination in multi-methodological practice, and it is the first time such ideas have been applied to technology supported learning.

- The research has shown how Beer's (1972, 1979) Viable System Model, used to model organised learning activity, helps to clarify the purpose of evaluation and the roles and relationships of stakeholders. This resulted in the construction of core evaluation questions used in practice as a framework to guide evaluation for different purposes (e.g. improvement, accountability).
- The homeostatic loop analysis Beer described in his methodology for Viable System Diagnosis (1985) resulted in the modeling of issues to explore in the evaluation that were relevant to answering stakeholders' evaluation questions. These issues formed the basis of generic questions used to develop a contextually relevant systemic logic model (table 4.6). This logic model formed the reference point for boundary judgements made about the evaluand that were subjected to the process of boundary critique.
- The core evaluation questions derived from the VSM were intended to guide evaluation for different purposes. This helped to make the vertical connection between a technology supported learning activity and the higher level strategy to which it might contribute. Although Patton (1986) suggested cybernetic systems concepts could be used to make this connection, he provided little guidance on how these concepts could be operationally applied, particularly how this approach to representing complexity could be simplified to be useful to practitioners.
- The research has also illustrated how interpreting VSM from the subjective paradigm and hence the modelling of information flow as communication, action and interpretation, provides the rationale for using interpretive methods to explore participants' different perspectives on their experiences and rationales for their behaviour. It was this approach to data generation which provided the rich data to which the conceptual frameworks could be applied to develop understanding of how the technology supported learning process was being socially constructed.
- The core evaluation questions and systemic logic model were used to frame both data generation and synthesis for the evaluand, starting from the conceptual 'whole', before generating information about the parts which helps to develop understanding how they connect to comprise the whole. This is taken from the subjective perspective, that these

connections are constructed by stakeholders, influenced by their interpretations and how these are reflected in their actions. This helps to justify the explanatory dimension of the theory of change for the technology supported learning activity. This improves on existing theory-based evaluation approaches, which seem to emphasise analysis at the expense of integration and fail to develop more than theory about what works i.e. the prescriptive or implementation theory.

- Critical systems heuristics (Ulrich 1983, 1987) helped to critically question boundary judgments made about change strategies from different stakeholder perspectives. This helped to develop understanding of the influence of roles and relationships, and guided ethical decision making about improvement. Use of CSH takes a more critical stance in the exploration of roles and relationships, and how activity is socially constructed, including the role of power and conflict.

Contribution to practice

- Using generic evaluation questions, and questions to explore participants theories of change that were derived from the VSM, helped to guide inquiry to generate rich information found relevant by different stakeholders to help their understanding of the operation and effectiveness of their implemented change strategy for technology supported learning.
- Using CSH provided questions that helped to frame critical reflection and reflexion in evaluation. This research adds to existing knowledge by showing how this can be operationalised in the form of both first and second order boundary critique. This applied the approach to judgments about the technology supported learning activity and the evaluation activity and its relationship with the evaluand. This helped the evaluator to be critical about how the design and implementation of the evaluation may have influenced data generated and hence interpretation about how the technology supported learning activity is being socially constructed.
- Using a systemic logic model to summarise theories of change was found helpful in the methodology to:
 - (i) frame communication between evaluation stakeholders about the evaluand *and* the evaluation activity.
 - (ii) provide a reference framework for the first order boundary critique.

7.3. Summary

At the start of this research systems thinking was chosen as a theoretical framework to underpin the evaluation and research methodology because of its potential to address the complexity associated with technology supported learning processes, in particular how they were being constructed. The early stages of exploring the literature indicated that a particular problem for inquiry into these processes was understanding how the technology fitted into the broader process of organised group learning activity, and if this was to be considered from a human-centred perspective, how the subjective perspectives of those involved influenced the activity and the role of technology in it. Existing evaluation theory was also argued to be limited in informing evaluation practice to explore this complexity.

However, as the research progressed, it became problematic to identify how a single systems methodology could successfully be applied to these contexts. If a perspective was taken that it was the social construction of these processes that need to be understood, then the issue of power and conflict could not be ignored. But critique of existing theory suggested that no single systems methodology would provide insight into this *and* the more traditional interests of evaluation clients associated with understanding its functionality: operation, effectiveness, impact, and sustainability.

Critical systems thinking was therefore chosen as an approach because its proponents argue that the principle of methodological pluralism allows systems methodology to be combined (in whole or part) to explore different human interests more broadly, i.e. the technical, social and emancipatory interests. The process of boundary critique is required for the methodology user to be critically self-aware of the impact their methodological choices have on what is learnt from the inquiry, and hence decisions about improvement. The approach to addressing power and conflict is not based on the assumption that it can be eliminated from the inquiry process, but rigorous frameworks for reflexion can be applied to question and improve the ethicality of activity, interpretation and decision making.

The importance of this research is in demonstrating how this theory can be interpreted and applied to the context of evaluating technology supported learning to lead to information found relevant and useful, and which has been used by the evaluation clients. The learning that has emerged from operationalising a critical systems approach supports Midgley's (2000) conclusion that it is 'methods' that are operationalised pluralistically, underpinned by a single methodology that is rationalised by the methodology developer, drawing on systems theory as it is relevant and

useful to the inquiry context. It is also aligned with Ulrich's (2000) and Gregory's (W. 2000) argument that Foucault's ideal of self-emancipation may be unrealistic in situations where stakeholders may not have the competency or motivation to engage in dialogue about change in a critically reflective way. It is therefore the 'professional' evaluator's responsibility to be critically aware of the factors at play here, by applying second order boundary critique to the evaluation and its relationship with the evaluand, as well as their own role in these processes. The emphasis is on being responsive to stakeholders' own perceptions of ethicality in context. For example, in an educational development context decision makers might delegate evaluation to an 'expert' if an appropriate relationship of trust is developed. They may then feel 'empowered' to devote more time to other activities for which they feel their expertise is better suited e.g. their own specialist research.

What has emerged from reflecting on how and why the frameworks work in the evaluation methodology, is that the principles and techniques on which it is based could have wider relevance to improving evaluation practice more broadly. However, this is a conclusion which would also need to be tested by applying them to a wider range of evaluation contexts.

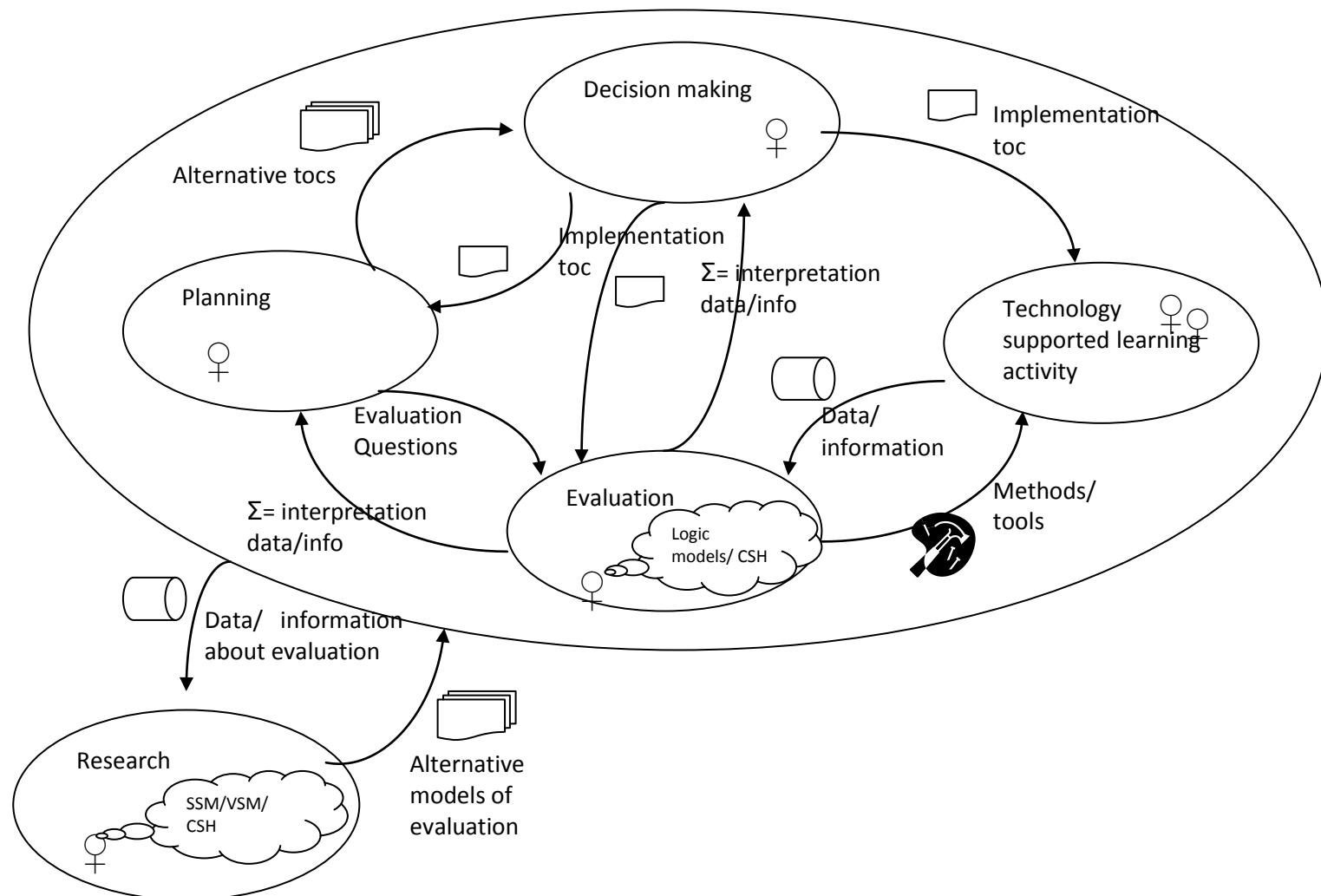
The research also started from the premise that methodology could be defined as:

"A methodology must show 'what' steps to take, 'how' those steps are to be performed and most importantly the reasons 'why' the methodology user must follow those steps and in the suggested order." (Jayaratna 1994, p. 43)

This definition suggests a somewhat linear approach to conceptual and action stages of the research. This idea of linearity in sequence is also replicated in models of learning such as the experiential/action research cycle. For simplicity of articulating the different stages of the methodology, these have also been presented in a somewhat linear way in the earlier chapters of the thesis. However in real evaluation cases the iterative process can be much more 'messy'. Figure 7.1 attempts to represent the complexity of interactions involved in the methodology in practice. This shows the relationship between the functions of decision making, planning, evaluation and the operational activity being managed and simplifies to some extent those relationships discussed in detail in the context of social systems and the VSM in Chapter 4. The decision maker's theory of change influences both the implementation of operational activity and the design of evaluation. The evaluator's inquiry is influenced by their own mental models of what constitutes appropriate methodology for the operational activity, which in turn influences the application of specific methods and tools to undertake the inquiry. Here I have drawn attention to

how CSH and the use of the systemic logic model (underpinned by questions derived from VSM) are the key conceptual frameworks being used. The resulting data and its interpretation influences planning and decision-making, but conceptualising the planner and decision-maker as separate functions helps to focus critique on whether planner's recommendations are being translated in practice through the decisions about implementation made by the decision maker. (This was not the case in Case 1 undertaken in the early stages of this research). Figure 7.1 is also intended to represent how the evaluator's models of evaluation practice are influenced by theory developed by research. In the case of the methodology used in this research it is influenced by ideas from CST about combining useful elements from different systems methodologies and models (SSM, VSM, CSH).

Figure 7.1: Conceptualisation of the systemic action research



Chapter 8. Reflection on the limitations of the research and implications for further research

8.1. Introduction

In discussing the contributions the research has made to wider theory about evaluation methodology, particularly for technology supported learning (Chapter 7), the emphasis has been so far on the perceived strengths of the research. The aim here is to reflect on some of the potential limitations, and hence further gaps in knowledge that the research has highlighted. This leads to recommendations for future research to address these gaps.

8.2. Range of case studies

In Chapter 4, section 4.4, four main criteria were stated to be guiding the choice of case study to use for the research. To reiterate, these were:

1. that a case involved organised learning activity for a group of learners with the same espoused learning purpose;
2. that the learning activity was supported by technology in some way;
3. that the case was accessible during the period of research supervision;
4. that evaluation of the case could be undertaken and completed as part of my normal day-to-day professional practice during the period of research supervision.

The impact of setting these criteria for the research was that *choice* was in fact quite limited, in particular because of the accessibility criteria. During the early part of the research there was literally no choice, since I was employed to undertake a particular role, i.e. that of ‘knowledge manager’ within a single project in which the initial ideas for the research emerged. To a large extent the direction of the research was dictated by the circumstances I found myself in rather than me seeking out cases which fitted with a checklist of very specific criteria that would enable me to select broadly comparable contexts in which to test the transferability of these ideas. However, I would argue that this is a feature of action research. As inquiry which evolves and centres on the lived experience, it is unrealistic to expect that the researcher will be able to select and be granted access to cases that would fit an ‘ideal’ model. Assumptions that this can be

achieved and findings compared between such ideal contexts are, in any case, aligned with the positivist, experimental tradition of inquiry.

The other potential impact of the cases used is that the range of cases is biased towards blended learning approaches, i.e. those e-learning approaches where the e-learning component is blended with face-to-face organised learning activity, rather than the learning being entirely mediated by technology. Whilst I would have preferred more opportunity to research the use of the methodology in learning activity that was more dependent on the technology to facilitate the learning dialogue between participants, few such cases arose to which I could gain access within the timescale of the Ph.D. research. I would argue that the impact of this on the learning about the methodology is minimal, because the research focuses on the *evaluation* methodology and takes into consideration the purpose and role of technology in the learning process. This would be more significant if the research had been intending to learn transferable principles about how to facilitate learning activity entirely mediated by technology.

The cases were also too different to develop experiential knowledge about good practice for technology supported learning, other than some of those basic principles that can be inferred from assumptions based on the Viable Systems Model about the conditions for effective organisation.

Implications for further research: Apply the methodology across a much wider range of cases that use technology in many different ways. This would improve experiential knowledge about the application of the methodology, and models of good practice in technology supported learning. This also is dependent on a significant amount of time to conduct the research (see below).

8.3. Time-bounded nature of the research and the availability of resources

One of the arguments for taking an action research approach in this research is that knowledge about process and its impacts in complex initiatives can be accumulated through experiential learning over some significant period of time (although what is reasonable is not quantified by theory). However, one of the drawbacks of this Ph.D., and other funded change initiatives, is that they are resource bounded, including with time. It is not always known what the exact scope of

activity will be at the outset. Although this can be modelled, in the way that change strategies have been modelled in the evaluation methodology developed, it cannot be known whether what is desirable to be achieved *can* be achieved within this time bounded period with the resources that are allocated.

From my employer's perspective, my time was a key resource that had to be distributed across a number of priorities. For some of the early change initiatives I was involved in evaluating, the level of resource allocated to evaluation had been agreed before my involvement, and this did not include any resource for iterative evaluation. The main implication of this for my own research was that, although I was able to iteratively use the methodology across different cases, I was only able to iteratively apply the evaluation to a single case (Case 3) in the timescale of the Ph.D. This meant it was not possible to develop understanding of any *trends* in designer/decision makers' strategies for change, or whether this learning was indeed leading to the longer-term improvement and benefits for learners. Longitudinal case studies would be needed to experientially build on the existing learning to find out how and why the methodology works for undertaking longer-term impact evaluation, and to consider improvements for this purpose. This would also be needed to explore any of the long-term effects (and side-effects) of improving methodology, such as its impact on practitioners' approaches to integrating technology into organised learning activity, and the impact of this on learners.

Implications for further research: Undertake longer-term research into single cases involving several iterations of methodology. The aim would be to evaluate its usefulness to practitioners in reducing uncertainty about change and impact, and in leading to improvement in the longer term.

8.4. Degree of complexity

A point of criticism that could be levelled at the research for developing transferable knowledge about evaluating complexity is that the case studies are not comparable in terms of their complexity with the large-scale social change initiatives that are the focus of much of the existing evaluation theory. They are small in terms of the range of stakeholder groups and number of participants involved, and the range and timescale of activities and their anticipated impacts. There was also a relatively high degree of certainty about the relationship between activity and its

anticipated impact because of the designer/decisions makers' previous experiences of learning design. It is therefore difficult to argue that the research has demonstrated any scalability to large scale complex initiatives. By this, I mean those that might be intended to impact across a number of institutions, or an entire region.

Implications for further research: Undertake research into larger-scale social change initiatives with different levels of strategy, to test the wider transferability of the methodological principles to other types of evaluand.

8.5.Connections between different levels of strategies

It has been argued that the methodology is useful for making the connection between different levels of organisation in evaluation. The VSM has helped me to conceptualise this relationship, and I have used this to compare the alignment of project level strategies with the strategy for an institutional grant schemes for educational development work. This has helped to guide some of the data generation at the level of the case studies used in this thesis, which has informed the evaluation of the grant scheme that forms the higher level strategy. However, it was not possible to evaluate the extent to which the connectivity between these strategies has been improved by the changes to methodology in the context of my existing responsibilities and within the time period for the Ph.D.

Implications for further research: Undertake research into implementation of the approach at the next highest level of recursion. The aim would be to improve understanding of how the methodology can connect different levels of strategy, and whether it helps to improve knowledge at this level about good practice in technology supported learning.

8.6.Use of the methodology by other practitioners

The assumption about the longer-term impact of the research is that the contribution it makes will improve knowledge about effective learning design for technology supported learning. This depends on others being able to use the methodology developed, and that it is adopted more

widely. The ability of other practitioners to use the methodology effectively is also something that has not yet been possible to investigate.

Potential users of the methodology are likely to have different purposes guiding their inquiry, different motivations for engaging with this particular methodology, different ideas about the resource that should be allocated to evaluation activity, and different capacities to engage with the underpinning theory. This raises serious questions about the power stakeholders will have to effectively undertake their own evaluations based on the underpinning principles of inquiry outlined in this research. They are not easy principles to grasp, and this may result in the methodology being implemented in a very prescriptive and superficial way. As a consequence it may not lead to information that addresses the purpose of the evaluation.

The change in the thinking and practice of others depends on how the transferable learning from inquiry is communicated to them. In the context of the evaluation of the case studies, much of this has been outside my control. The designer/decision-makers essentially owned the evaluation reports about their initiative, so any reporting of learning beyond the agreed reporting chain for accountability purposes (EU project funders and the monitoring group for the educational development grant scheme) was within their control.

Implications for further research: Undertake research into how to engage and guide others in using the methodology to develop understanding of how their own practice models work.

8.7. Emancipatory capacity of the methodology

Although the methodology has been used in such a way as to help the evaluator to critically reflect on the ethicality of activity, interpretation and decision making in the evaluation and evaluand, which enables them to highlight relevant issues to the designer/decision maker(s) for the evaluand, it could be criticised for not been used in this research in such a way that it helps in the process of ‘self’ emancipation. In the cases that were evaluated there was an expectation on behalf of the evaluation clients that the evaluator was bringing to the evaluation expertise and resource not available within the context of interest. There was also no expectation or requirement that individuals/teams responsible for managing the technology supported learning activity would be developed to undertake the evaluation in the longer term, although this could

have been a side effect of collaborating with them. The ‘self’ emancipatory capacity of the methodology therefore depends on the extent to which the designer/decision maker for the evaluand is also a competent practitioner in using the evaluation. Assessing this, would also be dependent on further research recommended in 8.6.

8.8. Dialogue about this research

The initial ideas for this research were primarily influenced by dialogue with my primary supervisor, who has particular interest and expertise in systems theory and its application. At this stage my own contribution was in thinking about how these ideas could be used in the systematic evaluation of technology supported learning activity, particularly in the analysis of qualitative data generated in the context of Case 1. Subsequent stages of the research were influenced by dialogue with colleagues who had already done some initial research and made a commitment to using the Theory of Change approach (Connell and Kubisch 1998) in the context of educational development initiatives. They were therefore supportive about the need to develop a methodology that would lead to learning about how and why change strategies work and their impact. My engagement in the Ph.D. research motivated me to use critical thinking about the merits and limitations of the Theory of Change methodology as the team intended to adopt it, and how systems thinking could add value and inform further development.

Wider communication of learning about the development of the methodology has also been ongoing. The early work aimed at sharing the learning from the research helped to develop clarity about the application of Churchman’s (1971) teleological principles for critical inquiry into e-learning group processes (Kawalek and Hart 2003a,b, 2007). More recently I have been involved in attempting to share learning about the development and use of the methodology in higher education change initiatives (Hart *et al* 2006, 2009a, b, Hughes and Hart 2007, Hart 2007).

Potential for further research: Following knowledge sharing and development of guidance material, undertake research into the wider adoption of the methodology and impact of its use on improvement in evaluation practice and wider improvement in technology supported learning.

8.9. Summary

Although this thesis has argued that there have been significant contributions to theory with respect to the use of critical systems thinking in the evaluation of technology supported learning, it has also been useful in highlighting gaps in learning that were unable to be addressed within the resource-bounded scope of this Ph.D. research. The articulation of the rationale for and implementation of evaluation methodology, and the learning from the research, together with reflection on some of the limitations, provides a sound basis from which this, or other researchers, can progress this research.

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Appendix 1

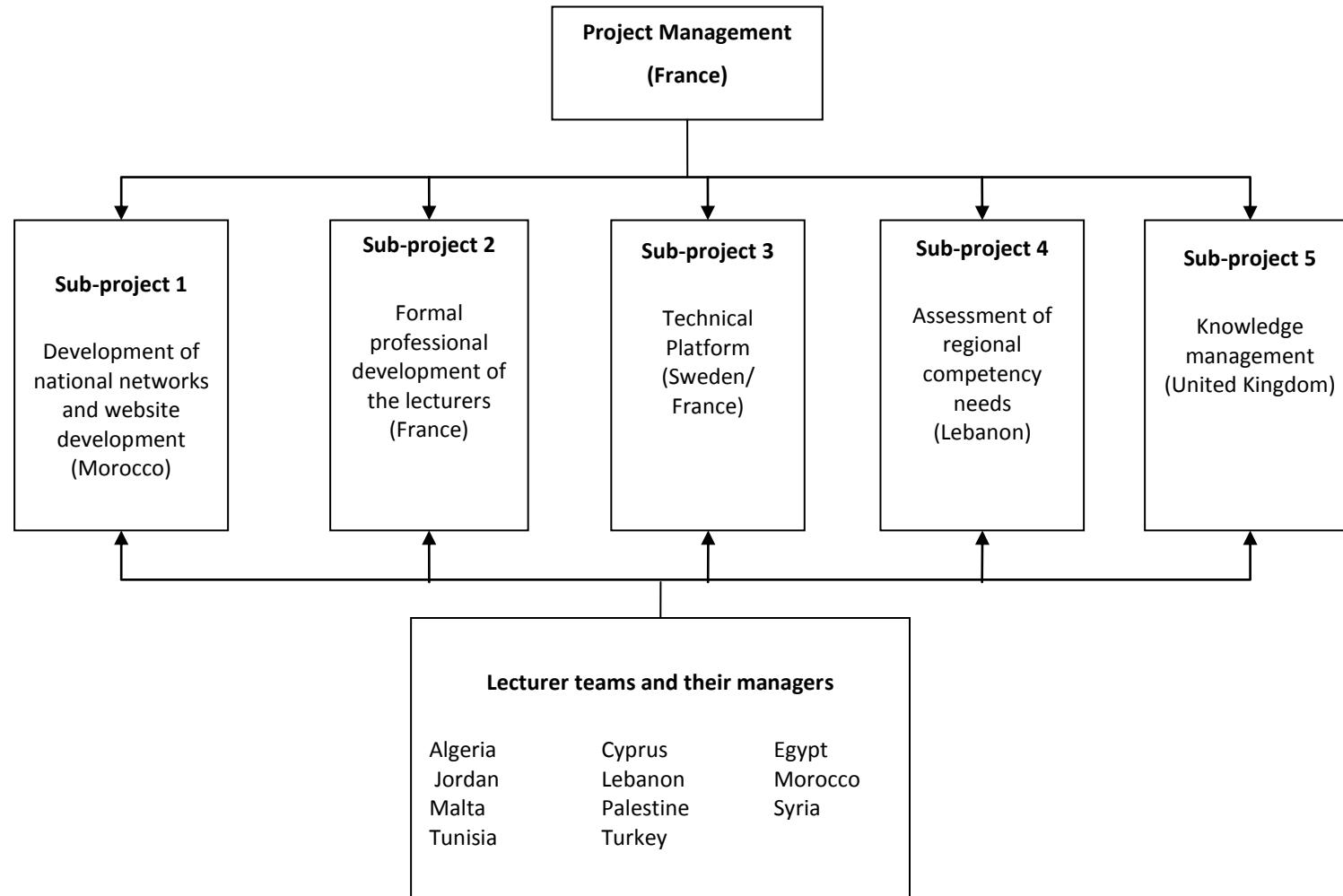
Development work undertaken in the context of Case Study 1

1.1. Background

Case 1 concerns a knowledge management initiative that was part of a project funded by a European Union grant. The KM component of this project involved developing an online learning environment and associated learning activity to support a group of geographically distributed lecturers in the Eastern Mediterranean region in improving their teaching practice in the discipline of e-business. As the initiative formed only one component of the EU project, its activities needed to be co-ordinated with those of other project activity and reported to and agreed with the project's management team. This management team consisted of a project manager, managers of 4 other sub-projects, and 12 country managers responsible for the teams of lecturers based in institutions in 11 different countries. Figure A1.1 shows the relationship between these project components.

The initiative was perceived to be complex at the outset. This complexity arose not only because of the complexity of the project associated with its different components, but also because of the diversity of participants involved in all of the different components in terms of their prior knowledge and experience, their motivations for being involved in the project, and hence their expectations of how they would benefit.

Figure A1.1 – Components and relationships of the EU project



1.2. Systems modelling of change in Case 1

At this stage of the research it was thought that Churchman's (1971) ideas about conceptualising teleological organised human activity would help to make sense of some of the complexity involved in the project. Taking a process perspective on modelling the knowledge management initiative provided a systemic framework through which to question its purpose, operation and effectiveness in relation to the purpose, operation and effectiveness of the supporting technology. This was helpful because the starting point for designing learning activity became the learners' needs and the purpose of the learning. How technology was used to support this was then designed and specified around these needs, rather than the learning activity being designed around the availability and functionality of the technology.

The development work for the organised learning activity was also informed by consultation with the 48 lecturers intended to benefit from it. They were asked to articulate what they thought they needed from the knowledge management initiative. This involved engaging them in group dialogue around this agenda. They anticipated their requirements to be:

- (i) to identify their learning needs for helping them to undertake their roles within the project;
- (ii) to identify and explore relevant theoretical concepts;
- (iii) to link these theoretical concepts with practice;
- (iv) to share experiences and work together to develop knowledge of good practice in e-business, e-learning and knowledge management;
- (v) to be able to adapt and use this knowledge of good practice in their own situations;
- (vi) to work collaboratively, for example on case studies and research;
- (vii) to extend their links with industry, enabling enhancement of the relevancy of their own courses.

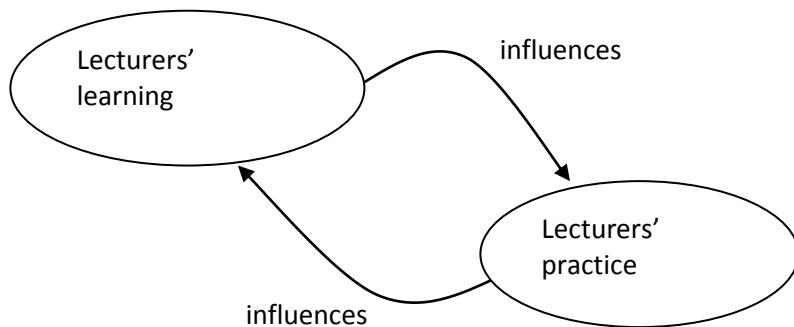
Other data and information that was used to inform the initial design work were:

- Academic literature on knowledge management, pedagogy, organisational learning, communities of practice and systems thinking.
- Consortium agreement outlining objectives and approach to the EU project.
- Consultation with country managers on the preliminary analysis of theory and good practice in knowledge management.

- Lecturers' application forms for participation in the project, which outlined their backgrounds, motivations and expectations.

The learning activity to be supported by technology was therefore envisaged as needing to help them to evaluate their own effectiveness, in both their roles in their home institutions as lecturers in e-business, and their effectiveness in their roles for achieving the aims of the EU project. It was therefore conceptualised as being meaningful only in relation to the practice context to which they would apply their learning. Figure A1.2 depicts this relationship as a low resolution systems model. This also resonates with the ideas about the interdependence of theory and action in experiential learning theory as articulated in Chapter 2.

Figure A1.2: Relationship between lecturers' learning and practice



In the same way the purpose of the knowledge management process was also conceived as being to manage the effective integration of their learning with the operational process so that it was effective in its improving the operational context to which it was being applied (figure A1.3).

This meant being able to adapt the knowledge management process to have a positive influence on the lecturers' learning, and hence their contribution in their operational context. If this is the case, then also associated with the knowledge management process was evaluation of its achieving this purpose. (Figure A1.4).

Figure A1.3: Relationship of knowledge management process with lecturers' learning and operational activity

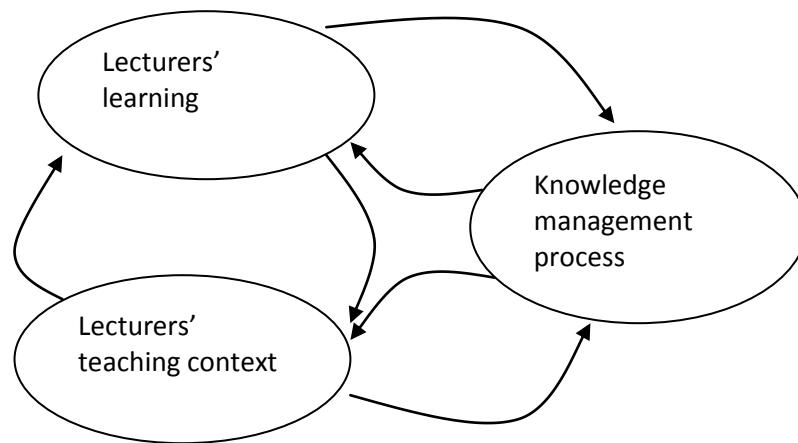
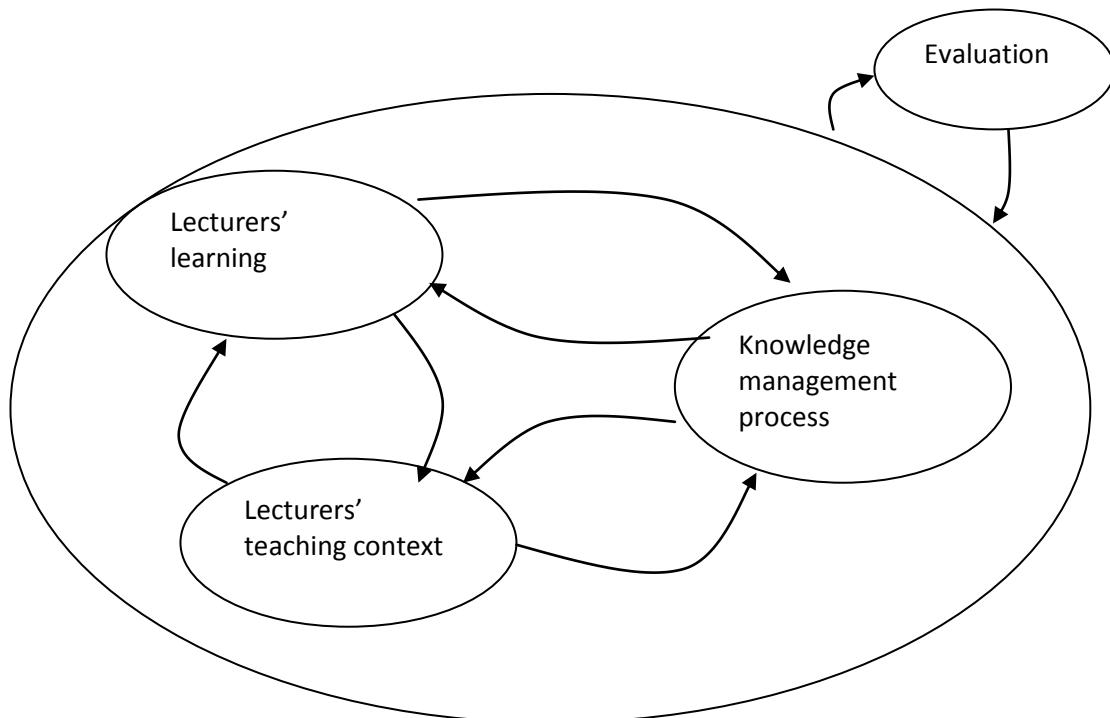


Figure A1.4: Relationship of evaluation with knowledge management process being evaluated



The main roles and relationships within these activities were therefore considered to be:

- (i) 'Clients' of the learning activity: taken to be the lecturers who would benefit from the knowledge management activity.
- (ii) Designer and decision maker for the learning activity, but through negotiation with country managers and other sub-project managers, and ultimately the lecturers by taking into consideration their learning needs.
- (iii) Facilitators of the learning activity.
- (iv) Designer and decision maker responsible for monitoring and evaluation, to inform design and decisions about improvement.

Table A1.1 summarises some of the initial boundary judgements made about these activities.

Table A1.1: The ‘designed’ processes

	EU project	Lecturers' operational context	Lecturers learning activity	Knowledge management activity	Evaluation activity
Intended transformation(T- or purpose)	-Improve e-business capability of each partner country. -Create sustainable network of e-business lecturers. -Create database of sharable resources for network.	-Improve practice as e-business educator. -Create local network of those concerned with e-business.	-Enhance knowledge about good practice in e-business and e-business education.	-Improve lecturers' performance in operational context through appropriate learning. -Effectively integrate lecturers' learning with their practice. -Create ICT facilitated 'community of practice' in the network.	-Inform effective judgements about interventions to improve knowledge management.
Client/beneficiary	Partner countries	Lecturers' students	Lecturers	Lecturers	Project managers
Start point	-No real 'networking'. -14 partner countries. -48 lecturers requiring professional development. -Under- developed e-business capability in partner countries.	-Lecturers have no real experience as e-business lecturer. -Lecturers have varied previous experience of teaching/training. -Lecturers from different disciplines. -Lecturers have different experience of ICT.	-Little or no knowledge of good practice in e-business and e-business education.	-No effective informal learning process for improving practice. -Incohesive network of lecturers.	-No informed judgement for making appropriate intervention
Intended outcomes	-48 e-business lecturers plus their own educated students. -Improved ICT capability of lecturers and their students. -Improved e-business capability of partner countries. -Sustainable network of lecturers for continued improvement in practice in e-business and e-business education.	-Lecturers have experience of teaching e-business. -Lecturers have experience of experimenting with e-learning technologies and pedagogy. -Lecturers' ICT access/environment improved (but not necessarily all the same). -Local network of those concerned with e-business. -Lecturers have developed good practice in e-business education.	-Lecturers developed ideas about good practice in e-business and e-business education.	-Effective informal learning process that improves practice. -Cohesive and sustainable 'community of practice'. -Appropriate ICT support for community learning processes	-Informed judgement for making intervention.

Component activities	<ul style="list-style-type: none"> -Educate the lecturers (formal learning). -Establish needs of each partner country. -Teach appropriate courses to practitioners in each partner country. -Develop sustainable network capable of improving e-business practice. -Develop technical infrastructure to sustain the other activities of the network. -Publicise existence of network and progress of project. 	<ul style="list-style-type: none"> -Participate in e-business formal training activities and workshops. -Participate in EU project activities -Develop e-business syllabi. -Develop e-business teaching resources. -Adapt shared resources to own context. -Experiment with pedagogical approaches and resources in own teaching context. -Build local network of those interested in e-business. -Undertake dissemination activities outside network. 	<ul style="list-style-type: none"> -Share experiences, ideas, techniques etc within network using reflective and reflexive learning process which challenge assumptions about good practice. Share resources. 	<ul style="list-style-type: none"> -Design appropriate learning pedagogy. -Design/specify supporting tools, including technology. -Motivate and facilitate participation. -Take action to improve process. 	<ul style="list-style-type: none"> -Design evaluation methodology. -Undertake evaluation activity. -Make data and its interpretation, and implications for further actions available to network. -Evaluate appropriateness of methodology.
Decision processes	<ul style="list-style-type: none"> -Project planning and monitoring by Project Committee. -Project evaluator to validate each country's contribution. -Criteria on which success of contributions and achievements assessed. 	<ul style="list-style-type: none"> -Lecturers evaluate own experience for implications with respect to improving practice. -Criteria by which experience judged useful for informing future practice. 	<ul style="list-style-type: none"> - Lecturers evaluate contributed ideas and resources for relevance to own practice. -Criteria by which contributions judged useful for informing practice. 	<ul style="list-style-type: none"> - KM managers evaluate implications of their decisions and actions in KM activity. 	<ul style="list-style-type: none"> -Evaluation of effectiveness of KM activity for improving lecturers' practice. -Criteria on which judgements about improvement made.
Resources	<ul style="list-style-type: none"> -EU allocated budget for direct costs. -Some existing resources of partner institutions (e.g. some equipment, networks) -Specialist knowledge of sub-project teams and Steering Committee. -48 lecturers. -Time to undertake component activities. 	<ul style="list-style-type: none"> -Access to some of project budget allocated to each country. -Access to technological platforms to support the work. -Knowledge and expertise of specialist sub-project teams and country managers. -Time to undertake component activities. 	<ul style="list-style-type: none"> -Collaborative working platform which includes communication tools and database for shared resources. -Time to undertake component activities. 	<ul style="list-style-type: none"> -Facilitator/learning set advisor(s) -Manager/developer for technical platform. -Time to undertake component activities. 	<ul style="list-style-type: none"> -Evaluator -Access to platform and participants. -Time to undertake component activities.

Internal environmental conditions	<ul style="list-style-type: none"> -Different motivations and expectations for each partner. -Different levels of existing technical infrastructure in each partner institution. -Distributed nature of the partners. 	<ul style="list-style-type: none"> -Different motivations and expectations of lecturers. -Different levels of support by home institutions. -Different languages/culture. -Lecturers have different access to ICT. 	<ul style="list-style-type: none"> -‘Safe enclaves’ needed for open discussion and development of trust. -Lecturers have different knowledge developed from chosen knowledge domains and their unique experiences. 	<ul style="list-style-type: none"> -Participative management with country managers and sub-project managers 	
External environmental conditions	<ul style="list-style-type: none"> -Rapidly changing field of e-business. 	<ul style="list-style-type: none"> -Different e-business needs in each partner country. -Different levels of technical infrastructure in each partner country. 	<ul style="list-style-type: none"> -Imposed requirements of project management. -See internal project environment. 	<ul style="list-style-type: none"> -See internal KM environment. 	

1.3. Narrative about the initial boundary judgements

This section provides the more detailed description of the designer's interpretation of the stakeholders' theory of change for the KM initiative, and how it was intended to fit within the broader change strategies being encouraged and funded by the EU.

1.3.1. External environment and its challenges

The EU project was funded through the EUMEDIS initiative. The purpose of this initiative was described as being to

"contribute to the expansion and qualitative improvement of the Euro-Mediterranean Information Society in the pursuit of the overall economic development, quality of life and mutual comprehension, and understanding the objectives of the Euro-Mediterranean cooperation" (EUMEDIS 2003)

A priority was therefore e-commerce. In terms of systems concepts, the transformation (T) anticipated by EUMEDIS was a narrowing of the digital divide between the different countries in the Mediterranean region in their ability to use IST (Information Society Technologies).

In working towards the objectives of EUMEDIS, then the long-term intended transformation (T) of the EU project being funded was assumed to be the improvement of the economy of the region through improvement in the e-commerce capability of its practitioners and citizens.

The EU project was considered to be operating within the rapidly changing wider knowledge domain of e-business. Hence the skills and knowledge needed in the sector were not clearly defined. Similarly the project intended for its network of lecturers to experiment with new educational models for teaching e-business, particular that of e-learning. Knowledge about effective pedagogy and supporting technologies was also rapidly changing. In addition there was diversity within the participating countries and institutions in terms of the technical infrastructure available and the existing knowledge of e-business and e-learning.

1.3.2. Internal environment and its challenges

The long-term transformation intended by the EU project was considered to depend on the expansion of the network of practitioners and its long-term sustainability. This in turn was seen to depend on the effectiveness of the community building and learning activity that would enable

network members to develop appropriate knowledge to improve their practice through sharing experiences, ideas, and techniques etc. However there were a number of internal factors anticipated to present significant challenges to achieving these intended outcomes. These were largely related to the diversity of the participants in terms of their motivations and expectations, existing knowledge and skills. They were from two different academic disciplines, Management and Computer Science. Their teaching experience varied, with some being quite junior teaching assistants and recently appointed lecturers, whilst others were academic staff members with quite a number of years' experience of teaching and research. Communication was also anticipated to present some difficulties given the diversity of first languages in the network, although a precondition for entry was the ability to communicate in English.

1.3.3. Learning activity and the role of technology

Given the identified expectations of the network on how the KM initiative should help them, it was assumed that a social learning model aligned with the concept of 'communities of practice' (Lave and Wenger 1991) was most likely to support them in achieving their needs and expectations. This would require a pedagogical approach in which learners would be encouraged to critically reflect on the impact of their actions in order to learn from them to inform their future actions (Schön 1983, 1987, Revans 1971, Freire 1972, 1973).

The geographical distribution and the limitation on resources available for frequent travel meant that it was impractical for the network members to meet often during the project lifespan (3 years) to enable the necessary social dialogue. Technology was considered to be a necessary component of the knowledge management initiative, to enable members to share artefacts or information around which learning dialogue would be structured, and to provide communication tools to support this dialogue.

The designed learning activity involved bringing together small groups of the network (around 5-7) in on-line peer-to-peer action learning sets facilitated by a learning set advisor. The aim of these learning sets was for members to explore relevant experiences and ideas in a non-threatening environment. It has already been argued in Chapter 2 that these groups work better as trust is developed, based on principles of reciprocity. In order to do this, members often have to expose their vulnerabilities. It was also envisaged that the intended learning of each learning set would be

determined by its members, based on their own learning needs presented by their practice situations.

On this basis, the original specification for the technology required to support the designed learning process was that it should have the capability to support the following functionality:

- (i) asynchronous communication. Members should be able to contribute dialogue to discussion at any time, without it being necessary for other participants in the discussions to be online at the same time. This was required because of the time differences between the countries involved, different patterns of weekly working due to religious and cultural norms, and other different commitments on their time which would make it difficult for them to schedule synchronous communication.
- (ii) document/file storage in logical folder structure to which all participants could contribute.
- (iii) search of the content of discussions, documents and other files contributed.
- (iv) collaborative work areas in which discussions and documents could be kept confidential to each 'learning set' when appropriate.

1.4. Evaluation planning

As designers and decision makers for the knowledge management activity, those of us taking on these roles considered ourselves to be the primary 'clients' of the evaluation. Its purpose was therefore considered to be to inform decisions about how the learning activity of the network members could be organised to be effective and sustainable in the longer term. Informed by the literature review undertaken, the knowledge management initiative was also conceptualised as a participative action research project. Hence, although we also occupied the roles of designer and decision maker for the evaluation, we intended to work collaboratively with the other stakeholder practitioners in order that *their* knowledge of the process of knowledge management and its evaluation could be improved, and to improve their commitment to making the necessary changes. There was also some developmental intention here, in that there would come a point at the end of the funded period when we would no longer be available to undertake or support the 'management' of the activity. However, unlike with the initial consultation about the design of learning activity, evaluation planning involved collaboration with only the core project management team and country managers. The extent to which country managers consulted their teams of lecturers about proposals and incorporated their views in the feedback about the

planned evaluation process was the decision of each country manager. We also recognised that in the role of decision maker for the evaluation, we ultimately had control over the criteria being used in the inquiry, despite this being informed by the wider consultation.

Using systems concepts to take a process view of the organised learning activity and inquiry into its operation and effectiveness resulted in conceptualising the inquiry on two levels:

- (i) monitoring of the operational success of the organised learning activity;
- (ii) evaluation of the strategic success of the organised learning activity.

The modelling process and consultation with the network members resulted in the monitoring and evaluation criteria shown in Box A1.1 (overleaf).

It was also decided as part of the consultation process that data for providing evaluative information about these criteria would be collected using the following methods:

- direct observation of the communication and behaviour of participants through my own involvement as learning set advisor and as one of the managers of the knowledge management initiative.
- a questionnaire with both quantitative and qualitative dimensions, to allow every network member to provide anonymous feedback. This was intended to give insight into their opinions underpinning the observed behaviour, and some indication of the strength of opinion.
- interviews with lecturers to provide a more in-depth insight into the rationale behind their observed behaviour. A further anticipated advantage was that those who were unconfident or less proficient in spoken English would be more comfortable with written language, and asynchronous communication would also provide them with the opportunity to reflect on questions and responses.
- face-to-face meetings with project manager, sub-project managers, country managers and lecturers, in addition to written consultation with them about the lecturers' feedback.

The development of the questionnaire and interview questions was therefore guided by the criteria listed in Box A1.1.

Box A1.1: Monitoring and evaluation criteria for Case 1**Criteria/Values guiding monitoring of the operation of the learning activity**

1. The extent to which the process engages and motivates the lecturers to participate (i.e. the extent to which they are sharing and contributing material).
2. The extent to which online help and guidance documents are found useful by the lecturers for supporting their engagement in the process.
3. That the learning sets operate as intended.
4. That appropriate and useful knowledge that could be applied in practice is being developed by the lecturers' participation in the learning activity.
5. That the technology is found to be adequately supporting the learning activity.
6. The role of learning set advisor is effective in facilitating the learning activity.

Criteria/Values guiding evaluation of the effectiveness of the learning activity

1. That the learning activity helps the lecturers to evaluate and develop materials that they find useful in their practice.
2. That the lecturers perceive that they have developed skills, methods, tools, strategies that will enable them to cope with their changing practice, including in the use of information and communication technologies.
3. That the lecturers perceive that their career progression or employment prospects have improved as result of their participation in the learning activity, either because of the networking opportunities, or because of the knowledge, skills etc developed.
4. The extent to which the lecturers' expectations of the process in helping them in their practice is met. For example, to what extent is the process relevant to their learning needs? How does it help them to prepare for their ambitions/roles?
5. That there are perceived network connections that indicate that the network is sustainable.
6. That the knowledge being developed during the project is considered transferable to new situations in higher education. This includes the knowledge developed by the lecturers about their practice in their knowledge domain, and also the knowledge developed about the knowledge management initiative design and implementation, i.e. does it contribute to knowledge about good practice in knowledge management?
7. The extent to which the network members work collaboratively to produce joint research papers, learning resources etc.

1.5. Implementation of the learning activity

Implementing the learning activity was dependent on implementing an appropriate platform that would support it. However the hardware and software procurement was the responsibility of one of the other sub-project teams (Sub-project 3). In addition to the technology required to support the knowledge management initiative, their responsibility was also to procure a virtual learning environment to support the more formally structured professional development for the 48 lecturers being organised by Sub-project 2. It may be significant that this was called ‘training’ by the project manager, implying that a more didactic approach was expected here. It was also expected that the virtual learning environment would be used by the lecturers to support their teaching and the learning of their own students on the courses they were developing. Given the specification for the knowledge management initiative suggested by the design, it was decided by the project management team that there were possible efficiency gains to be made if a virtual learning environment could be procured that also had the functionality required to support the knowledge management process. A tender was therefore designed around the requirements of both e-learning and knowledge management. However, because there was considerable variation in the capabilities of the participating countries and institutions with respect to infrastructure available to support the desired technology, procurement of the technology was delayed whilst different approaches to resolving these difficulties were explored.

The delay in procuring technology to meet the requirements for both the knowledge management and e-learning activity of the network led to a decision to temporarily implement the knowledge management initiative on a virtual learning environment also being used temporarily for the formal part of the training by Sub-project 2. This was not ideal for the knowledge management activity, since it was not capable of the all the desired functionality.

It also became apparent from the initial consultation stage that network members were not familiar with the intended action learning pedagogy. It was decided that the initial phase of implementing the knowledge management initiative would need to involve a short induction into how action learning in learning sets would work in the virtual learning environment. Since lecturers were to use the process to help them to develop e-business case studies to use in their teaching, *and* case studies of how they had used learning resources and engaged students in learning activity, it was decided to divide them into different learning sets according to their core teaching specialisms. The country managers also requested to join these learning sets, an

eventuality that had not been considered in the original design. We, as decision makers for the knowledge management process, thought this would undermine the intention of the learning sets to engage in open and honest discussion, with members exposing their vulnerabilities and uncertainties i.e. it would introduce a power dimension to the learning process which we felt was not supportive of the intended learning process. However the project management team exerted pressure to allow country managers to be admitted to learning sets. Following some negotiation, they *were* admitted, but only on the same basis as the lecturers, and with a health warning that this might influence the group dynamics in a way not intended in the original learning design.

The project was implemented in two phases. The first phase commenced in October 2003 and involved temporary use of a virtual learning environment, Blackboard's⁴ CourseCompass. Nine months later the online learning sets were eventually implemented on Microsoft's SharePoint Team Services⁵. This platform more closely matched the technical specification.

Induction to the virtual learning environment was based on a series of on-line activities aimed at encouraging members to use and become familiar with the tools available to them, and to engage them in debate and critical reflection. One of the aims of this programme was for the lecturers to become aware of how the role of learning facilitator was undertaken, so that they would be able to take responsibility for structuring and facilitating their own learning set activity in the longer term.

The final implementation stage only required a brief induction into how to use the Team Services online environment for the action learning activity. This involved providing network members with some routine tasks to introduce them to its functionality and structure. Once all the resources developed by the lecturers had been uploaded to Team Service's file store, lecturers were also asked to complete a number of structured activities aimed at updating the teaching and learning resources and encouraging more interaction around the exchange of good practice in the application of these resources.

⁴ <http://www.blackboard.com/>

⁵ <http://technet.microsoft.com/en-us/windowsserver/sharepoint/bb741069.aspx>

1.6. Data generation and synthesis

Evaluation questionnaires were distributed and completed after implementation of the first phase of the initiative in Course Compass, as a means of providing data to inform improvement in the second phase of implementation. Interviews were conducted in the latter stage of the EU project. Lecturers were given a choice of interview method (asynchronous or synchronous email, or telephone) depending on which was most convenient.

The systems constructs used by Churchman (1971) to describe teleological processes and outlined in Chapter 3 Section 3.4.1 were used to organise thinking about the complexity of the implemented learning activity and how it could be improved. Improvement was considered to be progress with respect to how the learning activity meets the requirements of its 'clients', in this case the learners.

In the formative evaluation, systems constructs were used to help synthesise and reflect on the meaning of some of the data generated. This is illustrated in the discussion and critique of the data, through the organising of the discussion by these themes.

Systems constructs were used to more systematically synthesise the interview data in the summative stages of the evaluation. Table A1.2 shows how a template analysis approach was taken to organising data obtained from each interviewee (King 2004), with the template categories being derived from these systems constructs. The sub-categories within the primary categories in the template were not pre-defined but instead were generated from the data as they emerged.

Table A1.2: Template for Interview Data- example Lecturer J

Purpose

1.1. Priority designed outcome(s)	I think the most important expectations were as follows: link these theoretical concepts with practice, develop best practice in, share experiences to develop new knowledge in e-business, work collaboratively for example on case studies and research
1.2 Personal goal(s)	In the long term, I aim to teach lectures in a university.

Transformation

2.1 Learning	2.1.1 Perceived needs(s)	The reason for this is, as [...] team our course content has enough technical detail, but do not contain so much business practices. Hence we wish to study the cases of other groups to have a better understanding of best practices in [...].
	2.1.2 Perceived outcome(s) expected and/or experienced	
2.2. Developing good practice	2.2.1 Perceived needs(s)	
	2.2.2 Perceived outcome(s) expected and/or experienced	<p>(Q) Has your idea of what is a good case example changed since reading the other trainers' cases? If so how has it changed?</p> <p>(A) Not much. But we referred to good case examples pointed by [...] to understand the characteristics of the good cases referred in the previous section.</p> <p>(Q) You mentioned you were using the cases to look for examples of good practice in e-commerce. Have you been using them at all to look for examples of good teaching practice i.e. in the development and teaching of a case study?</p> <p>(A) Since [...] Team will be a part of [...] case book preparation, we tried to find good case studies (best practices) in order to be able to evaluate the [...] cases. We looked to the ones directed by [...], and also searched the internet for this purpose.</p>
2.3 Continuing Professional Development/Career enhancement	2.3.1 Perceived needs(s)	
	2.3.2 Perceived outcome(s) expected and/or experienced	<p>(Q) Has your participation in the [...] network helped you in any way towards achieving these ambitions?</p> <p>(A) In this respect [...] project helped me a lot experiencing teaching.</p>

Process

3.1 General Participation	
3.2 Using database resources	<p>We aim to go over the cases of other groups in [...], and review them</p> <p>We have started to download the cases. [...] will compile the [...] cases into a [...] chapter for the joint [...] book. We will contact with the owners of the cases through team services if they need to be updated.</p> <p>(Q) In what way do the cases need to be updated to meet your needs?</p> <p>(A) Most of the cases were not technical at all. Since as [...] we are more experienced in technical aspects of e-commerce, we will try to comment in that respect. But this is still in progress.</p> <p>(Q) Have you used any of the other trainers' cases in your teaching yet? If so what sort of feedback did you get? Would you change it in any way as a consequence of this feedback?</p> <p>(A) Not yet unfortunately.</p> <p>(Q) You mentioned you were using the cases to look for examples of good practice in e-commerce. Have you been using them at all to look for examples of good teaching practice i.e. in the development and teaching of a case study?</p> <p>(A) Since [...] Team will be a part of [...] case book preparation, we tried to find good case studies (best practices) in order to be able to evaluate the [...] cases. We looked to the ones directed by [...], and also searched the internet for this purpose.</p>

3.3. Sharing ideas/experiences	
3.4 collaborative work	<p>We will contact with the owners of the cases through team services if they need to be updated.</p> <p>(Q) How exactly will you use Team Services to help you in the process, since there is no direct email contact to the writer of a case through Team Services?</p> <p>(A) Actually we have not contacted the authors yet. But [] informed me that he has the emails of [] trainers. (This is an indirect way anyway :)</p>
3.5 Networking	<p>Unfortunately we have not communicated at all.</p> <p>(Q) What further contribution do you think the [] network could make in helping you achieve these ambitions?</p> <p>(A) We will continue our seminars, through which I will gain more experience.</p> <p>[Note absence of any mention of involvement in network!]</p>

Decision making

4.1. Evaluation Criteria	<p>(Q) When you are reading the cases, what is it for you that makes a case 'good' for your purposes? What sort of things are you looking for?</p> <p>(A) We are looking for the following characteristics:</p> <ol style="list-style-type: none"> 1. whether it is informative 2. whether they provide adequate info for the students to assess the case 3. whether the case is open ended. If it is not it is not a very successful one since it will not create a discussion environment 4. whether teacher notes and questions are added to the case
4.2. Process	<p>(Q) How you decide which of the cases are useful to you?</p> <p>(A) Unfortunately the summaries for each case were not available, hence we have downloaded and read all of them.</p> <p>(Q) What methods and criteria do you use?</p> <p>(A) As indicated since all of the cases will be in the book, we had to retrieve all of them. In fact my colleague [] helped me in this process.</p>

Resources

5.1 Technology	May be more fine grained attributes can be asked to the authors while they are uploading their documents. But the specification of these attributes will highly depend on the purposes the documents will be searched for.
5.2. Knowledge/Skills	
5.3. Motivation	<p>(Q) You report not communicating at all with the other [] trainers since the [] workshops. What do you see as the main reason(s) for this?</p> <p>(A) Although we have committed ourselves to [] project, each of us have a lot to do in our universities. Lack of time, and motivation for collaboration is the main reason.</p>
5.4. 'Help'	

Internal Environment

6.1. Roles		
6.2. Culture		
6.3. Language		
6.4. Control	6.4.1 Structured activities	If the aims of these studies can be arranged so that they match the activities that we already have to do within the scope of [], then they help the trainers. Otherwise they may be seen as an extra effort. [Note does not respond as to own feelings]
	6.4.2 Incentives	
	6.4.3 Monitoring and evaluation	
6.5. Other constraints		
6.6. Feedback from Trainers	<p>(Q) Have you used any of the other trainers' cases in your teaching yet? If so what sort of feedback did you get? Would you change it in any way as a consequence of this feedback? (A) Not yet unfortunately.</p> <p>(Q) Have you/[] had any feedback from the students on these courses to be able to assess the impact of these resources? If so, what changes would you need to make as a result of this feedback? (A)[]'s course was selected the best course in the department as a result of student's evaluation reports.</p>	

External Environment

7.1. Transferability	<p>(Q) You mentioned you haven't used any of the other trainers' material in your own courses yet. But have you used any of the material you have developed yourself through [] for other courses that do not form part of the [] contract? (A) [] is already teaching [] for the last 7-8 years. She has used the slides that has been prepared for [] in the [] course given in the [] Department, []. Also some part of the material is being used in the [] course.</p> <p>(Q) If you did, what have you been able to use and how much did you have to adapt it for a different purpose? (A) We have not adapted the material for [] course, but for the [] course only a limited, introduction material on internet technologies is presented to the students. For this reason the material had to be simplified.</p>
7.2. Institutional constraints	<p>(Q) You report not communicating at all with the other [] trainers since the [] workshops. What do you see as the main reason(s) for this? (A) Although we have committed ourselves to [] project, each of us have a lot to do in our universities. Lack of time and motivation for collaboration is the main reason.</p>
7.3. Boundary	

Improvements

8.1. Process	
8.2. Decision making	(Q) Since you had to download all the cases before making any evaluation about what would be useful, how do you think the File Share libraries could be improved to help selection at this stage? (A) The summaries of the cases may help a lot. In fact there was such a functionality, but it was not used frequently, or the summaries were not so informative. May be more fine grained attributes can be asked to the authors while they are uploading their documents. But the specification of these attributes will highly depend on the purposes the documents will be searched for.
8.3. Environment	
8.4. Resources	

When the sub-categories were relatively stable and manageable, a matrix analysis was used to compare data across all interviewees and to summarise and integrate it to provide information about each of the main evaluation criteria (Nadin and Cassell 2004), as shown in table A1.3.

Table A1.3: Summary of systems analysis of interview data by evaluation criteria

(A) – (L)= source interview templates

Evaluation criterion: That the learning process helped the lecturers to evaluate and develop materials that they found useful in their practice.	
Purpose	<ul style="list-style-type: none"> -Use others' resources so know what aiming towards in own (C). -Not teaching, therefore no clear idea of what needs are, or which resources might be useful (I). -Investigating a specific problem (D) or topic (E). -More general browsing when don't know what will be teaching in future (E). -Level of use linked to relevancy to own practice, i.e. make more use of when material likely to be relevant to courses teaching (F).
Transformation	<ul style="list-style-type: none"> - Nothing being learnt from materials that are repetitive or just regurgitate material from workshops. (D) -Idea of what is good case study not really changed since formal part of training (J, K). -Learnt to present 'facts' in more digestible/interesting form (C). -Believes will use only small percentage of resources to support teaching, mainly case studies (B).
Process	<ul style="list-style-type: none"> -Evidence of searching and looking at others resources (E, F, G, H) and benchmarking own work against that of external resources and other trainers resources (C). -Resources examined for ideas on both good practice and content (F, H) e.g. how a lecture is organised (H). -Reading resources in full (B, L) particularly when full summaries were not available (J). -Targeting resources of particular type, eg case studies, magazines, e-journals (C) -Contacting other trainers by direct email if contextualisation needed (J).
Decision making	<p>Criteria</p> <ul style="list-style-type: none"> - Case studies believed to be most useful (B, F), to support active learning (B) and with greatest scope for re-usability (F) - Resources must be contextualised in some way "<i>powerpoint slides by themselves are not helpful anyway; you need to have the book/reading where they came from to be able to lecture based on them</i>" (D) - Originality of material (source needs to be known –trainers own or not) (D). Relevancy to own teaching context (H). -"<i>We are looking for the following characteristics:</i> <ol style="list-style-type: none"> 1. <i>Whether it is informative</i> 2. <i>Whether they provide adequate info for the students to assess the case</i> 3. <i>whether the case is open ended. If it is not it is not a very successful one since it will not create a discussion environment</i> 4. <i>whether teacher notes and questions are added to the case</i>" (J) -Recommendations by colleagues (J) - Criteria to be developed through discussion with colleagues within sub-community (K) – but not on platform!
Environment	<ul style="list-style-type: none"> -Team Services environment perceived to have "<i>easy, effective and fast search mechanism</i>" (G) also (C), with "<i>clear arrangement of the tasks</i>" (E). Easy to use, especially with help files (K). -Summary information helps to find cases likely to meet needs, but still have to read through in entirety to find out if appropriate (B). -A lot of repetition in other material (though still some scope to find some content missed in own courses)(F). Resources not providing any new information (G) -Slow performance (D) -Believes platform needs more material, particularly case studies (B) and materials from specific perspective (e.g. technical) to interest individual (E) -No time to look through all resources (D) or to read them in full as need to do to determine if useful (L) -Impact of monitoring on encouraging use "<i>Actually I used the Team Services mostly to be able to understand and answer your interview questions</i>" (G).
Summary	<ul style="list-style-type: none"> -Range of different types of use depending on experience and needs of trainers. -Novice users using KM for 'kick-starting' own resource preparation, getting ideas for content and how to present. Criteria seem to be implicit. Those more experienced finding less value, nothing original, insufficient contextualisation, particularly in relation to time required to find what is need. Most value here is in case studies, which are more readily transferred to new situation without adaptation – but perhaps insufficient range currently to meet demand. -Only one trainer talks of discussing and developing criteria with colleagues, but not on Team Services.

Evaluation criterion: That the lecturers perceived that they had developed skills (including ICT skills), methods, tools, strategies that would enable them to cope with their changing practice.	
Purpose	
Transformation	<ul style="list-style-type: none"> -Not identified knowledge skills needed (B). -Has given novice lecturers confidence to deal with the unknown (H). -Novice lecturer whose practice has been influenced by shared resources (C).

	<ul style="list-style-type: none"> -New ideas on collaborative and group work obtained through interaction with other lecturers, and different approaches to UG and PG teaching (F). -Has supported transition to introducing e-learning component into teaching approach (G). -More experienced lecturer's ideas about best practice not much changed, but more confident in using technology to support teaching (L, M).
Process	
Decision making	<ul style="list-style-type: none"> -Positive feedback from students on courses to new practices introduced (C, F, M). -Insufficient feedback yet from students (G).
Environment	
Summary	There is evidence that lecturers feel the changes they have made to their practice has received positive feedback from students. Some novice lecturers feel that they are more confident in dealing with the unknown, those with more teaching experience feel more confident with the use of technology to support their teaching (but note that KM learning again not differentiated from formal training).

	Evaluation criterion: That the lecturers perceived that their career progression or employment prospects had improved as result of their participation in the learning process (either because of the networking opportunities, or because of the knowledge, skills etc that they had developed).
Purpose	Not all lecturers had expectations that [project] would help their career progression (F).
Transformation	<ul style="list-style-type: none"> -Stated explicitly that they felt that the knowledge gained through participating in the project has helped with career progression (H, M). [But note that they are often thinking of the project as a whole, which includes formal learning process, not just KM.] -[Project] participation complements parallel experience of MBA in helping towards personal goals(C). -Novice lecturer feels benefited (I), but also that every new experience of benefit since at such early stage (H). -Novice lecturer feels been given experience of teaching (J). -Participation [in project] has improved chances of achieving personal goals, but expected "<i>better in quantity and quality</i>" (A). -Since still has identified unfulfilled knowledge needs feels not helped as much as hoped (in project – G). -Believes ambition of greater networking will be enhanced as latter part of project reached and know better other members' interests (B). Where improving research was goal, not really benefited (D). -Yes – but no reasons given (K).
Process	
Decision making	
Environment	-Does not see how KM can help with research because of diversity of members interests and perspectives (D).
Summary	Novice lecturers especially feel learning has helped, since they are at a stage in their career where all new experience helps. However, they have not really differentiated KM experience from project experience as a whole.

	Evaluation Criterion: The extent to which the lecturers' expectations of the process in helping them in their practice had been met. For example, to what extent had the process been relevant to their learning needs? How could the learning process have helped them further in preparing for their ambitions/roles?
Purpose	<ul style="list-style-type: none"> -There was some desire to become specialist or expert in the lecturers' core topic (A, G, L), and in one case to have certification of this expertise (A). -For some, there was a clear purpose from the lecturer that at the outset seemed well aligned with the [project] goals, and the timing fitted well with the lecturers needs. (D) Conversely, lack of urgency to participate was evident where there was no immediate need, because either the lecturer was not teaching at all, only supporting others in their teaching (I, J) with the aim of teaching at some unknown later stage themselves, or teaching was being undertaken later in the project (F). -One lecturer thought the project would be an interesting way to learn (F), and had no other particular agenda in mind. -For some their purpose was not clear from the interview responses. -Some indication of narrow focus on immediate teaching commitments, and not at this stage with the broader issue of developing best practice (E) [perhaps it is just too early?] -Some were hoping participation would help them develop a different disciplinary perspective on their e-business topic. (E, J, K) -For a novice lecturer, or those less confident in developing materials for teaching their new core topic, there was some indication that sharing the KM resources was a way to 'get started' i.e. by seeing what others were teaching and how they could judge the appropriateness of their own approach or get ideas for how to approach their teaching. (B) -Those more experienced the priority driven by their institution is research (D). -Those that were not experienced researchers recognised the need that to produce good research publications, research must be relevant (K), and therefore there is a need to develop the link between theory and practice to support this, and hoping that the KM process would help in this respect (E) and to keep up with recent

	<p>developments (F).</p> <ul style="list-style-type: none"> -In terms of the structured tasks some recognised they would benefit if they completed structured tasks (but lack of time to complete given low priority – see environment) (F, H, K, L). -Purpose of structured tasks not understood (D). -Purpose for learning will emerge naturally from dissemination phase, not from structured tasks (C). -Purpose of structured tasks needs to be more aligned with existing activities, otherwise given low priority (J).
Transformation	<ul style="list-style-type: none"> -From those that had not particularly high expectations of the learning process or the experience, the [project] has met expectations (but note KM not always differentiated from project as a whole). -Main benefit experienced is from access to resources. "<i>I have access for more cases, articles and teaching aid for sure it helps</i>"(L). -There is some evidence that having access to resources prepared on topics from different perspectives (management/computing) is helpful for those who need to consider from a different perspective (A, E). -It is also helping lecturers to observe the different approaches through their resources (E) [although we have to recognise limitation since cannot see contextualised or put into practice]. -Also, those that feel they needed a ‘kick-start’ have found the resources useful. They are therefore going as far as using other lecturers’ resources to help them identify what they perceive as gaps in their own knowledge (B, C). -The process is not really helping lecturers to explore and learn from theory in sufficient depth, (A) or to help them improve from their own disciplinary perspective (E). -It is also not helping those lecturers whose work has been used as exemplar to others since they feel they have nothing to learn from the process.
Process	<ul style="list-style-type: none"> -Process not really operating in the way intended. -There is an observation that to truly collaborate on a level playing field, some of the trainers need to develop more theoretical knowledge of the subject to participate (D). -Some are interested in exploring theory further (A,G). -There is still some perception that the KM component should include formal opportunities to explore theory further, through for example courses, face-to-face workshops (A), and conferences (G). -There is also some evidence of focus on the technology and the resources rather than on the role of ‘self’ in the process (B, C). Some perceive that an archive of relevant, searchable resources will help them keep ‘up to date’ with current knowledge (G). Some observation that needs more on ‘latest news’ e.g. “research results, software, conferences” (L). -Some expectation that the role of technology was only as an intermediary for storing data, which can perhaps help in benchmarking their own work, approach, etc with that of others, but that continuing any real learning depends on the individuals in the network themselves (H). -Those that are beyond novice stage want to see more interaction, and posting of more original resources, articles, cases, and more contextualisation of material through suggestion and discussion on how to use (D). -There is recognition that the SIGs could be useful, but they may need to be divided initially by discipline perspectives, with measures in place to foster communication between SIGs, e.g. by a SIG ‘manager’ responsible for this ‘boundary spanning’ role between SIGs (E). -The process should be more ‘need’ driven (E). -Need more practical experience in specialist topic, and to be able to identify market needs (C). -Believes structured activities not helpful in terms of ‘how to use’ platform, since believe own needs will drive this (C).
Decision making	<p>Decision making processes of the project management, i.e. through monitoring and evaluation, also have an impact on the way the platform is used. For example, as one lecturer says "<i>I use it only to do the tasks you require</i>" (D).</p>
Environment	<ul style="list-style-type: none"> -Lack of participation is primarily explained with two reasons from interviewees. -Lack of time and lower priority compared to other commitments (A, B, D, E, G, H, K, M). -Slow platform (A,D). -Perceived problem is diversity of experience and implications for the process of ‘sharing’. For those novice lecturers that felt they needed access to the resources to get started, they are not really ‘sharing’ but consumers of the resources at this stage (D, E). Once resources are completed there is a tendency to hoard rather than share (E). -The diversity and experience of the trainers has raised the question about why, and on what basis, some of the trainers were selected since their own ‘purpose’ does not seem sufficiently aligned to the EU project objectives. (“<i>I really wonder how some of the trainers were selected. Some are not in educational/research settings, so why should they worry about preparing an [/] course or doing research on [/]?</i>” (D)). -Converse view that diversity positive attribute (M). -Preferences for face-to-face collaboration is still being expressed (A, G). -Communication not in first language still seen as barrier (A, E). -Many of the lecturers who had used the site found they had no need of the help documents, they were comfortable with the technology and its structure (B,C, E, F, G). -For those that used help documents, they were believed to be helpful “<i>All the help documents were so much useful to me , cause they were direct and easy to show me how to do each task.</i>” (K). (Although one person found them too detailed - G). -Questions raised over extending boundary e.g. to trainees, as a benefit to existing lecturers who will have access

	<p>to more resources (B) and to links with practitioners (L) and as benefit to students who will be able to learn from existing resources (F). Project taking too much time. Extending boundary would relieve existing lecturers of so much pressure to keep producing new materials (B).</p> <p>-There was belief that resources should remain free to members, since access to free resources had been one of the motivations for joining the network (D).</p> <p>-There is perception that there is no 'reward' or incentive for doing the tasks that are requested. For example there has been no progress yet on the case study book (D).</p> <p>-There is a lack of time to do structured tasks, which means they become seen as just additional pressure (C).</p> <p>-Sees tasks as "<i>an inconvenience, and in a way, just a way of going through the motions</i>" (D) in order to fulfil EU requirements, with no clear idea of purpose.</p> <p>-Structured tasks seen as low priority compared to other [project] tasks, therefore with other demands of time just not completed. (F, G, K, L).</p>
Summary	<p>-Novice lecturers mainly benefiting from identifying gaps in own knowledge from others' resources. There is less value for other lecturers who feel they perhaps want to explore theory in more depth. -Developing best practice not really seen as a priority at this stage (perhaps too early?).</p> <p>-Experienced lecturer who has not really benefited, sees KM tasks as only fulfilling EU requirements with no clear benefit to lecturers.</p> <p>-Others recognise benefits of these tasks but other demands on their time place them as low priority and so they do not get done. In terms of KM, some still feel that purpose not closely enough aligned with own needs for them to benefit (at least from structured tasks).</p>

Evaluation criterion: That there were perceived network connections that would indicate that the network could be maintained beyond the lifetime of the project.	
Purpose	<p>-Again, because some of the lecturers are not currently teaching their [project] courses they do not have the motivation to network (B, C), or have not yet even identified their knowledge needs (I).</p> <p>-Believes need to collaborate will develop as more experience gained through dissemination phase (G).</p> <p>-Recognition of potential for finding collaborative partners. (F)</p> <p>-Willing to undertake collaborative research or comparative case study (L).</p>
Transformation	<p>-Explicit statements not really benefited (G).</p> <p>-Feels has benefited but not stated how (I).</p> <p>-There is some evidence of direct email networking between trainers, but very little (A, D, E). Some seems primarily social (I) [but this is a start!].</p> <p>-Resources that have been shared perceived as unoriginal, and nothing learnt from them (G).</p> <p>-Evidence of one proposal for collaborative work, but this was between a team and project management in [location], rather than between lecturers.</p> <p>-Some collaboration between Arab countries on 'arabization' of materials. But so far using direct email (K).</p>
Process	<p>Types of communication discussed are specific request to specific lecturer (E).</p> <p>-Poor experiences of not receiving any feedback or reciprocity to email contact (either direct or on Course Compass) means that this not continued (D).</p> <p>-Would like to see more discussion on the 'how to' (D).</p> <p>-Interest in using for preparation for conferences, but not a clear idea of process (E).</p> <p>-Feels sharing would benefit in obtaining cross-disciplinary perspective (E).</p> <p>-Sees more potential for collaboration across countries that share borders (K).</p> <p>-Suggestion need more information who is teaching what, and when (D).</p>
Decision making	<p>Given some of environmental constraints (lack of time etc) whether to invest in to collaboration/ networking or not seems to be based on past experiences of communications (not good), or perceptions of commonality of perspective, interest, perceptions of value of experience, how easy is it likely to be expressed in English. Also Platform is not necessarily preferred choice of communication.</p>
Environment	<p>-Again, some conflicting priorities, and lack of time prevent networking (B,C, D, J, L).</p> <p>-Slow platform (A, D, E).</p> <p>-Some believe that now more of the lecturers are known, and their research interests, the prospects of networking and collaboration will be better (B). Also that the work will continue after the contractual requirements are met (C).</p> <p>-Feel that there are other sources to go to first (D).</p> <p>-Process for applying for international funds for research that crosses national boundaries perceived as complicated. Therefore no incentive if research ideas also felt to be weak (G).</p> <p>-Lack of confidence that own experience worth sharing (G), supported by previous experience of interactions with trainers at [location] workshops.</p> <p>-Language a barrier (G).</p> <p>-Perception of different perspectives on what constitutes research (D).</p> <p>-Little visibility of members research interests or perspectives (D).</p>

	<ul style="list-style-type: none"> -Difficult finding common interests and perspective for collaborative research/work (D, L). -Not sure of others experience/background therefore not sure who to direct communication to (D). -Conversely some see diversity of backgrounds as complementary rather than problematic (E).
Summary	No real evidence of network connections that imply the network is sustainable in the longer-term. Those that have engaged have become demotivated by the lack of reciprocity. Issue of lack of common purpose identified to be problematic for network building/sustainability.

	Evaluation criterion : That the knowledge developed during the project was considered transferable to new situations in higher education. This included both the knowledge developed by the lecturers about their practice in their knowledge domain, and also the knowledge developed about the KM process itself, its design, implementation, operationalisation etc. i.e. had the project contributed to knowledge about good KM practice?
Purpose	
Transformation	<ul style="list-style-type: none"> -Not being used to modify existing modules(A). -No (E, H). -Some of more general basic subject specific material being used in other courses (F, J). -Learning from 'best practice' being used in other courses (F). -Using others resources in classes (L).
Process	Has to change slides in lectures to contextualise for reuse (L) but can use any of cases or articles as written (L).
Decision making	
Environment	
Summary	Very little new knowledge yet being developed by lecturers

1.7. Description and interpretation of the data

Nearly all (44) of the lecturers participated in some way in the induction process, although the extent of participation varied. 32 completed questionnaires were returned as part of the formative evaluation. By the end of the project, all had contributed to the knowledge management initiative in some way, and 12 participated in evaluation interviews. These latter 12 lecturers were from 9 organisations in 7 countries. Most (9) chose to conduct the interview by asynchronous email. Two chose synchronous email, and one a telephone interview.

1.7.1. Operation of the learning activity

There was observed to be a disappointing level of engagement by lecturers in the learning set discussions in both the induction phase on CourseCompass, and in the subsequent implementation on Team Services.

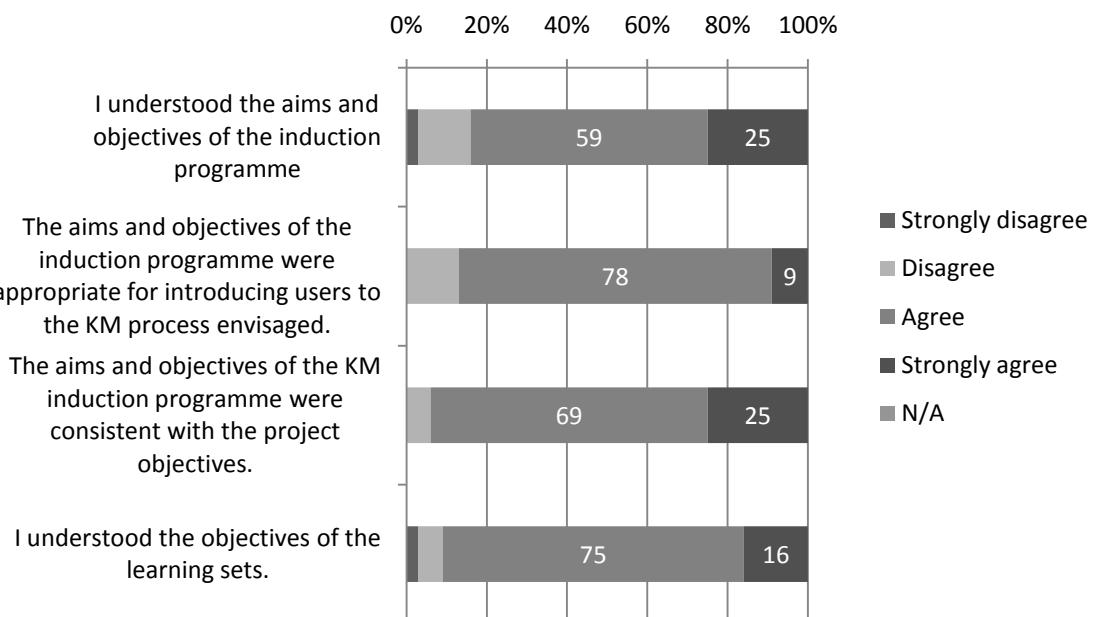
Observation and tracking of activity on CourseCompass revealed that during the induction period although 44 of the 48 lecturers had made some effort to explore the site and read the induction material and information about the activities, and 38 created a brief home page, only 37 attempted to join in the work of the learning sets to the extent of making an initial set contribution. Of these, only 18 of them attempted any further interaction with their colleagues after their initial contribution.

The learning activity was therefore in no way operating in the way intended by those of us that had designed and implemented the process. The data generated enabled the following factors to be considered in influencing this outcome.

Learner's motivation and engagement in learning activity

The formative feedback questionnaires explored the lecturers' understanding of the purpose of the KM process and the relevancy of this to their learning needs. A summary of the responses is shown in figure A1.5. Data labels have been added to highlight the values associated with agreement with statements.

Figure A1.5: Purpose of the KM process



There was general agreement amongst the lecturers they felt they understood the objectives of the induction programme and that it was consistent with the overall aims of the project. Therefore lack of motivation could not be attributed to the trainers considering the designed KM approach 'irrelevant' to achieving the expected outcomes of the project.

This was illustrated by comments in the freeform sections of the questionnaire such as.

Extracts from the data: Purpose of the KM process

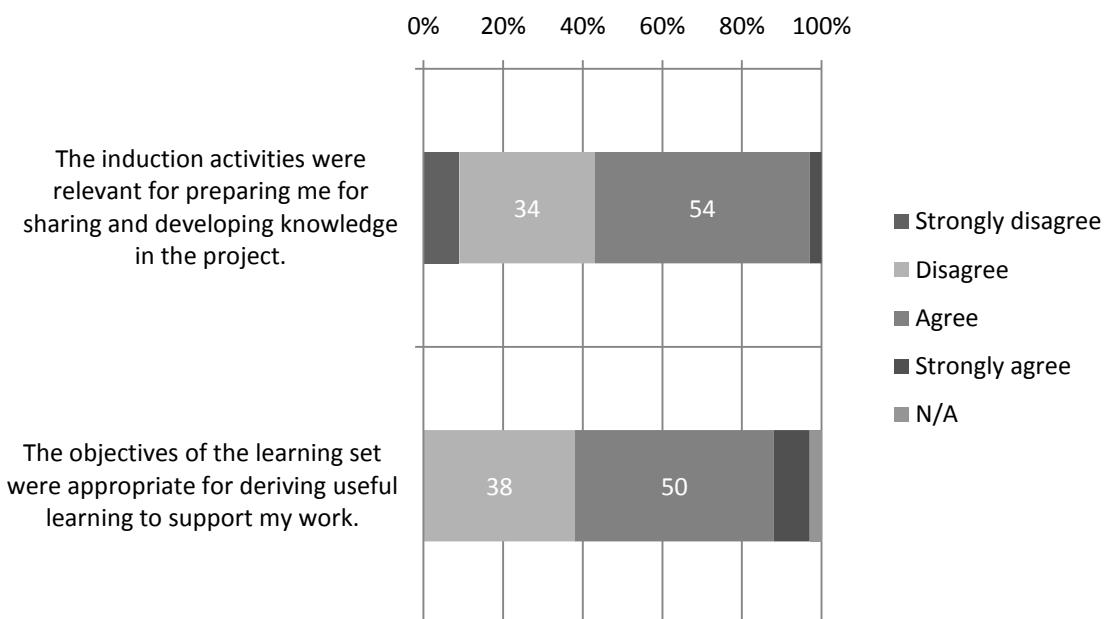
"The exchange of ideas and experiences is the most interesting point of the KM. Especially for those who haven't yet elaborated their syllabi or who are still hesitating about it. It is helpful to see what the other members are doing. And we can benefit from each other's experience."

"The KM process symbolize the [name] project objectives, I mean sharing information, group work, and experience and files exchange"

"KM is an important aspect of the project, however I feel several trainers of the project misunderstand or underestimate the importance of KM."

However, there did seem to be an issue with the KM process, and the project overall, being designed to meet their individual learning needs. Strength of agreement about this relevancy proceeds from left to right in the chart in figure A1.6. Many disagreed with questions exploring this relevancy.

Figure A1.6: Alignment of KM process with individual needs

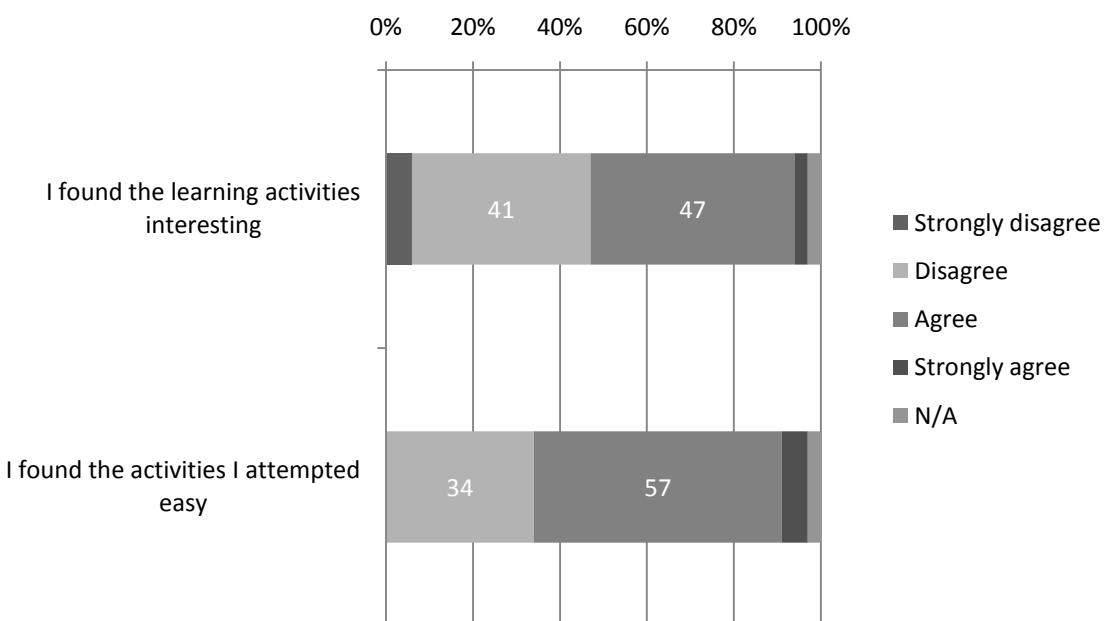


Extracts from the data: Alignment of purpose with individual needs

"Sincerely, there is no problem with KM, but there is problem for me with [name] project, I am not sure about interest of the aims of the project."

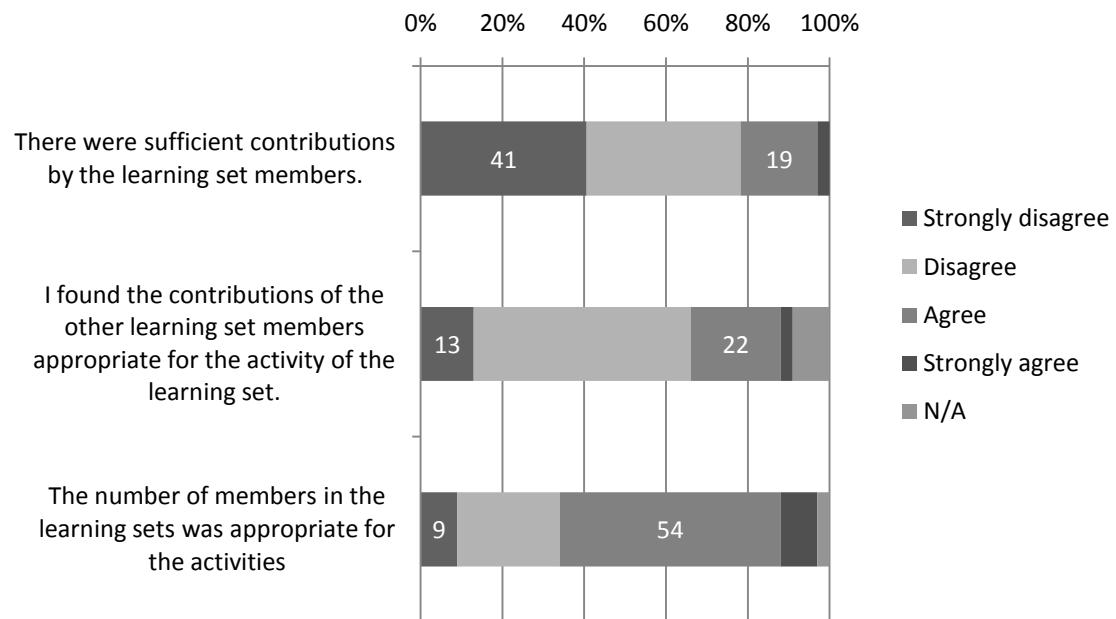
The lecturers were also asked about the extent to which they found the induction activities challenging and interesting. Again there was significant diversity in their response to this (figure A1.7).

Figure A1.7: Opinion on interest and challenge presented by the induction activity



Those lecturers that were initially engaged indicated that they became less so because of the lack of reciprocity and engagement shown by others. This is reflected by questionnaire data about their opinion of the interaction (or lack of) in the learning sets (figure A1.8), and data extracted from the freeform comments.

Figure A1.8: Interaction in the learning sets



Extracts from the data: Interaction in the learning sets

"I found KM program was very interesting and helpful but at the beginning my expectations were higher. I was encouraged to contribute and I provided 2 important files but I didn't hear from the members of my learning set any criticism. I assumed that members were very busy at their jobs with tight schedules which contributed to their limited participation. This has demotivated me later because I'm willing to share my effort and work with other members but I'm also expecting to benefit from the other members. If people are not willing to participate in an active way the results will not be good enough."

"I feel that we started off on a very good note but later on everything fizzled into thin air. I was hoping to find good contributions from members to help me develop my work better. Admittedly, when I saw lack of interaction, I did not participate either."

"Whenever, you post some material, you expect others to do the same thing. That is what I understand from sharing and collaboration. Unfortunately, this did not happen."

"I personally feel like I'm giving out information all the time and receiving none, except from my [name]instructor.[] why should I keep posting stuff?"

"In general, I found your work very good and useful, but problems comes from the participants (few participation and contribution...of interest)."

"Please remember that a lot of us are beginners in the EC Field. In my opinion, this is the main reason of having a little participation in the KM activities"

"Some participant having a few experiences in the E-business field that leads them to be always needs to get information's and not to post it."

"The thing which frustrates me most is that I cannot hold a conversation with ghosts, let alone share something worthy. All we need is valid contributions, but very few seem interested in contributing. You can see the feedback to my posting: non-existent!"

Observation of the learning sets revealed that not all discussion contributions were inclusive of the whole group, or invited responses, feedback, or further discussion. Where this did occur, the invitation was sometimes very general, and did not therefore make it clear what issue(s) the other members of the group should focus on. Where information exchange did occur, the delay in

response was sometimes so great, that at that stage the response was unlikely to be useful to the original contributor.

In subsequent interviews following the Phase 2 implementation, many of the lecturers attributed this lack of reciprocity to a lack of shared objective. Lecturers in the same learning sets were from different countries, but these countries were often at different stages of developing their syllabi for courses in their own institutions. Therefore those that were more experienced or advanced with their work perceived themselves to be the net providers of information and experience, whilst others were perceived to be the net receivers, and also felt they had nothing of value to contribute. This meant there was a lack of *intrinsic* motivation to participate.

Extracts from data: lack of shared objective

"In my view the major obstacle for an acceptable participation from all the trainers was the lack of a common subject (or a common goal). What I mean by that, is an axis around which the trainers would have had to built and add their contributions."

"Our needs, backgrounds, teaching status, time frame, etc. are not the same, so it's hard to gather us around a common goal."

"I really wonder how some of the trainers were selected. Some are not in educational/research settings, so why should they worry about preparing an [] course or doing research on [topic]."

"I guess I was keener than most because I was expected to teach a new course at my institution and the timing of the project was just right for me. But the other folks don't have the same priorities as I do."

"My technical background that let me start teaching our IT students the technical issues that are related into building [] Web sites issues, and when I'm looking at the resources which are published in the [] e-learning platform, I didn't see any new technical resources or links that serve my interest."

Despite this lack of participation and motivation there was some evidence from the interviews that the lecturers in the early stages of their career were using the resources of other lecturers to help 'kickstart' their own preparation or against which to benchmark their own work. Resources

were being examined for ideas both on content and good practice (e.g. about how to organise a lecture).

Equally there were a number of lecturers who were not using the resources. Various reasons were interpreted from the interview responses:

- (i) Some lecturers were not actively involved in teaching at the time of the project, and therefore had no clear idea of what their needs would be and what might be useful, and no time to browse resources without this specific purpose;
- (ii) Some lecturers thought they had nothing to learn from the resources because their own were being used as exemplars, or they were not perceived as useful when judged by their own evaluation criteria.

For example, problems identified by some of the lecturers in the evaluation of the knowledge artefacts being developed were that

- there was insufficient contextualisation ;
- the source of the material was often not known – i.e. whether it was a lecturer's own or whether it was copied from another source;
- there was little that was original in the material, therefore nothing new to learn. Much was regurgitated from the formal development programme, hence there was a lot of repetition.

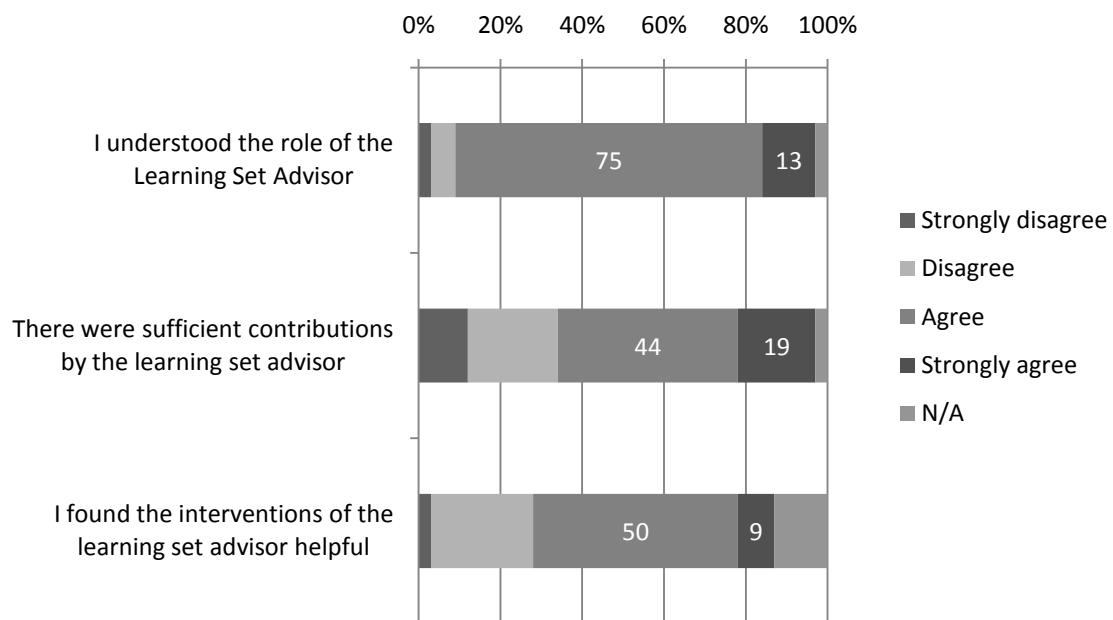
Extracts from data: Usefulness of knowledge resources

"powerpoint slides by themselves are not helpful anyway; you need to have the book/reading where they came from to be able to lecture based on them"

Resources, support and guidance

Most of the lecturers stated that they believed they understood the role of the learning set advisor in the action learning process, and found their interventions sufficient and helpful (figure A1.9).

Figure A1.9: Support provided by learning set advisors



However, many of their comments indicated that there was actually a misalignment between their interpretations and the designers' intentions. This indicated that some of lecturers were more comfortable in a teacher-centred learning environment. This expectation was not helped by the simultaneous participation in the development programme offered by Sub-project 2 in which there was a much more didactic relationship with their instructors.

Extracts from the data: Role of the learning set advisor

"the teacher should motivate the students."

"the team work and the different ideas gained from the group members were helpful, in addition of the contribution and the support of the course advisors. But I personally found that my experience in the first online course and the way we interacted was more interesting and I felt that I gained personal and individual support and follow up by the instructors in my work more than what I got in this course."

"If the [Sub-project 2] advisors coach the process and provide advices and recommendations and follow up on the work of group members this would improve active participation of everybody."

"If I'm not able to get contributions from everyone (so maybe some form of enforcement should be present here)"

Feedback was largely positive about the functionality and usability of the technology, although some slow connection speeds that were beyond the control of the knowledge management sub-project did lead to an unsatisfactory experience for some. Most of those that were interviewed did not need to use the help documents. Those that did use them said they were helpful and easy to follow. Only one lecturer found the documents were too detailed, but had no need of them anyway. Some expressed a preference for face-to-face communications for KM activity, and not being able to communicate in first language was still cited as a problem.

Extracts from data: Issues relating to the technology supporting the KM process

"all provided tools in KM Platform like Forum tool and others are very useful for us."

"what the platform offered was helpful for getting these needs. I was able to see what others added to the site and get the information, and I expect that the Team Services will continue to deliver more, especially now since all materials are complete and we got a very rich source of data."

"I have access for more cases, articles and teaching aid for sure it helps."

"The used E-learning platform is very clear to use it. Because of that we didn't read all help documents that were uploaded by you. The help documents are very useful, and I don't have any comments about it."

"Unfortunately, I could not read through the help documents. They seem to be too detailed. Currently I do not have a strong motive to read them, since I can manage my way around without reading them."

"Time-consuming connection."

"Slow connection"

"The conventional tools such as e-mail occurred to be more practical for me. Due to the lack of time I preferred to use the more practical but old fashioned ways to communicate so I could not really contribute myself."

"This program requires face to face interaction to discuss the syllabi, it's much easier this way."

"We are checking our e-mails daily/hourly, but not the KM pages that frequently. I personally would prefer communicating with my interest group through e-mail."

The timing and duration of induction activity was imposed by the EU project manager against the advice of the KM process managers. This poor timing and short time a scale for induction meant that lecturers felt that had insufficient time to undertake activity, which was also a factor affecting participation. This was found not to co-ordinate well with lecturers' commitments to other project activities, or activities outside the project. This problem was also attributed to the lack of adequate support from within their home institutions for participation in the project.

Extracts from data: Issues relating to time resource

"all tasks were at the same time, and the course added to the overload."

"I did not have the chance to finish my syllabus so I could not participate to my learning set's discussions (even if most of the people did not!) Still think that our knowledge to each subject [names] is young and things need to be learned."

"I think this training should have been carried out before we actually started working on the material in the syllabus. It would have been ideal to do it after the July training when we were still in the process of absorbing all the training."

"Scheduling is difficult especially if it is across countries with different local times and professionals with busy schedules."

"Some partners are not dedicated in their jobs to the [] activities, which lead for not having the enough time to be active."

"Probably members had very little time to contribute – that was my case anyway."

"The timing was not good for me. It was near end of semester one (our academic year is divided into 2 semesters one from Oct – Jan, and the other from Feb – June) when normally I am tied up with a lot of academic meetings, exam scripts to review, lectures to deliver, exam scripts to correct etc."

*"These activities synchronised with **an intensive load in our personal ordinary work** in the university."*

"One other thing is that I feel we are always being sent deadlines from [] on this task or that (including KM), and it gets a bit overwhelming."

"It is clear from all discussions that the [project] work is not seen as a top priority. They do the "bare minimum" to meet deadlines." (Country manager)

This lack of alignment of the designed process with their own expectations meant that the lecturers were looking for more extrinsic motivation to guide their action. They were also guided in their action by what they perceived to be the criteria of those funding the EU project, and often completed what they perceived to be the minimum to meet their contractual obligations for this funding.

Extracts from data: Need for extrinsic incentives

"The [project management team] promised us a lot of things in return for doing the tasks they asked us. We [lecturer's team] have been quite reliable in providing all they asked for, but we have seen no developments on the support they were to provide us."

"Perhaps such activities are helpful. But I currently choose to allocate the minimum time possible to such reporting, platform exploring activities due to a high demand on my time."

"to stop or just doing whatever the project wants (as a duty), or continue..."

"They are overall reluctant to invest too much time on [EU project] as the project so far has not given them enough incentive for doing so (e.g. accreditation of participating in the training programme, etc.)" (Country manager)

Other internal and external factors

In both stages of implementation using the different technological platforms there was some confusion amongst lecturers about the relationship between the knowledge management initiative and the more formal and didactic approach to their development being taken by sub-project 2.

Extracts from the data: Relationship with other project activities

"I think there was confusion on when we should use the Knowledge Management platform and when to use our other Course Compass Platform. Some of the comments were being repeated in both platforms, others contributed in one platform and not the other."

"I'd rather have the knowledge management tools incorporated in our specific platform to avoid lack of communication with the other members of the group who would be posting material and discussing issues on the other platform."

The process of engaging in open and reflexive discussion was also quite unfamiliar for some of the lecturers from certain cultures and disciplines, and the need to do this in a second or third language (English) made this more difficult.

Extracts from data: Differences in pedagogic experiences, language, culture etc

it is easy for me to read what is on the platform, but much more difficult to express ideas and discuss.”

“My learning set was essentially dead. I posted something, got something back ages later, the clarification I requested was late and not very useful (issue of English vs. French), and that was it for me.”

“Dealing with different languages (English, French, Arabic). I mean that, the English language is not good for some participants. Which leads to less communication between trainers”

“they faced difficulties to understand the objectives (due to language difficulties) and feel documents “heavy”. (Country manager)

“They appear to have relatively limited expectations on what they will get out of it... This may be also linked to some intercultural dimensions. They do not have, and they admit it, a “sharing” culture. A lot is done on a one to one basis and informally.” (Country manager)

The difficulty was compounded by the fact it was necessary to develop materials in English or French for teaching in the local context. If in French, then it was difficult to bring these materials constructively to an English speaking learning set, since it was pointless translating them specifically for this purpose.

Some thought the uncertainty about the continuity and sustainability of the network beyond the project deadline influenced their commitment and motivation to making the knowledge management initiative work.

One worry about the approach to implementation had been about the impact of the admission of country managers into the learning sets. It became clear from some of the lecturers' comments that their concepts of 'management control' in the process were somewhat different to those of us that had designed the learning activity, and that they expected a certain degree of enforcement or monitoring of their activity to ensure that workload was equitably distributed.

Extracts from data: Expectations of 'management control'

"Should inform us directly by email for specific tasks required or updated material on the platform. The busy schedule does not allow us to go everyday to the platform for checking requirements."

"Reminders in the form of emails may not be enough, a phone call could be more effective especially to resolve ambiguities and clarify things. Realistic time schedules and a regular reminder could make the process of participating effortless."

"Another thing may be to see who wants to be on the platform. Apparently some people don't, since they don't respond. Others may want to be there just to get access to stuff, without contributing anything. This ought to be monitored and corrected."

"Encouraging trainers to participate in KM initiatives and if necessary coercing them to do so with warnings that their lack of participation has a direct negative effect on the outcome of the project."

"Can be more proactive. Whenever a learning set member did not do one or more of the assigned tasks, it can warn this member"

"Making this platform the only way to communicate with the group would make me contribute and benefit more from the tool. (if such a way can be considered as encouragement)."

"They expect more facilitation and contribution from [sub-project] teams."
(Country manager)

1.7.2. Effectiveness of the learning activity

This level of discussion concerns the extent to which the lecturers felt they achieved outcomes that were relevant for them, and their perception of the contribution the KM process made to helping them achieve these outcomes. This evaluation was not done until towards the end of the project lifecycle, although some of the findings about the operation of the learning activity were clearly relevant to the judgment about effectiveness.

One of the main problems in using the lecturers' feedback to make this judgement was that in their answers they did not necessarily separate their experience of the KM process from their experience of the project as a whole.

Feedback suggested that those who felt they had benefited most [from the project as a whole were the early career lecturers, who had little or no teaching experience prior to their involvement in the project. They suggested they were more confident in dealing with the unknown. Some of the lecturers' perceptions about this development was also reinforced by positive feedback from their students.

More experienced lecturers also talked about having benefited in some ways, but not as much as they had hoped. Examples included being more confident in the use of technology to support their teaching. Examples of unfulfilled knowledge needs were: knowledge of appropriate collaborators, and wishing to become 'expert' in their e-business discipline. Those interested in becoming 'expert' seemed to associate this with a process that enables them to explore theory further, and the process was not really helping them to do this.

Extracts from data: Benefits experienced by lecturers

"this was my first experience in teaching. So, I think that I've been influenced with what [project] gave me from material resources, case studies, the concepts themselves"

"..I think..I feel that I have gained something about something that I have never been faced before"

"My teaching practice has been changed in the sense that I am using a new set of course material including CDs and the cases. Next semester I will be teaching online. Then I should be utilizing these as well as web resources more."

"The students reacted so good with the courses being taught"

"The project as a whole helped me to improve my degree of knowledge, resulting in an expected increase on my career progression. The formal training [] showed us a "way"[].. continuing the learning process depends on us..."

However, much of this transformation could have been gained through the formal development offered by Sub-project 2, and the face-to-face informal interaction. There was no explicit connection made by the lecturers between these benefits and the online learning activity implemented as their knowledge management process.

Hence there was some evidence that the KM process was making some contribution to lecturers' learning and improvement in practice, but only in a limited way, and not in the way that had been originally intended at the design stage for the learning activity.

With respect to other intended outcomes, there was no evidence of networking or collaboration taking place within the Team Services environment, and from the interviews only a little indication that networking or collaboration was being undertaken with the help of using other communication tools or face-to-face. There also appeared to be little motivation or sense of purpose to do so. A small number of lecturers believed that the desire and need to network and collaborate would emerge later following the dissemination phase, and as members learned more about each others' backgrounds and interests.

Extracts from data: Networking and collaboration

"Since the [] workshop, they have not developed any real and deep contacts with the country team." (Country manager)

"The [team] feel that they are always driving & contributing, while the others are not taking this very seriously and waiting for the others to contribute first...This came up in all my discussions when we talked about collaboration and what it means for them. So they will do the bare minimum to meet the deadlines." (Country manager)

1.8. First order boundary critique: of the evaluand

Systems constructs provided a useful starting point for analysing and categorising the qualitative data generated to help to understand how the various components of the process were operating and issues affecting the integration of these components into an effective whole.

A summary of the interpretations of the implemented learning activity in comparison to the original design is shown in table A1. 4.

Table A1.4: Comparison of implemented processes with designed processes

	Implemented processes	Designed learning process	Designed KM
Intended transformation/ Purpose	<p>'Enhancing' all individual's knowledge difficult given diversity of experience of network (see start point)</p> <p>Purpose of members quite diverse, often based on experience/current practice. Ranging from developing teaching practice (novices), developing different perspective or new courses, and enhancing research profiles (more experienced).</p> <p>Some novice lecturers not yet undertaking any real teaching responsibilities.</p>	Enhance knowledge about 'best practice' in e-business and e-business education and training	<p>Improve trainers' performance in operational context through appropriate learning.</p> <p>Effectively integrate trainers' learning with their practice.</p> <p>Create 'community of practice' in the network.</p>
Client/ beneficiary	Lecturers EU	Lecturers	Lecturers
Start point	<p>Diversity of experience (novice to experienced), discipline (Management-Technical), expectations (improvement to 'expert', teaching - research), and needs (some currently teaching, others not).</p> <p>Diverse expectations for pedagogical approach (see process)</p>	Little or no knowledge of 'best practice' in e-business and e-business education.	<p>No effective informal learning process for improving practice.</p> <p>Incohesive network of lecturers.</p>
End point	<p>Novices benefiting most by developing ideas and confidence with own teaching resources through benchmarking with others.</p> <p>More experienced lecturers more confident in use of technology to support teaching (but not really developed through KM).</p> <p>No good practice being developed, possibly because those seeing some benefits at moment do not feel have enough experience to exchange.</p> <p>Some isolated instances of communication/collaboration, but not necessarily on Team Services. No real community evolving through this process.</p>	Developed ideas about 'good practice' in e-business and e-business education.	<p>Effective informal learning process that improves practice.</p> <p>Cohesive and sustainable 'community of practice'.</p>

Component activities (Process)	<p>Many resources uploaded. Not all lecturers using these.</p> <p>Lecturers not sharing experiences, but some expression that this is desired.</p> <p>Some lecturers expect to explore more theory.</p> <p>Insufficient incentives. Those promised not delivered.</p> <p>Structured activities aimed at improvement perceived as possibly of benefit, but still too low priority. Others see as only 'going through motions' for EU benefit.</p>	<p>Lecturers share resources.</p> <p>Share experiences, ideas, techniques etc. using reflective and reflexive learning process which challenge assumptions about 'good practice'.</p>	<p>Design appropriate learning pedagogy.</p> <p>Design/specify supporting tools, including technology.</p> <p>Motivate and facilitate participation.</p> <p>Take action to improve process.</p>
Decision making	<p>Some (mainly novices) using resources to identify gaps in own knowledge.</p> <p>Benchmarking processes for evaluating resources mainly through implicit criteria. Some evidence of explicit criteria for more specific purpose, and evidence of some being developed within Arab sub-community.</p>	<p>Establish learning objective</p> <p>Evaluate contributed ideas and resources for relevance to own practice.</p> <p>Criteria by which contributions judged useful for informing practice.</p>	<p>Evaluate effectiveness of KM processes for improving lecturers' practice.</p> <p>Establish and improve evaluation criteria for KM.</p>
Resources	<p>Lecturers find platform easy to use, but performance slow and frustrating.</p> <p>In most cases Help documents not needed, where they are mainly found helpful. Only one comment that too detailed (but not needed anyway).</p> <p>Facilitation not yet called upon because no learning sets evolved.</p> <p>Team Services does not include synchronous communication tools (a tool that was thought would improve process in formative evaluation.)</p>		<p>Facilitators of learning process</p> <p>Technical platform and Help process.</p>
Internal environmental conditions	<p>Broad diversity of starting points still causing some motivational problems (experienced feel nothing to learn from novices, novices unconfident to contribute).</p> <p>Similarly cultural diversity -communication in language not first problematic, some preferences for face-to-face communication.</p> <p>However, diversity has some positives, some have expressed have benefited from cross-disciplinary perspective.</p>	<p>'Safe enclaves' needed for open discussion and development of trust.</p> <p>Lecturers have different knowledge developed from chosen knowledge domains and their unique experiences.</p> <p>Different motivations and expectations of trainers.</p> <p>Different languages/culture.</p>	<p>Participative management with CM's and other SPM's.</p>
External environmental conditions	<p>Timing of tasks to meet project requirements not necessarily integrating with lecturers 'purpose' (e.g. interviews undertaken even though some lecturers had not starting teaching).</p>	<p>Imposed requirements of project management.</p> <p>Different levels of support by home institutions.</p>	<p>Different motivations and expectations for each partner joining.</p> <p>Different levels of existing technical infrastructure in each</p>

	<p>Clearly other commitments, including those of EU project and home institution taking priority over KM.</p> <p>Experience of platform performance partly influenced by local bandwidth conditions.</p> <p>Not all lecturers have access to synchronous email communication tools.</p>	Lecturers have different access to ICT.	<p>partner institution.</p> <p>Distributed nature of the partners.</p>
Boundary	<p>Some lecturers requesting extension of boundary to include own trainees, to benefit both lecturers and trainees.</p>	<p>Existing EU project network only – to develop trust and core community, and establish processes.</p>	

1.8.1. Sustainability and viability

There was considerable diversity of opinion and perception amongst the lecturers about the purpose of the learning activity, how the activity should be undertaken, and specifically how it would benefit them. These diverse expectations were based on diverse and unique prior knowledge and experience in their different disciplines, institutions, and cultures. The problem of engaging the lecturers was also exacerbated because of their different expectations and experience of pedagogic practice, for both the learning activity being undertaken within the network, and the learning activity they were responsible for designing and implementing. Many felt uncomfortable with the critically reflexive and discursive approach to learning, and expected the facilitators to adopt the role of ‘expert’ who would ‘transmit’ information about what was currently known about ‘best’ practice in e-business and e-learning. They found it difficult to adjust to the role expected of them and the technology in the process. In particular they experienced difficulty in attempting to engage in critical reflexion in on-line discussion groups. This difficulty was compounded by them having to communicate in their second, or sometimes third, language.

Systemic interpretation of the data suggested that there was insufficient alignment of purpose between the different levels of organisational analysis, i.e. between the individual lecturers and their learning sets, and the individual lecturers and the EU project as a whole. Some of the environmental constraints on this were that individuals had been admitted to the EU project without sufficient consideration of the extent to which their motivations and learning needs were aligned.

For some there was a clear purpose at the outset that was well aligned with the project goals, and the timing of the project fitted well with their needs. For those that expressed less urgency to

participate, this appeared to be connected with a lack of immediate purpose, either because they were not teaching at all, or they were only supporting someone else's teaching with the aim of teaching at some unknown, future date. For the early career lecturers the motivation appeared to come from the need to build confidence to get started, by seeing what other more experienced members of the network were doing. Others with more experience were hoping to develop a different disciplinary perspective on their core topic, or to develop network connections that would help provide a better link between theory and practice that would impact on their research practice and outputs, by providing them with access to more relevant 'knowledge'.

This interpretation of the data therefore raised the question of the viability of the process with the existing members whose learning needs, expectations, and experiences were too diverse for them to be able to engage in mutually beneficial learning dialogue. This resulted in an overall conclusion that without addressing this fundamental issue of alignment of purpose, the learning activity was not sustainable in the longer term.

1.8.2. Implications for change

The results of the evaluation were used to inform discussions with the core project management team and country managers about desirable and feasible improvements to the process. These discussions were centred on issues such as:

- whether any resource could be made available for extrinsically motivating participation and creating a common purpose, for example in developing a commercially marketable book of case studies;
- whether learning sets should be encouraged in different languages, and if so, who would facilitate them. It was thought that perhaps too many assumptions had been made about lecturers' ability to engage in critically reflexive learning dialogue in the online environment, particularly in a second or third language. Although this proposed improvement was technically feasible, there were also concerns that this would be more divisive than integrative;
- whether the KM process should include more formal opportunities to explore theory further through for example, courses, and face-to-face conferences and workshops. The existing budget meant that this was not economically feasible, and in the longer term this would

depend on securing alternative funding or activities whereby income generation would balance the costs involved.

- how the uncertainty about the continuation and sustainability of the network could be reduced.

1.9. Second order boundary critique: of the evaluation

Systems modelling of the evaluation process and its relationship with the evaluand helped to focus reflection on how this relationship may have influenced what was learnt from the evaluation, in particular as a consequence of decisions and actions associated with the evaluation activity. The key points of learning emerging from the research in Case 1 were:

- (i) By conceptualising ourselves as 'designer' and working collaboratively with decision makers and other stakeholders, we made assumptions that our evaluation against collaboratively agreed criteria for success would form the basis of decisions about improvement of the knowledge management initiative. We also provided information from a wider environmental analysis, for example by basing design proposals and recommendations for improvement on theory about good practice in developing communities of practice, online collaboration and learning, and socio-technical systems. However, the decision makers responsible for the overall project management exerted considerable pressure on us as implementers of the knowledge management initiative to act according to *their* ideas about managing the learning activity rather than allowing local intervention to be informed by the evaluation inquiry. Hence decision making for the knowledge management initiative was not sufficiently influenced by the feedback loops designed by the evaluation. Instead, its implementation was more strongly influenced by the instrumental requirements of the EU project leader to undertake tasks and achieve deliverables that had been pre-determined at the EU project design phase.
- (ii) The design of feedback loops, did not sufficiently integrate with other EU project components. This was illustrated by the confusion shown by the lecturers about the relationship between the more informal and discursive learning approach represented by the knowledge management initiative, and the formal didactic professional development offered by another of the sub-projects.

(iii) The lecturers' contributions to the knowledge management initiative, and feedback given during the evaluation, indicated that their participation (or lack of) was also guided by motivation to undertake only the minimum activity they perceived to be required to meet their contractual obligations to justify the funding allocation. For example, one of the lecturers stated that "*Actually I used the Team Services mostly to be able to understand and answer your interview questions*". Although 30 of the 48 lecturers completed formative evaluation questionnaires half way through the project, by the time the summative evaluation was undertaken only 12 of them responded to opportunities to engage in interviews with myself about their experience of the learning activity. Whilst this generated more than enough data to cope with given the resource available for the evaluation, this also reinforced the interpretation that they were largely disengaged with the project by this stage, and did not think that the process could really benefit them. With respect to those that did contribute, there was a perception that they were perhaps providing responses that they thought the KM management team wanted to hear, possibly because of their relationship with us as facilitators of the learning activity, but also because their culture did not encourage expressing criticism to someone in a perceived role of 'authority' or 'power', or who they thought might be offended by this. This also supported the earlier interpretation that they were undertaking only those tasks perceived to be required to fulfil their contractual commitments.

Extracts from the data: Engagement with evaluation

"Thank you Diane for the good job. I hope I was helpful to you in gathering the information you wanted to complete these interviews, and hopefully I'll be able to work on the platform soon."

"Please tell me if you need any more information. And if I didn't answer your questions in the right way please tell what to do."

"Finally, I appreciate your efforts with us to make the e-learning platform more active, useful & successful."

Further learning from Case 1 concerned the approach taken to generating data used in the evaluation. This was not systematically and explicitly planned by using systems thinking. However,

systems thinking had been used to inform the design of the organised learning activity, and the evaluation incorporated questions that helped to explore the key elements of this design. As a result, the data collected about the implemented activity was still sufficient to enable a systemic analysis, but in retrospect this happened more by accident than design, and was something that needed to be addressed in future evaluations, particularly to ensure an approach that would effectively integrate both analysis and synthesis.

I was also a little concerned about my decision to make considerable use of technology in collecting the lecturers' feedback because of my lack of experience in this area, and because there was little advice in the literature about using electronic research methods. This was also considered as a learning experience that could develop knowledge about data generation methods. Examples of this experience and learning were:

- (i) Early in the project I used email to distribute word-processed questionnaires for collecting the formative feedback, but gave the learners the option of printing the completed questionnaires and sending them back by post if they wished to retain their anonymity. All of the lecturers that responded returned their questionnaires by email, appearing to have little concern that I would not process their feedback ethically.
- (ii) Only one lecturer chose to participate in a telephone interview, so for pragmatic reasons it was decided not worthwhile making the changes to the telephone equipment that would have enabled the recording of the conversation. The time delay in the dialogue across the international line, the difficulties for both parties in interpretation of either a second language or unfamiliar accent, and the lack of visual cues, meant that the dialogue was difficult to conduct in an open and flowing way.
- (iii) The choice of synchronous email meant that dialogue was written, which might have helped the interviewee in the interpretation of questions. There was still a delay between typing a question and receiving a response. Because of a lack of visual cues, it was also difficult to know if slow responses meant more was being added to a response but being typed slowly, or whether the interviewee was waiting for further questions. The slowness may also have reflected their difficulty in composing a written response in a second or third language in real-time. Several breaks in connections during these interviews also resulted in a somewhat disjointed process.

- (iv) The asynchronous interviews overcame some of the disadvantages of the synchronous interviews, by allowing for more time for reflection in composing of questions and responses. However, these were more time consuming in terms of re-reading previous dialogue to refresh my memory of the previous dialogue before composing further questions. It was also much easier for the interviewees to withdraw from the interview.

Appendix 2

Development work undertaken in the context of Case Study 2

2.1. Background

Case 2 was an educational development project in which the course leader had been allocated additional funding to support the development work associated with the design of a new final year undergraduate module. Using social systems constructs (Churchman 1971), the course leader was therefore conceptualised as the designer and decision maker for the learning activity, since he would also be the individual implementing the learning activity with students. Attached to this funding was resource for the required evaluation. As already explained in Chapter 4, the purpose of this evaluation was to provide accountability for the funding allocated. This would take the form of an evaluation report presented to the monitoring panel for the educational development grant scheme. However, an expectation of this panel was that the evaluation should help the course leader learn about the effectiveness of the learning design, and lessons about ‘good practice’ that he could share more widely within educational communities inside and outside the institution. The resource allocated for the evaluation comprised of my own time as ‘evaluator’. The intention was that I would collaborate with the course leader in the design and implementation of evaluation that would lead to this learning. However, the course leader had decision making control over the evaluation in the sense that he could make use of this resource as he felt appropriate, up to a maximum time constraint of 10-15 days. This meant he could use me as a source of advice to facilitate his own undertaking of data generation, synthesis and produce his own written report, or he could request that I undertake these activities for him. In this case he chose the latter.

2.2. Initial boundary judgements about the learning activity

Using my experience from earlier cases of modelling organised learning as a teleological social system, the first stage of the evaluation involved systemically modelling the course leader’s theory of change that was articulated in his bid documents for grant scheme funds and in subsequent dialogue.

The project’s educational aim, or core **purpose**, was to improve students’ understanding of the role and use of new media and technology in the presentation of language, and hence how it is interpreted. A secondary aim was that in the context of their discipline specific learning they

would also develop skills they would find useful in future employment. This explains the relationship of the learning activity with its **wider** environment.

To achieve these aims the course leader intended to engage students in **component learning activities** that would require them to take a more experimental, creative, analytical and critical approach to the study of language and literature, through the use of multimedia technology. The learning activity therefore involved the students working in small groups to create multi-media presentations of examples of language from literature and poetry taken from the texts being studied in the course. This was not only intended to allow students the opportunity to learn how to use new technology, but also to stimulate reflection on the experience of the creative process (their intentions, process etc) in relation to the final artefact produced and its interpretation by others in the group. The underpinning pedagogical assumptions of the learning design were based on constructivist and social constructionist perspectives, whereby students would learn by applying their existing theoretical and practical knowledge to meaningful activity, with opportunities to discuss the meaning of their experience of this activity with the other students and the course leader.

The first role of technology in supporting this learning activity was as a tool which the students would use to create their multimedia presentations. In order to be able to use this technology to do the creative work, students needed to attend workshops in which they would be introduced to some basic skills in using a range of multimedia technologies. The course leader received some additional support for the design and implementation of these workshops, and the preparation of resources for the workshops, from a specialist educational developer with experience or educational technologies.

Secondly, the course leader used a virtual learning environment (VLE) to provide relevant information to the learners, setting the context for their learning. He expected students to use the communication tools in the VLE to exchange information about their own reading and research. The purpose of the online discussion was to stimulate critical reflection and discussion around particular topics of the course, and the connection between the theoretical elements with the creative practical work. The intention was also that this would prepare students to engage in further learning dialogue in face-to-face seminars. The incentive for student engagement in the various learning activities took the form of credit for the assessment activity. This was weighted at 40% of the module mark for the multimedia product from the group work, 40% for an individual

piece of reflective writing about the work, and 20% for written contributions to the discussion board in the virtual learning environment.

Although this form of representation was not explicitly used in this case, this theory of change can be represented by the logic model, which is shown in table A2.1.

As the course was an option module, the course leader decided to register only a smaller number of students (12) the first time it ran, in the spring of 2006. He also decided that all the formal taught elements, including the workshops introducing students to different multi-media technologies, would take place in the first half of the course. This would enable students to concentrate on their creative projects in the latter part of the course.

Table A2.1: Logic model for Case 2

Rationale for change	Resources/Enablers	Activities	Intended outcomes for funded project period	Anticipated impact in longer term and in wider environment
<p>1) Graduates perceived as not having good ICT skills, yet many end up working in positions that require understanding of how to use media technically and creatively.</p> <p>2) Discipline has opened up to new ways of engaging with texts which will remain closed to students without skills required to access them in these ways.</p>	<p>3) Purchase of appropriate software, specialist books and manuals</p> <p>4) Head of department allocates project leader time to undertake development work</p> <p>5) Specialist in educational technology provides support/training for project leader in use of multimedia technologies & preparation of support materials</p> <p>6) Specialist in educational technology provides initial training to students on basic use of multimedia technology</p> <p>7) Project leader develops materials to support students' learning in the use of relevant technologies.</p> <p>8) Project leader develops VLE to support student learning</p> <p>9) Students able to access and use learning resources when required -computers with appropriate software -VLE & books/manuals</p> <p>10) Students able to seek technical support if experiencing difficulty accessing/using software or electronic resources</p> <p>11) Copyright required for reproduction of artists' work</p>	<p>12) Students participate in workshops on basic use of multimedia technology</p> <p>13) Students practise with relevant multimedia technologies</p> <p>14) Project leader motivates & supports students in their experimentation with multimedia, their study of literature and their analysis of the relationship between the two -seminar discussions -use of resources in VLE -supervision of practical experimentation</p> <p>15) Students work individually or in pairs on a project to represent a literary piece of work using these technologies - project 40% module assessment</p> <p>16) Students critically reflect on their engagement with literature through the practical use of multimedia - short contributions to VLE discussions (20% module assessment) - assessed individual reflective piece (40% assessment)</p> <p>17) Project leader shares learning from project</p>	<p>18) Students positively engaged with the learning activity - challenged - supports achievement of educational outcomes</p> <p>19) Students have improved understanding of the role of new technologies in the presentation and communication of language and literature and its impact on interpretation</p> <p>20) Students have developed modern, flexible, transparent employability skills - use of ICT - communication - collaboration -ability to write/express themselves in more innovative ways</p> <p>21) Students have developed study skills that will equip them for lifelong learning -critical thinking - independent and collaborative learning -creativity & experimentation</p> <p>22) Project leader has improved knowledge of innovative teaching and assessment methods</p> <p>23) Project leader is confident in fully integrating technology into course, without specialist support in future</p>	<p>24) Approach rolled out to all 3rd years registered for degree programme</p> <p>25) Use of technology/ICT further embedded in departmental curriculum</p> <p>26) Enhanced engagement of others with innovative teaching and assessment methods - partnerships forged with other academic staff in department & institution interested in using the approach</p> <p>27) Graduates recognised externally as having modern, relevant, employability skills</p>

2.3. Evaluation planning

One of the learning outcomes from Case 1 was that systems constructs also needed to be used to plan the data generation as well as framing its synthesis and interpretation. The conceptual thinking that underpinned the use of the Viable Systems Model in this planning process has already been discussed at length in Chapter 4, and hence is not repeated here.

The first step in planning data generation for Case 2 involved modelling amplifiers and attenuators for the course leader's theory of change that would enable relevant data to be generated to inform the evaluation.

Tables A2.1-3 show how the framework in table 4.2, was applied to planning data generation for Case 2. The first column in the table corresponds to the different elements of the framework in table 4.2. The final column shows how this resulted in decisions about specific observations or questions to be directed at data sources in the data generation process.

Table A2.1: Observations

Information needed about....	In context this is...	Data sources
Problems and opportunities both internal and external to the learning context	Problem/opportunity being addressed by the educational development initiative Rationale for learning design	Rationale for the initiative given in the bidding documents.
Learners' participation and interaction in learning and assessment activity Learners' access to and use of resources (including learning support) Learners' access to and interaction with the learning environment	Students' behaviour and interaction observed in virtual learning environment.	Authors, content and relationship between discussion contributions VLE tracking data
Communication to learners about the learning design and allocation of resources for implementing it Communication and action aimed at motivating and improving learner participation and engagement (with learning activity/assessment/resources/environment)	Module leader's communications with students about :- intended learning outcomes (discipline specific and generic skills) and how this fits in with other modules for degree; how the course will operate; what is expected of students, in terms of course participation, assessment requirements etc	Module introduction and resources on VLE Other course information provided Discussion interaction on VLE discussion boards. Observed interactions between students and module leader in VLE-based discussions (Pragmatically resource was not available to observe other interactions. In retrospect observation of at least one workshop would have been useful.)
Learners' achievement Feedback to students about their achievement	Learning demonstrated in exams/assignments Communication to students by module leader about achievement	Exam/coursework results (but meaningless to evaluator without interpretation of assessor) Content of exams/assignments (but access restricted for evaluator. Reliance on reports/interpretation by assessor)
Resources allocated for learning process Resources used	Resources allocated for supporting the implementation Resources used to support the implementation	Bidding documents and correspondence Records of resources used (budget spent, time spent by those involved)
Trends in how the learning design is experienced by participants, and the factors influencing this experience	Trends observed from iterative evaluation	This is first time module has run, so no trends to observe
Trends in student achievement and other intended and unintended outcomes	Trends in student module results, impact on degree results	

Table A2.2: Student feedback

Information needed about....	In context this is...	Focus Group	Questionnaire	Contextualised Questions
Learners' motivation, expectations and engagement	Reasons students chose to take this option module. Student expectations of learning outcomes (English & generic skills). Student expectations of their learning experience.	✓		Why did you choose this module? What did you expect to learn? How did you think module would be different to other modules?
Learners' satisfaction with their learning experience	Students' satisfaction with: Teaching (multimedia, workshops, online facilitation) Learning activity (group work, project work, online activity in VLE) Learning resources (equipment, software, other) Learning environment (lab space, VLE, other)	✓	✓	(F) In what ways has the module met your expectations? (in relation to learning experience) (F) In what ways has the module not met your expectations? (in relation to learning experience) (Q) Opportunities to comment on curriculum, teaching and learning, resources (including libraries, computers, accommodation)
Factors in the learning design that are positively and negatively affecting the learners' experience and achievement	Students' perceptions of the module design that have influenced their learning, in particular in relation to aspects that relate to funded aspects of the initiative:- multimedia workshops and support for learning multimedia; integration of multimedia with rest of curriculum (seminars, independent & group work); opportunities to engage critically with subject; resources provided to support multimedia project work and learning (e.g. books, software, manuals, pc's, lab space); learning environment (lab space, VLE, other).	✓	✓	(F) Did you find the learning approach challenging? Why/not? Explore extent to which provided opportunity to be experimental/creative/engage in critical thinking. (F) What do you think have been the key factors that have influenced your experience of the course? Explored in relation to:- Multimedia workshops Use of multimedia technology Seminar discussion activity Reflective work on VLE discussion boards Group work Assessment Course structure Available learning resources (VLE, books etc) (F) What do you think is particularly innovative about this course that you would like to see more of in other courses? (Q) Opportunities to comment on Curriculum, Teaching (&learning), Resources.

Learners' participation and interaction in learning and assessment activity	Student explanation for their behaviour & communication in response to learning activity expected in on-line learning environment, VLE.	✓	✓	(F) How did you approach the online work requirements? (F) Explore in relation to:- <ul style="list-style-type: none">- whether students made and read postings as requested by module leader;- why they didn't reply to other students' postings;- would they like to see more online interaction?
Learners' access to and use of resources (including learning support)	Students' satisfaction with:- Teaching (multimedia, workshops, online facilitation) Learning activity (group work, project work, online activity in VLE) Learning resources (equipment, software, other) Learning environment (lab space, VLE, other)			(F) In what ways has the module met your expectations? (in relation to learning experience) (F) In what ways has the module not met your expectations? (in relation to learning experience) (Q) Opportunities to comment on Curriculum, Teaching (&learning), Resources (including Libraries, computers, accommodation..)
Relevancy of the purpose to learners' needs	Students' opinions on relevancy of the educational aims and learning to their academic discipline Students' perceptions of impact of the learning on their employability	✓	✓	(Q) Opportunity to comment on Curriculum (Books studied, topics covered) (F) How relevant do you think the use of Multimedia is to supporting L&T in your discipline? (F) Should there be more ICT used in the English curriculum? In what way? (F) How did you think taking the module would affect your employability? (F) In what ways has the module met your expectations? (employability) (F) In what ways has the module not met your expectations? (employability)
Learners' achievement	Students' satisfaction with what they have learnt and the project work they have produced Satisfaction with module results (but not known at time of focus group)	✓		In what ways has the module met your expectations? (in relation to what you have learnt) In what ways has the module not met your expectations? (in relation to what you have learnt)
Learning facilitators' communication and action aimed at motivating and improving learner participation and engagement (with learning activity/resources/environment)	Students' satisfaction with feedback from module leader on their contributions to learning activities and progress		✓	Opportunity to comment on any issue relating to coursework/assessment. (Feedback)
Feedback to learners about their achievement and corrective action				

needed				
Unintended outcomes	Students' opinions on any other issues that were not anticipated by the other questions about their learning	✓		(F) Is there anything anyone would like to add about any issue relating to your learning experience that we've not already covered?
Recommended improvements	Students' opinions on how the module could be improved	✓		How do you think the module could be improved for students taking the module next year?

Table A2.3: Feedback from Course Leader

Information needed about....	In context this is...	Interview Questions
Communication to learning facilitators and learners about the learning design and allocation of resources for implementing it	Interpretation of module design on implementation Rationale for changes	How did you implement the module? How did this compare to the original learning design? What was your rationale for any changes?
Learners' motivation and engagement Learners' achievement	Course leader's perceptions of the extent to which students are motivated to achieve the educational aims Course leader's perceptions of extent to which students are engaged with their learning Course leader's perception of extent to which educational aims and intended outcomes for the course have been achieved	In the bid you stated that these would be the main educational aims and intended outcomes with respect to student learning and achievement (ref bid). To what extent do you think actual achievement compared to your expectations? with respect to:- extent to which students were more experimental, analytical, and creative in their approach to studying English; students development of critical thinking skills; student motivation and engagement with the course; student understanding of the use of multi-media and its relationship with language; student performance in the assessment; development of students' transferable skills; How challenging do you think students found the learning activity and assessment? Are you getting requests for references to support job applications by these students? What kinds of jobs?
Factors in the learning design that are positively and negatively affecting the learners' experiences and achievement	Course leader's perception of how effective the implemented module has been for helping students to achieve its intended educational aims	In what ways do you think your approach help students to:- -understand the relationship between multimedia and language, and how it can be used to present different types of text (literature, poetry etc)? - to achieve the intended learning outcomes? In what ways were the assessment methods appropriate for -helping students to demonstrate their learning? - helping you to judge the extent to which students had achieved the intended learning of the module? Explore also effectiveness of:- module content and structure; integration of multi-media into the module; workshops for preparing students for engaging with the rest of the course and using Multimedia for their project work; group activity .

<p>Learners' participation and interaction in learning and assessment activity</p>	<p>Course leader's reaction to student feedback and VLE tracking data etc in relation to own experiences</p>	<p>What have you learnt about the effectiveness of the learning design -from the VLE tracking data & contributions? -from student feedback?</p>
<p>Learners' access to and use of resources (including learning support)</p>		<p>What other factors do you think had a positive or negative affect on the achievements of the project?</p>
<p>Learners' access to and interaction with the learning environment</p>		<p>Examples might include:- Amount/availability of financial or other resources; Departmental management support; Collaboration with staff (own or another dept); Clarity of roles, relationships, responsibilities of those involved in educational development initiative;</p>
<p>Learning facilitators' communication and action aimed at motivating and improving learner participation and engagement (with learning activity/resources/environment)</p>		<p>Decision making at different stages of the initiative; Communication between participants</p>
<p>Factors in the implemented learning design that are positively and negatively affecting the learners' experience and achievement</p>		
<p>Factors affecting learning facilitators' abilities to undertake their role</p>	<p>Course leader's experience of teaching the module Course leader's perceptions of what factors affecting ability to teach the course</p>	<p>What have you learnt from your own experiences of this educational development initiative? How do you think this will affect your teaching practice in the future?</p>
<p>Unintended outcomes</p>	<p>Course leader's perceptions of unintended outcomes</p>	<p>Were there any unexpected outcomes for your initiative? What were these?</p>
<p>What factors do you think contributed to these?</p>		
<p>Recommended improvements to the learning design</p>	<p>Course leader's perceptions about changes/improvements that are needed to the module to improve:- -embedding of the approach in the curriculum ; -the sustainability of the module; -student learning and their learning experience.</p>	<p>What did you learn from the students' feedback about what could be improved? How will it affect how you teach the module next year?</p>
<p>Feedback to learning facilitators about how their communications and actions could be improved to improve the learners experience and achievement hence on their experience/achievement</p>	<p>Course leader's satisfaction with evaluation findings for informing their improvements to the module</p>	<p>How effective do you think the evaluation strategy has been in helping you determine potential improvements to your module?</p>
<p>Influence of feedback on the effectiveness the learning process on informing improvements to the learning design</p>	<p>Course leader's perception of the effectiveness of the evaluation process</p>	<p>How do you think the evaluation could be improved, if at all, to help you assess the impact of your module and inform its improvement?</p>
<p>Factors in the implemented learning design that are positively and negatively affecting the learners' experience and achievement</p>	<p>Course leader's opinion on general principles of good practice that lead to effective learning and teaching</p>	<p>What do you think you have learnt from undertaking this module that could be transferable to other teaching contexts?</p>
<p>Course leader's perceptions of factors affecting good L&T practice</p>		<p>What factors might affect this transferability?</p>

Resources used	Course leader's investment in time in the educational development initiative	Do you think the initiative has been a worthwhile investment of your time?
Resources needed for the future operation of chosen learning design (with desirable and feasible improvements)	Resource implications for the future	To what extent do you think you will be able to teach the multi-media workshops yourself in future? Do you think you will need any further personal development to do this? Are there any other factors you think will affect your ability to teach the module in the future?

The conceptual synthesis and analysis of the data and its meaning in relation to the original design was still guided by considering the organised learning activity as a teleological process, as guided by Churchman's (1971) inquiring principles. However, the use of Beer's (1985) ideas about viable systems enables the relationship between the various sub-systems 1-5 and their purpose, to be more clearly conceptualised, leading to improved clarity about evaluation clients and their questions. Again, this was outlined in detail in Chapter 4 and is not repeated here.

2.4. Implementation of the learning activity

The main departures from the original planned learning design were:

- (i) One of the technology workshops had to be postponed due to unforeseen staff illness. The rescheduled demonstration and practice was reduced from three hours to one hour.
- (ii) The small cohort size in this first year made it difficult for the student groups to be any bigger than pairs and for there still to be some variety in what they produced. Students were also given the choice of working in pairs or individually. The course leader's rationale for this choice was that the purpose of the project was not for students to learn about teamwork, but to help them understand about the use of multimedia and language. He felt that he should not insist on students working together if they did not wish to do so.

2.5. Data generation and synthesis

Feedback from students was collected by the home department's standard questionnaire used for monitoring the quality of courses and a focus group. The rationale for this decision was that with the small cohort size it would have been impossible to determine any real trends from questionnaire data. There was therefore little point in designing a questionnaire for the change initiative, although the standard questionnaire did provide some opportunity to provide anonymous feedback, and it did include open questions to allow issues to emerge. Because of the small numbers involved, it was possible to invite all students to participate in the focus group. The group discussion was designed to seek greater qualitative insight into the students' experiences and to fill gaps in the inquiry not addressed by the standard course questionnaire. A reflective interview was undertaken with the course leader at the end of the course after student assessments had been completed and marked, and after student feedback had been collected and summarised. At this time he was able to reflect on the meaning of the feedback in relation to his own experience in order to plan for future changes to the course and to think about the lessons of wider interest to the institution.

2.6. Description and interpretation of the data

Six of the 12 students returned module questionnaires, and 8 of the 12 students participated in a 45 minute focus group discussion.

The information resulting from the evaluation of Case 2 is used here to illustrate its *relevancy* to understanding how the organised learning activity has been socially constructed, to support the argument made that the modelling approach taken helped to focus on issues relevant to answering the core evaluation questions, i.e.

How is the learning activity operating?

Is it effective?

What is its wider impact beyond the immediate learning context?

Is it still appropriate? What are the implications for change?

Is it still viable/sustainable?

2.6.1. Operation of the learning activity

In the focus groups, students stated that they had chosen to do the course because they thought it would enable them:

- to explore an innovative and experimental mix of IT and literature;
- to engage in a new approach to studying;
- because of the lecturer's enthusiasm and encouragement.

Their comments reflected that their expectations were met and *exceeded* in the following respects:-

- the extent to which they were encouraged to think differently about the nature of multimedia and how it is used to construct meaning. They said it made them 'think for themselves', 'use their imagination', through encouraging them to develop their own ideas and opinions and become 'independent thinkers'; [Student quote: "*I feel like we've really been encouraged to become independent thinkers.*"]
- the depth of theory associated with the course, rather than just being focussed on the practical;
- the level of challenge and interest;

- it had provided something new that was not available through other module choices available at the same time.
- they found it unlike other modules which expected them to critique other people's ideas and opinions, and much more about their own ideas and creativity. One student described this as '*empowering*' (i.e. to have their own ideas considered more important than someone else's).

Their expectations had not been met with respect to the supporting workshops that were designed to introduce the technologies so that they could undertake the substantial project work that would be assessed. In the workshops they worked in small groups around computers with large display units. Students stated that it would have helped their learning of the technologies more if the demonstrations had been conducted in different space to allow them to practise individually with the software while being supervised.

Students that had worked in pairs for the project stated that they felt they had benefited in a number of ways:- it supported the creative process as ideas were developed between the pair, with two having a greater range of ideas and experiences than the individual; more could be accomplished in the time available; mutual support and encouragement; and playing to each other's strengths. Those that had worked individually had done so because either they had an idea they wanted to focus on which was not of interest to anyone else, or they had not previously established contacts or bonded with anyone in the group, or they thought they preferred to work alone.

Tracking data from the virtual learning environment showed that all students were accessing the resources available there, and in their questionnaire feedback they were extremely positive about the support this provided. All students were observed posting the contributions required as preparation for seminar discussions, but which also formed part of the assessment. However, 7 out of the 12 students had posted exactly 4 contributions, indicating that they were perhaps doing the minimum needed to meet these assessment requirements. There was also little evidence of any dialogue between students in these online discussions. There was mixed feeling amongst the students about the requirement to make these discussion contributions. Using systems thinking here it could be interpreted that there was not necessarily agreement about how this component of the process would contribute to the success of their learning activity or how this success should be measured. In the focus groups they talked about how they were aware they had not really engaged as a group with this in the way that the course leader had hoped, and gave a number of

reasons for this: lack of time, nervousness about exposing their ideas to others; lack of anonymity; and being unsure about how to conduct academic dialogue in this environment. Despite their reluctance to engage fully with the process, they thought the requirement to make the postings had been a factor in motivating their engagement with the course material early in the course.

2.6.2. Effectiveness and impact of the learning activity

The students stated in the focus groups that the benefits they anticipated when enrolling for the course were to gain some new, transferable, IT skills. They agreed with a comment made by one of the students, that most people studying their subject do not get chance to develop these kinds of skills. This is broadly aligned with the designed purpose of the learning activity, although some agreed with one student's comment that the potential impact on their employability had not been a big factor at the time of making their module choice.

Students in the focus group were satisfied that the technology workshops would have adequately prepared them for the project work, had it not been for disruption to one of the workshop due to unforeseen staff illness, and difficulties of timetabling a rescheduled class. They felt this was a minor disruption, but that it had probably impacted on their approaches to their projects. (See also earlier comments about their preference for more opportunity to work as individuals.)

The course leader thought that the students had achieved the intended educational outcomes. He stated that they had taken an appropriately creative, analytical and critical approach to their project work and writing tasks, which demonstrated their understanding of the texts being studied, developing multimedia, and the relationship between the two.

Regarding the choice students were given to work together in pairs or individually on their multimedia creations, none of the students stated that they felt disadvantaged by this choice, and the course leader thought it had not made much difference to their achievement in assessment as there was a good distribution of excellent marks amongst those that had worked alone and those that had worked in pairs.

In the reflective discussion, the course leader stated that, despite the students' attitudes to making the contributions to discussions in the VLE, he had been pleased with the effectiveness of these contributions since he was able to ascertain that they had read and engaged with the recommended reading material. Students were also arriving at seminar classes prepared for the face-to-face discussion. He also felt their discussion contributions in the virtual learning

environment demonstrated that they had not been disadvantaged by the absence of an overview for every topic. Given the student reactions to this element of the learning design, this suggested that communication about its purpose could be improved.

2.6.3. Other outcomes and wider impact

The course leader was also asked questions that were relevant to inform judgements about the effectiveness of the grant scheme in supporting wider institutional change. These were about the potential transferable learning from the project, and his experience of the grant scheme.

An example of transferable learning about the Case 2 learning activity is that use of the discussion board in the virtual learning environment helped to stimulate reflection on course materials and content before face-to-face seminar discussions. This kind of approach could have much wider applicability than the immediate context, to improving the way students engage with their work in other courses. In terms of the value of the grant scheme in advancing the institutional strategy course leader stated that it provided him with resources to buy equipment, software, licences and manuals, without which it would have been impossible to run the course. It also provided some funds for buying out his time from teaching to undertake the development work, although this was not as easy to achieve in practice because of constraints within his own department on who was available and able to take on this teaching. The grant allocation also provided some legitimacy amongst colleagues and managers for the extent of the development work, in that its value was being recognised beyond the local context.

Other indirect stakeholders in the evaluation are those that Ulrich (1983) calls witnesses. In this case they may not directly be affected by the organised learning activity that has been evaluated, but they also may have an interest in what has been learnt, and this too might result in wider impact. Examples of witnesses are other staff who have been involved in the supporting the educational development work rather than the learning activity e.g. the educational advisors, learning technologists and evaluator. Through this involvement, and from the evaluation, they may stand to learn something that might inform improvement in their own practice in supporting educational development work. Other examples are managers and other staff who may have a vested interest in the transferable learning through some role or responsibility they hold, for example as course leader of a different course within the institution.

2.7. First order boundary critique – of the evaluand

2.7.2. Sustainability and viability

Using critical systems thinking, one of the questions prompted is about whether the learning activity is serving the students' interest. Considering this question resulted in the conclusion that, on the whole, students did experience the learning activity positively and perceive themselves to benefit from the learning. The use of technology was also helping the learning in the way intended in the design.

In terms of the sustainability of the approach in the longer term, one of the factors on which this was dependent was that the course leader would be able to teach the multimedia workshops to students himself in the future, without additional support. He was confident that there would not be a problem with two of the technologies, but thought he would need help with the third for one further year only. A further factor was that demand for the course from students continued at a level which made resourcing it viable. At the time of the evaluation, actual registrations for the following year were not known, although the course leader was receiving sufficient interest in the form of enquiries from students to suggest the number of students participating in the following year would be greater.

2.7.3. Implications for change

The evaluation also helped to identify areas where staff and students agreed that improvement was needed and where there was some misalignment between the staff and student perspectives. An example was that when students were initially introduced to the software they would use in their project work. They stated that they would have liked more support to be able practise individually. The course leader felt that without additional resource to fund additional supervision, which was not available, he would be unable to divide his time adequately between the number of individuals to support them. Working in groups around computers meant that he was able to dedicate a reasonable amount of time to helping each group, and group members would at least be able to help each other. An additional hindrance was that resource was not available to purchase further licences to run the software applications on more computers. This suggested that in future, if students' expectations could not be accommodated, the rationale for this element of the design would need to be explained to them more thoroughly.

Some of the evaluation data provided an example of where there had been inappropriate assumptions in the learning design about 'channel capacity'. Although the course leader had built

into the course a specific workshops to help students' initial learning of the technology and media that they would be expected to use, he had assumed a certain level of basic skill in using information technology, e.g. how to organise electronic files and write them to CD/DVD. But he found that some students required much more help in this area than he had expected, and that in future he would need to provide some written instructions as an additional resource for those students who did not have these basic skills.

In discussion, the focus group members suggested that an improvement in the course would be to provide an opportunity for students to form potential alliances for the group work, so that they could make a more informed choice about this, and so that the choice to work in a group was not foreclosed. With respect to the impact of students' feedback on the differences associated with working individually or in pairs, the course leader acknowledged that he would not have become aware of this through his own reflective practice, but was pleased that the evaluation had provided this information. He communicated his intention to consider this in his improvement action, but needed some time to consider alternative models that might integrate with the remainder of the design, which on the whole was working well.

"I would very much like to learn from this feedback and facilitate the process of forming working groups. But how best to do this is less clear to me."

2.8. Second order boundary critique

Unlike my experience in Case 1, both the course leader and students were very co-operative and willing to engage in the evaluation of Case 2. In the focus group discussion, students talked about the influence of the enthusiasm and efforts of the lecturer on their positive experience of the course and their learning. They were clearly appreciative of the efforts that he was undertaking to develop a good learning experience for them. This might have thrown into question some of the value of the evaluation information, particularly if this had been overwhelmingly positive. However, the discursive and open nature of the focus group discussion meant that students were offering information that was not specifically sought (e.g. about their critical thinking), and they genuinely seemed to take the time to take a balanced view in considering the negative aspects of their experience (e.g. lack of supervised practice with technologies). Whether this balanced response was also a consequence of the discussion being facilitated by myself rather than the course leader is impossible to verify. This led to information that was found to be particularly relevant by the course leader. His opinion was that it had led to *"some really useful suggestions for*

improving the experience next time around. [] I think you really get to the heart of the matter [] it's been a very useful process for me!"

Appendix 3

Supplementary documents for Case Study 3

Section 1: Data generation strategy

(i) Planned observation

Logic model component	Data sources
4) Project team collaborate to design multidisciplinary learning experience for students that is relevant to practice in construction design disciplines	Documents/briefings issued to students Minutes of meetings
5) Project team collaborate to develop learning resources in VLE comprising a case study of an authentic development site	Observe completed resources on VLE
6) Support required from educational technologists for development of the VLE resources	Support requested in project bid documents Support allocated as notified in correspondence Amount and nature of support provided
7) Electronic resources need to be accessible and usable by students	Observe completed resources on VLE VLE tracking data
11) Teaching team integrate resources into interdisciplinary programme and relevant sustainability modules in participating departments	Documents/briefings issued to students Observation of VLE course environments for each module.
12) Teaching team motivate students and facilitate learning activity	Documents/briefings issued to students Observation of interactions with students where possible
13) Students undertake discipline specific learning activity, multidisciplinary introductory programme and collaborative group work	Observation of learning activity where possible
14) Students use VLE resources to support their learning	VLE tracking data Observe completed resources on VLE
15) Project team share their experience and learning from the project more widely	Published documents/papers Internal dissemination documents Observed presentations

(ii) Planned collection of student Feedback

Logic model component	Data/information needed	Method(s)
7) Electronic resources need to be accessible and usable by students	Student satisfaction with accessibility and usability Students' experiences of accessing and using resources Factors affecting students' access to the VLE resources	Questionnaire (Likert) Questionnaire (multi-choice) Questionnaire (open) Focus group(s)
9) Access to development site is required	Student satisfaction with the site visit for helping them to undertake the project brief Student experience of the site visit	Questionnaire (Likert) Focus group(s)
13) Students undertake discipline specific learning activity, multidisciplinary introductory programme and collaborative group work	Students' opinion and experience of the various learning activities Factors affecting students' experience of learning activities	Questionnaire (Likert & open questions) Focus group(s)
14) Students use VLE resources to support their learning	Students' purpose and approach to using the VLE resources to help their learning Students' satisfaction with the resources for helping their learning Students experiences of using the resources to help their learning Factors affecting students' experiences of using the VLE resources	Focus group(s) Questionnaire (Likert) Focus group(s) Questionnaire (Open)
16) Students engaged with learning activity	Student expectations of their learning experience Students' satisfaction with learning activity Students' positive & negative experiences of learning Factors influencing students' experiences	Focus group(s) Questionnaire (Likert) Focus group(s) Questionnaire (Open) Focus group(s)
17) Students achieve intended educational outcomes	Students' learning Students satisfaction with what they have learnt Factors affecting students' learning	Focus group(s) Questionnaire (Likert & open) Focus group(s)
20) Graduates in construction design disciplines have improved range of employability skills	Relevancy of students' leaning and their experience to their future employment	Focus group(s) Questionnaire (Likert)
22) A collaborative learning community is fostered across construction design disciplines in the University	Students' experiences of working with students from other disciplines	Focus group(s)

(iii) Planned collection of project & teaching team feedback

Logic model component	Data/Information needed	Questions/for team discussion
4) Project team collaborate to design multidisciplinary learning experience for students that is relevant to practice in construction design disciplines	Team's experiences of working together Team's satisfaction with what they have achieved Factors affecting collaborative working	What have you learnt from your own experience of participating in this project? Are there any other factors you think may have had a positive or negative affect on the outcomes of the project?
5) Project team collaborate to develop learning resources in VLE comprising a real life case study of development site	Ditto	Ditto
6) Support required from educational technologists for development of the VLE resources	Team's experience of support from professional services and how this has influenced development of resources	Ditto
7) Electronic resources need to be accessible and usable by students		What have you learnt from the tracking data, student feedback, your own experiences/observations?
8) Copyright needed for reproduction and inclusion of appropriate material	Team's experiences of securing copyright and factors influencing this	Were there any issues which negatively influenced integration of resources into the learning experience?
9) Access to development site is required	Team's experience of arranging access to the site and factors influencing this	Are there any other factors you think may have had a positive or negative affect on the outcomes of the project?
10) Additional resources required	Team's experience of securing additional resource required and issues affecting this	Ditto
11) Teaching team integrate resources into interdisciplinary programme and relevant sustainability modules in participating departments	Team's experience of using the electronic resources in their teaching Factors influencing use of electronic resources in teaching	Was the project implemented according to plan? What was the rationale for any change? What have you learnt from the tracking data, student feedback, your own experiences/observations?
12) Teaching team motivate students and facilitate learning activity	Team's experience of attempting to engage students in learning activity, and factors influencing this experience	Ditto
13) Students undertake discipline specific learning activity, multidisciplinary introductory programme and collaborative group work	Team's perceptions of student experience of learning activity and factors influencing this	What have you learnt from the tracking data, student feedback, your own experiences/observations?
14) Students use VLE resources to support their learning	Team's perceptions of student engagement with the VLE resources and factors influencing this	Ditto
15) Project team share their experience and learning from the project more widely	Team's experience of dissemination activity	What dissemination activity have you undertaken so far?
16) Students engaged with learning activity	Team's perceptions of students' experiences and factors influencing these	What have you learnt from the tracking data, student feedback, your own experiences/observations?
17) Students achieve intended educational outcomes:-	Team's satisfaction with students' achievement Team's perceptions of what students have learnt Team's perceptions of factors	To what extent do you think students have achieved the intended educational outcomes? What have you learnt from the tracking data, student feedback,

	positively and negatively influencing student learning	your own experiences/observations?
18) Good practice and transferable knowledge is developed in participating departments	<p>Team's learning from their own experience and students' feedback, including</p> <ul style="list-style-type: none"> -connections they are inferring between activity and outcomes -unintended outcomes and their implications -transferability of what they have learnt outside the immediate learning context & factors affecting this transferability 	<p>What have you learnt from undertaking this project?</p> <p>What would you like to do differently next year? What is actually feasible?</p> <p>What factors will affect your ability to continue with this approach, with feasible improvements, in the future?</p> <p>What advice would you give to others embarking on similar initiatives?</p>
19) Other departments also adopt resources and become involved in multi-disciplinary approach	<p>Experiences of team members' from other departments that join the collaboration</p> <p>Team members' rationales for joining collaboration</p>	
20) Graduates in construction design disciplines have improved range of employability skills	<p>Team's experience of students' success in securing employment in construction design industry</p> <p>Team's opinion about the continued relevance of the learning experience to employability in construction design disciplines.</p>	To what extent do you think you have made progress towards your intended longer-term impact?
21) Innovative approaches to teaching and learning adopted elsewhere in departmental curricula	<p>Feedback team have received as a result of dissemination activity</p> <p>Team's knowledge of any changes in practice elsewhere as a consequence of their dissemination activity</p>	To what extent do you think you have made progress towards your intended longer-term impact?
22) A collaborative learning community is fostered across construction design disciplines	Team's experience of teaching collaboration	To what extent do you think you have made progress towards your intended longer-term impact?

Section 2: Data generation tools

(i) Student feedback questionnaire - 2007

The interdisciplinary programme and collaborative design project were introduced to your courses for the first time in 2007. We would like to receive some fairly detailed feedback from you on this part of the course to help us understand what is working, what is not, and therefore how we can improve it. This questionnaire will take about 10 minutes to complete. Please hand it in by the end of the final interaction day (date) to.....

1. Please tick the course for which you are registered

- | | |
|--|--|
| <input type="checkbox"/> Discipline 1 (Module 1) | <input type="checkbox"/> Discipline 1 (Module 2) |
| <input type="checkbox"/> Discipline 2 | <input type="checkbox"/> Discipline 4 |
| <input type="checkbox"/> Discipline 3 | <input type="checkbox"/> Discipline 5 |

Other.....

2. To what extent do you agree with the following statements about *your experience of the interdisciplinary programme and collaborative design project?*

1= Definitely disagree

5= Definitely agree

N/A= Not applicable

(please circle your response)

I understood what I could expect to learn by participating.

1 2 3 4 5

My timetable allowed me to attend those introductory lectures and activities that I wanted to attend.

1 2 3 4 5

I had sufficient understanding of sustainable design issues to be able to engage with the introductory programme.

N/A 1 2 3 4 5

I found the introductory programme interesting.

N/A 1 2 3 4 5

The introductory programme helped prepare me for working with students from other departments on the collaborative design project.

N/A 1 2 3 4 5

The project briefing document helped me to understand what was required to complete the project.

1 2 3 4 5

The site visit and project briefing provided a useful introduction to the site.

1 2 3 4 5

The time allocated for the project was sufficient for the tasks to be completed effectively.

1 2 3 4 5

My group was able to get appropriate advice and support from an academic member of staff when we needed it.

N/A 1 2 3 4 5

Taking part in this project has been relevant to the kinds of situations I think I will face in my future work.

1 2 3 4 5

Contributing to the project was challenging for me.	1	2	3	4	5
I enjoyed the project work.	1	2	3	4	5
The introductory programme and interaction days were well organised.	1	2	3	4	5
The interdisciplinary programme and collaborative design project fitted in well with the aims and content of the rest of the module.	1	2	3	4	5

3. How did you feel about your ability to contribute to the collaborative design project?

- More able than other students in the group
 - About the same as other students in the group
 - Less able than other students in the group

If you did not feel able to contribute to the project to your full potential please explain a little about these feelings and what you think influenced them.

4. Your access to electronic learning resources

Did you use any of the resources on the VLE Yes No

Had you used the VLE before you enrolled for this module? Yes No

How confident are you in using the VLE?

- Not at all confident Fairly confident Very confident

If you used the resources, from where did you access them? (tick any that apply)

- University open access centre Hall of residence

Home (broadband) Home (modem)

Departmental computer suite (building no./name.....)

Other, please specify
.....

If you used the resources, through which VLE course did you use to access them?

- Generic Discipline 3 Discipline 5

If you experienced any technical problems when using any of the electronic resources please give details.

5. To what extent do you agree with the following statements about *your experience of using the resources on the VLE?*

0=not used

1= Definitely disagree

5=definitely agree

(please circle your response)

I received clear information about how to access the resources.

1 2 3 4 5

The resources provided enough information to help me understand the context of the project.

0 1 2 3 4 5

I found the resources useful in helping me to prepare for the site visit.

0 1 2 3 4 5

The resources provide a useful way to visually revisit the site.

0 1 2 3 4 5

The resources presented the different stakeholder perspectives in an interesting way.

0 1 2 3 4 5

The resources helped me to understand the range of different stakeholder perspectives.

0 1 2 3 4 5

The resources helped me to make my contribution to the group project work.

0 1 2 3 4 5

The resources helped my learning of sustainability issues more generally.

0 1 2 3 4 5

6. To what extent do you agree or disagree with the following statements about *the effectiveness of the collaborative design project in helping your learning?*

1= Definitely disagree

5=definitely agree

(please circle your response)

Taking part in the project has....

1 2 3 4 5

improved my understanding of sustainable development issues.

1 2 3 4 5

improved my understanding of the contribution of different design disciplines to sustainable building design projects.

1 2 3 4 5

improved my confidence in the use of technology and tools commonly used in creating and evaluating sustainable building designs.

1 2 3 4 5

improved my confidence in working as part of a multi-disciplinary team.

1 2 3 4 5

improved my awareness of sustainable design issues that fall outside the traditional boundaries of my own discipline.

1 2 3 4 5

7. If you think the project has influenced your learning in any other way, please give details here...

8. Tell us if you had any negative experiences of the interdisciplinary programme and collaborative design project or of using the electronic resources. In particular, if you disagreed with any of the statements, please explain why.

9. Tell us about your positive experiences.

This information will help the course teams to build on good practice and share it more widely within the University.

10. Your suggested improvements:-

to the interdisciplinary programme:-

to the collaborative design project:-

to the VLE resources:-

to the way the interdisciplinary programme, collaborative design project, & VLE resources are integrated into your experience of the whole module:-

Thank you very much for giving up your time to complete this questionnaire. We will attempt to provide you with a brief summary of your feedback and post it in the VLE before the end of semester.

(ii) Focus group discussion guide

1. Student expectations of learning experience

Why did you choose to take this module?
How did you think it would be different to other modules?
Did the multidisciplinary group project influence your choice? How?

2. Actual learning experience and factors influencing this

In hindsight, how has your experience of taking the project compared to what you expected?
What have been the highlights for you?
Have there been any negative aspects of the experience? What?

What do you think have been the key factors that have influenced your experience of this project?

3. Team dynamics/collaboration (prompts if these issues do not arise from earlier discussion)

How did you choose to organise your work together as a group in order to fulfil the design project brief?
What do you feel you each brought to the project? (Skills, knowledge, perspectives...)
Was this broadly similar or different for each of you?
What do you think worked well for your team in the way you chose to work together?
What do you think worked less well?

4. Learning/Achievement and factors influencing this

What do you feel you've learnt from the experience?
How did you feel about what you managed to achieve in your group? Were you pleased with the outcomes?
What do you think were the main factors influencing what you were able to achieve?

Did your team make use of the various electronic resources available to you? How?

How useful did you find these? In what way?

5. Potential improvements

How do you think this multidisciplinary component of the course could be improved in future years?

(iii) Student feedback questionnaire (2008)

We would like to collect some feedback to help us understand how you have experienced the project so that we can continue to try and improve it for future students. This questionnaire will take about 10 minutes to complete. Please hand it in by the end of the final interaction day (1st May) to either[] or [].

1. Please tick the course for which you are registered

- | | |
|--|--|
| <input type="checkbox"/> Discipline 1 (Module 1) | <input type="checkbox"/> Discipline 1 (Module 2) |
| <input type="checkbox"/> Discipline 2 | <input type="checkbox"/> Discipline 3 |
| <input type="checkbox"/> Discipline 4 | <input type="checkbox"/> Discipline 5 |

Other.....

2. What have been the main benefits for you of participating in this project?

(e.g. your learning, experience, discipline specific knowledge & skills, employability/life skills)

3. What have been the highlights of the project experience for you?and why?

4. Has there been anything about the project experience that you have not liked? (Please give details and explain why)

5. Please add any additional comments you would like to make about the project, including suggestions you may have for improving it in the future.

(Continue your answers over the page if you need to)

(iv) **Discussion guide for Project Team reflection (2007)**

Project Implementation

Did the project & interaction programme plan go according to plan, or did you have to make any changes when it came to running it?

What changes? What were the reasons for any changes made?

Achievement of educational outcomes

To what extent do you think the educational aims of your project i.e. outcomes for students -have been achieved? (Cross ref- specific outcomes on logic model if need reminder)

Effectiveness

What did you learn from the VLE tracking data & students' feedback about their learning experience? Was anything surprising?

From the students' feedback, VLE tracking data and your own experiences, what do you think is working well?

Possible prompts:-

Site visit & access to site;

Learning resources- extent to which enhanced reality of situation for students;

Introductory & interaction programme;

Assessed project work;

Interdisciplinary approach

Space/resources;

Improvement and sustainability

Were there any issues relating to the integration of the project/resources into the context of your own discipline-specific learning context?

What were these?

How have they been overcome/ or will you overcome them in future?

What changes would you like to make to the interdisciplinary component to improve what students get out of the experience?

Are there any issues that will affect your ability to undertake/be involved in the interdisciplinary component (with these improvements) in the future?

Do you think you will need any additional specialist support or personal development to continue with this approach or make any of the changes you want to make?

Wider Impact

What do you think you have learnt from undertaking this project that could be transferable to other teaching contexts?

What factors might affect this transferability?

Other project outcomes and factors affecting the success of the project

Were there any unexpected outcomes for your project? What were these?

Are there any other factors you think have had a positive or negative effect on the outcomes of the project?

Longer-term impact

To what extent do you think you have made progress towards your anticipated longer term impact?

Would you like me to be involved with some impact evaluation in the future? If so- in what way (advisory or in carrying it out?)

Section 3: Data generated for Case 3

[Note: Quantitative data generated from the questionnaire responses is included in the main body of Chapter 5.]

(i) Comments from 2007 questionnaires

If you did not feel able to contribute to the project to your full potential please explain a little about these feelings and what you think influenced them.

Disc 1 Mod 1	"I reckon [Discipline 1s] and [Discipline 2s] should have met before any interaction day. Or they should be given full freedom to design the master plan." "Such a programme requires arriving at decisions with a lot of discussions, but it is very difficult due to various restrictions of varying maturity levels. As in my group case [Discipline 1s] should be allowed to design freely which wasn't the case totally."
Disc 5	Able to contribute same: "But ended up doing more." "I did feel that I had to do more work than was required. This is because we had one member less. Because group members from another discipline has other course commitments, I ended up having to produce a lot of the work, in addition to doing my report." "Too few group meetings possible (timetable issues)." "[Discipline 1] had done a lot of work before we had even started."
Disc 3	"Group politics resulted in a reserved attitude in leadership and negotiation." "The [Discipline 1] students in our group sometimes objected to what we believe was a reasonable group contribution, leaving other members to take on more." "Large group." "[Discipline 3] designs could be properly started after solid designs of buildings." "Lack of structural, town planning knowledge." "The project seemed to be more focused on the town planning and building architecture issue. The panel didn't seem to care about engineering issues." "I was able to contribute as required, but there was less for [Discipline 3] to do." "The limited importance of the project during a stressful, critical time for final year students restricted the contributing effort for many."

Technical problems of using WebCT

Disc 1- Mod 2	"Not come across any major problems."
Disc 5	"Did not always load up" "Camtasia wasn't convenient to stream the video. Camtasia is a good idea, but you can't skip parts of the lecture (you have to listen to the whole presentations)." "I couldn't watch them [video clips] on my machine" "None."

Disc 3	"None."
Disc 2	<p>"WebCT crashes CONSTANTLY!!!"</p> <p>"Sometimes they wouldn't load, or took a long time to do so, after logging out and back in everything worked better."</p> <p>"Video merged presentations, didn't work. Some presentations were too large."</p>

If you think the project has influenced your learning in any other way, please give details here...

Disc 1- Mod 1	"To understand the actual professional culture and I believe it helped understand my capabilities for co-ordinating other discipline guys[?]"
Disc 1- Mod 2	"Working with group was very nice idea although there were hard times."
Disc 5	"I realised how different the views of different disciplines are."
Disc 3	<p>"Group politics resulted in a reserved attitude in leadership and negotiation."</p> <p>"Yes, interdisciplinary team – excellent opportunity".</p> <p>"Taught me to listen more and respect other discipline views."</p> <p>"Encouraged more diffusion of ideas."</p> <p>"Working with students from other departments has been long overdue."</p> <p>"Provided a better understanding of sustainability issues."</p>
Disc 2	<p>"Far more aware of the roles of the other disciplines which they may need to undertake."</p> <p>"It allowed me to have experiences working with other disciplinary team, which influenced me in a way that experience is far more valuable than academic studies."</p> <p>"Details of how other professions operate."</p>

Negative experiences

Disc 1- Mod 1	"It was difficult explaining the people from other department but I took it more like a challenge. My only suggestion would be if [Discipline 2s] and [Discipline 1s] meet before."
Disc 1- Mod 2	"It was fantastic."
Disc 5	<p>"Major problems with people from other disciplines refusing to do their work. People were unclear on the percentage which the project was for them, & times to meet up were often difficult with everyone's different workloads."</p> <p>"Had problems within group. Mainly other disciplines focusing on other projects and unwilling and sometimes even refusing to do any work. This led to the [Discipline 3/5s] doing a disproportionate amount of work with no way of sorting marks accordingly. Include peer assessment."</p> <p>"Members of my group refused to work and I was one of a few members who</p>

	<p>undertook most of the work. It was unfairly balanced."</p> <p>"I think the difference in the way disciplines were assessed meant group members were pulling in different directions. Also, the [Discipline 5] students were only fully told how they were going to be assessed in the second week after work had already been done on the project. I think this is unacceptable."</p> <p>"There was too much information given (many documents explaining the same thing). I also feel that I had to spend a lot of time managing the group because there was a large difference in the understanding and knowledge in the whole group. I really think we should have had a peer assessment of group members."</p> <p>"I did not feel that the interactions between the disciplines was realistic."</p> <p>"Unsure generally on the weighting of our [Discipline 5] report to the presentation/interdisciplinary project</p> <p>"Too much information [on WebCT] overwhelming."</p>
Disc 4	"No negative experiences."
Disc 3	<p>[Discipline 1] was simply useless."</p> <p>"Most people not clear on which students were supposed to do what i.e. responsibilities for each course."</p> <p>"Some higher contributions from group members than others."</p> <p>"A certain member of the team put in little effort and rarely showed up. Hence there was more work for the rest of us."</p> <p>"It was difficult working with someone who had completed his part of the project last week and no longer cared about it. He rarely showed up and if he did it was late, which hindered our progress."</p> <p>"Would be good in the Autumn semester."</p> <p>"Difficulty in understanding what was required of our discipline."</p> <p>"different groups with different weighted module."</p>
Disc 2	<p>"An email received 3 days before the presentation/poster deadline to disregard taking Yorkshire Forward and LCC views/guidance. As a [Discipline 2], this was outrageous!"</p> <p>"Struggled to complete work out of the interaction days at times due to other assessment commitments."</p> <p>"We only had 8 members in our group. The [Discipline 1] was hard to work with and there were language difficulties, in the future 2 [Discipline 1s] would be much better per group."</p>

Positive experiences

Disc 1- Mod 1	<p>"Learn your capacity. An experience of professional working. Working with group."</p> <p>"Share all the information from different department. All the group member have their idea can help me to develop the strategy."</p>
Disc 1- Mod 2	<p>"Interesting interaction between the different streams"</p> <p>"Everything was organised"</p>
Disc 5	<p>"Learned to use some new software."</p> <p>"Learnt to use Google sketching as a tool/"</p> <p>"It has taught me how to tolerate people from other disciplines."</p>

	<p>"Enjoyed learning about innovative building design, and the intro lectures are very interesting."</p> <p>"It broadens the mind (which at time can be solely focused on one's discipline) to other disciplines and their field of expertise – more importantly, how it affects you."</p>
Disc 4	<p>"Learnt[?] experiences of working with students from other departments. Communication skill improvement"</p>
Disc 3	<p>"I liked [Discipline 2s] and [Discipline 5s] types. They were fun."</p> <p>"Good work experience and a big positive for interviews."</p> <p>"Multidisciplinary teamwork."</p> <p>"Improve my teamwork and communication skills".</p> <p>"Enjoy working with students from other disciplines. Interesting to see how they went about understanding projects"</p> <p>"Mixing with other disciplines."</p> <p>"Good to learn about contribution of disciplines to planning process (relevant to job)."</p> <p>"Good experience. Encourages others to do the same."</p> <p>"I enjoyed working with people from different disciplines. I would love for this to be done more often."</p> <p>"Yes, it's a good course with good content."</p>
Disc 2	<p>"Felt it has been a useful experience working with people from other disciplines."</p> <p>"Learned how to work as part of a team, and good to work with disciplines."</p>

Other – "I enjoyed the work and a different atmosphere of work"

Improvements to introductory programme

Disc 1- Mod 1	<p>"I couldn't attend most of the lectures – better course schedule!!!"</p>
Disc 1- Mod 2	<p>"Provide more maps".</p> <p>"[Discipline 1] should independently design schemes and later on interact with other group members just as it happens professionally".</p>
Disc 5	<p>"Initial lectures were pointless – We had members in our group from all other disciplines to give us information from their course, so why were lectures on these things necessary as well?"</p> <p>"Include peer assessment. Make people aware of additional submissions before the last week. Make sure everyone receives the same amount of credit to ensure equal payload."</p> <p>"Most lectures gave good overview but it seemed unnecessary to attend lectures from own discipline."</p> <p>"Make assessment of disciplines as similar to each other as possible."</p> <p>"Maybe some organised progress meetings/deadlines? (Very, very small issue – thought it worked really well".</p> <p>"Make clear to the [Discipline 5s] what is expected at the outset."</p>
Disc 3	<p>"Be more clear on what each person actually has to do."</p> <p>"Important – uneven marking between courses resulted in uneven effort levels. Should be run in a much shorter period instead of dragged out. Finished by week 8. Groups should be much smaller. Much too wide a subject to summarise in 20 mins and 1 poster."</p>

	<p>"Good."</p> <p>"Do the module in Autumn Semester as workload is too heavy in Spring."</p> <p>"More clearer focus, building, site, both. Mixed view from panel."</p> <p>"Clearer outline of the required work. Many people, even lecturers, were unsure what exactly was needed."</p> <p>"It should be earlier stage of the semester."</p> <p>"Perhaps nominate leaders in each group, difficult work as a unit with unknown personalities."</p> <p>"Make sure module weighting is same for all disciplines."</p> <p>"Make the objectives more clear."</p> <p>"Equal weighting."</p> <p>"Start the course early in the semester."</p>
Disc 2	<p>"Less intro lectures, greater planning emphasis – no retraction!!!"</p> <p>"Clearer initial guidance at early stages as to what is required from individuals and the group as a whole in the assessments."</p> <p>"Meet/form group earlier. Don't schedule work for Easter holidays. Start programmes earlier."</p> <p>"Everyone has [Discipline 1s]."</p> <p>"More equal numbers of the disciplines."</p>

To collaborative project

Disc 1- Mod 1	"Maybe little more preparation, more time".
Disc 1- Mod 2	"Nothing"
Disc 5	<p>"The project should be the same percentage for all group members to encourage fair contributions."</p> <p>"Weighted unevenly between different disciplines"</p> <p>"Peer assessment. Strict guidelines on every discipline's part in the project."</p>
Disc 4	"Probably the [Discipline 4] should be divided and full in all design groups."
Disc 3	<p>"Workload of [Discipline 3] students from other modules is immense other subjects seem to have nothing else to do!"</p> <p>"Good."</p> <p>"Get rid of some of the initial tasks and concentrate more on poster. Ensure each group has relevant skills."</p> <p>"More clearly outlined roles within the project for each degree so that appropriate amounts and types of work may be done."</p> <p>"Better info on what was required."</p> <p>"Fine."</p>

To resources

Disc 1- Mod 1	"Very good."
Disc 1- Mod 2	"Nothing"
Disc 5	"No improvements required!" "Didn't use too regularly so have no comments." "Very good resources, but there is too much information. Having the capabilities of skipping through the lecture video."
Disc 3	"Did not enjoy working with some individuals in the group didn't seem to be relevant to other subjects in the module". "Good." "Ditch WebCT." "A search feature, too many folders and files." "Good." "Fine."
Disc 2	"More guidance related to the assessment requirements." "Good." "More organised."

To integration

Disc 1- Mod 2	"Nothing, was perfect."
Disc 5	"Some requirements were mentioned in the brief that were not required. A different brief for each discipline group would be useful."
Disc 3	"Good." "Move the large project forward in the semester as it takes up a lot of time and final year projects are in only 6 days later." "Enjoyed it."
Disc 2	"Overall very good and felt it has been a valid experience."

(ii) Student feedback 2008

Total number of completed questionnaires: 70

Discipline 1- Mod 1	4
Discipline 1- Mod 2	11
Discipline 2	12
Discipline 3	12
Discipline 4	9
Discipline 5	22

BENEFITS:

Disc 1- Mod 1	<p>“Competition with others.”</p> <p>“Experience in working with people of different field (working in group).”</p> <p>“Working in a group of different disciplines and understand their point of view. Also integrate these different ideas to better solution.”</p> <p>“Group-working experience.”</p>
Disc 1- Mod 2	<p>“Good experience of working in a group.”</p> <p>“Taking sustainability aspects from other fields (Disciplines 2,3,5) is really helpful.”</p> <p>“Learning discipline specific knowledge (e.g. from Disciplines 3, 5, 2)”</p> <p>“Learning and working with other disciplines, which will help me in my career.”</p> <p>“Specific knowledge and skill learning.”</p> <p>“It teaches team work which will be important later in professional life.”</p> <p>“I learned and experienced the way of thinking of [Disciplines 3/5] (without thinking human as a social being.)”</p> <p>“Working with multi-background team members.”</p> <p>“Focus on the urban design about the sustainability.”</p> <p>“Learn more sustainable issues not only from lectures but also from students of other courses.”</p> <p>“Working with other disciplines. Different ideas, knowledge.”</p>
Disc 5	<p>“Reinforcement of subjects learnt in other modules.”</p> <p>“Inter-disciplinary team working.”</p> <p>“Working with different people with different skills in a large group.”</p> <p>“Learning how to design in a sustainable way.”</p> <p>“Good work in groups.”</p> <p>“Working as a team with people who you’ve never worked with before.”</p> <p>“Team management, and learning to harness skills.”</p> <p>“Sustainability.”</p> <p>“Working with other disciplines”</p> <p>“Learning about sustainability in more detail from lecturers who really <u>know</u> what they’re talking about.”</p> <p>“Increased awareness of sustainability outside construction aspects (i.e. social, economic sustainability.”</p> <p>“Improved group working skills.”</p> <p>“Gaining experience of planning larger scale projects, beyond the detailed focus on a specific building or element.”</p>

	<p>“Working with multi-disciplines.”</p> <p>“Working with other disciplines.”</p> <p>“Learning about sustainability.”</p> <p>“Working with other disciplines helped to develop communication skills.”</p> <p>“Multi-disciplinary group work experience, development of organisational skills working with such large groups.”</p> <p>“Additionally presentation skills.”</p> <p>“Practical experience that can be taken forward into industry/career.”</p> <p>“Experience of multi-skilled group work.”</p> <p>“Working in a large group, discussing large scale sustainability problems.”</p> <p>“Learning how to work in a large group.”</p> <p>“Low work load!”</p> <p>“More understand the environmental, social and economical areas.”</p> <p>“Group decision experience, leadership etc. Idea brainstorming in large groups.”</p> <p>“I have realised how difficult can be working together with people from different trainings. Also I have learnt how productive such a big group of people can be in such a little time.”</p> <p>“Improved understanding of what other disciplines can contribute.”</p> <p>“Meeting people from other disciplines.”</p> <p>“Learning how to make an AO poster.”</p> <p>“Learning, co-operating, searching, presenting.”</p>
Disc 4	<p>“Team working”</p> <p>“Presentation skills”</p> <p>“Well I’ve learned too many new things about sustainable development like sustainable energy, revising water, and it was so interesting that how people with different skills are joining together to designing a place.”</p> <p>“Team work and presentation skills”</p> <p>“More deeply study on Suds”</p> <p>“Can consider much more factors on sustainable design”</p> <p>“Experience in giving presentations (increased confidence)”</p> <p>“Knowledge of Flood Risk Management”</p> <p>“Gained more information/knowledge to use for my dissertation”</p> <p>“Experienced what it would be like having to work in a real company.”</p> <p>“Observing thought processes of alternative groups and how they rate the various drivers.”</p> <p>“Learning about different points of view and working in a team with real meetings.”</p> <p>“Setting up consultancy improved team communication skills, management of different areas.” “Improved idea of water management frameworks/strategies etc. Took charge of minutes and meeting arrangements.”</p> <p>“A knowledge of social, environmental and economic sustainable development is very important.”</p>
Disc 3	<p>“Learning about other disciplines of study”</p> <p>“Interdisciplinary teamwork”</p> <p>“Learning to cope with the frustrations of team work”</p> <p>“Knowledge of other disciplines and how they tackle the issues of sustainability”</p> <p>“Finding out that [Discipline 3s] actually do know best!”</p> <p>“Working with other disciplines has taught me how well [Discipline 3] students are taught and how little everyone else knows.”</p>

	<p>“Learning about my role in an interdisciplinary team and presenting a persuasive argument.”</p> <p>“Meeting and mixing with different disciplines”</p> <p>“Working with other disciplines and seeing a final project come together with a common good.”</p> <p>“Better working with students of other disciplines – improved teamwork.”</p> <p>“Gained knowledge of a wide range of problems faced by developers of sustainable ‘communities’.”</p> <p>“Teamwork”</p> <p>“Objective analytical thinking”</p> <p>“Good group dynamic – working in an interdisciplinary team.”</p>
Disc 2	<p>“Increased employability”</p> <p>“Learning skills of new disciplines”</p> <p>“Seeing how other disciplines view sustainability”</p> <p>“Working with other disciplines”</p> <p>“Learning about renewable energy constraints & positives”</p> <p>“Learning about my role in interdisciplinary projects”</p> <p>“Learning experience”</p> <p>“Discovering how other disciplines think and work”</p> <p>“Appreciation and understanding of viewpoints from other disciplines.”</p> <p>“Learning to work with students with different backgrounds of knowledge in terms of their discipline.”</p> <p>“Collaboration”</p> <p>“Experiencing working with other departments – see other points of view.”</p> <p>“Learned about different disciplines strengths and weaknesses, learned more about where my skills fit in and how to guide members’ creativity towards overarching goals.”</p> <p>“Working with the other disciplines.”</p> <p>“Working on such a challenging, unique, important and large site.”</p> <p>“Learning about other disciplines, skills and expertise, collaboration on a major project, learning more about aspects of sustainability.”</p>

HIGHLIGHTS:

Disc 1- Mod 1	<p>“That I’ve had to think also with the head of other people. Like this I’ve had the chance to learn new things not specifically connected to my field.”</p> <p>“Understanding group work importance.”</p>
Disc 1- Mod 2	<p>“Looking at the issues from micro to macro scale.”</p> <p>“Designing and producing visual presentations – Poster and ppt”</p> <p>“Experience of co-work with other students in different departments.”</p> <p>“Getting to know different people from different departments”</p> <p>“Learning about the sustainability issues and solutions in the UK, since I am an international student.”</p> <p>“Really fun to work with [Discipline 2s].”</p> <p>“It is about learning and listening to others and finding a commonly acceptable way to do things.”</p>

	<p>"Renewable energies and their performances so we could discuss from different points of views ([all disciplines])."</p> <p>"Team work – because all of us come from different departments."</p> <p>"Interaction with civil, mechanical engineers and urban planners."</p> <p>"Meeting [guest speaker], and his comments."</p>
Disc 5	<p>"Good group interaction between departments."</p> <p>"General good experience."</p> <p>"Creativity."</p> <p>"Being organised as a whole team, and produce an end product we are all happy with."</p> <p>" Trying to fit all our ideas in the area, because is quite difficult to agree with 13 people."</p> <p>"Working with new people really well. Normally it's full of friction."</p> <p>"Being involved with areas I am strong with, as things run smoothly."</p> <p>"I enjoy being creative. Poster design was fun."</p> <p>"Group interaction – meeting new professions."</p> <p>"Holding group meetings in the pub, as it helped the group bond and resulted in much wider discussion of the issues."</p> <p>"Working in a group, because ideas are highlighted that I wouldn't have thought of myself."</p> <p>"All our meetings in the pub!"</p> <p>"Working as suited us."</p> <p>"We could do all our meetings in the Pub! This created a good atmosphere in the group."</p> <p>"Working with other department members."</p> <p>"Current issues."</p> <p>"Learning about a new subject and applying the knowledge practically."</p> <p>"Interesting lectures."</p> <p>"Site visit."</p> <p>"Lectures from professionals within the industry."</p> <p>"New material/topics."</p> <p>"The vision and how it was appreciated and liked by the judges."</p> <p>"Environmental."</p> <p>"The successful presentation process and the fact our vision was different and unique."</p> <p>"It is possible to make a sustainable development. It is just a matter of good initiatives and invention."</p> <p>"Understanding more thoroughly about the processes used in developing an area."</p> <p>"The relaxed atmosphere and good spread of the workload."</p> <p>"Co-operating as people from different departments, with different knowledge background."</p>
Disc 4	<p>"Working with other people because in future when we went to work in office we will have to work with different people, so it was really good experience for me."</p> <p>"Learning about new sustainable technologies"</p> <p>"The co-operation between team members."</p> <p>"The reach method using in team."</p> <p>"Team work (working as a team was very good)."</p> <p>"Comparing alternative proposals/posters."</p>

	<p>"Gaining an understanding of cost/benefit of sustainable water/renewable energy technologies and cutting edge ideas."</p> <p>"Team work"</p> <p>"Co-operation"</p> <p>"Do the research"</p>
Disc 3	<p>"Presentation and question"</p> <p>"Buffet"</p> <p>"Getting the poster finished"</p> <p>"Lectures in week 1? were useful"</p> <p>"Getting to know and interacting with people from other departments"</p> <p>"Seeing the final poster completed and lots of people looking at it and asking questions."</p> <p>"Presenting and receiving good feedback"</p> <p>"Pub in Leeds. Free dinners."</p> <p>"Visiting Leeds."</p> <p>"Investigating renewable energy schemes in a real environment."</p> <p>"The buffet lunch."</p> <p>"Meeting and going on the site visit"</p> <p>"We could have all our meetings in a setting that the group decided, i.e. the pub."</p> <p>"Largely free to work when and where appropriate, but with assistance and advice available where necessary."</p> <p>"Setting up renewal energy in a site."</p> <p>"Getting some compliments on our vision!"</p>
Disc 2	<p>"Learning about technical aspects of sustainability"</p> <p>"Presenting in a different situation (i.e. in front of panel of experts).- I have not had the opportunity to do this in the past"</p> <p>"Interesting lectures, buffet lunch. Leeds trip"</p> <p>"Group work. Fun and challenge."</p> <p>"Working with other disciplines as it has given an insight into potential future working"</p> <p>"Teamwork, meeting other disciplines."</p> <p>"Site visit."</p> <p>"Site visits"</p> <p>"Sketch-up" (x2)</p> <p>"Learning from the architects and explaining why you are important and what you can give."</p> <p>"Producing the poster"</p> <p>"Meeting new people"</p> <p>"Presenting and asking/answering questions"</p> <p>"Being able to deal with people without specific planning knowledge and teaching them/focussing them on broader visions."</p>

LOWLIGHTS:

Disc 1-Mod 1	<p>"Not enough information about [site]"</p> <p>"Not enough information about [name] site for a development project. Like water level at flooding. (A flood of 20cm of water is only rising of the river.)"</p> <p>"There wasn't much time to spend on the site for getting more look at areas."</p> <p>"In big groups time management can be a problem because everyone has other things to do."</p>
Disc 1-Mod 2	<p>"[Discipline 3/5s] dominating while MASTERPLANNING, but in the end was good."</p> <p>"The [Discipline 4] group is next to useless"</p> <p>"Group work with different levels of academic backgrounds, i.e. mixing postgrads and undergrads. Had no problem with the flow of knowledge, but too much emphasis on group work with postgrads. OK with undergrads."</p> <p>"Co-work with people in different departments is interesting."</p> <p>"Lectures are too long."</p> <p>"It was not very specific in MOLE."</p> <p>"Masterplan application because it doesn't have any functional and social relationship from the point of [Discipline 1] that should take care of all those aspects and organise them in a way that works well. [Because of domination of [Discipline 3/5s](way of thinking)]."</p> <p>"Short in time period."</p> <p>"Working in such a large group – negotiating designs."</p>
Disc 5	<p>"It is very easy due to number of participants for individuals to get lost/disappear."</p> <p>"Too long – too much time given to this project. Could have finished in 1 week."</p> <p>"Too many people in group."</p> <p>"Interactive days weren't as structured as expected. Were not able to do much on the first Thursday."</p> <p>"Maybe we would have worked better in smaller groups for the amount of work it was."</p> <p>"Group size. Difficult to manage size (group 6-8 would be fine, possibly with 1 [Discipline 2] in each group)."</p> <p>"Site visit was at wrong time, and only little relevance until further into project."</p> <p>"Groups were too large. A lot of time was spent on making decisions."</p> <p>"Working with the [Discipline 4] 'consultants' who kept us waiting all week to answer our questions, then didn't answer them or provide any information, resulting in criticism at the formal presentation over the lack of water information."</p> <p>"Given very poor information as to what was expected for the second presentation, leading to us not being able to present our work in the format that was required, leading to us not receiving any useful feedback."</p> <p>"Hard to organise because of the different courses, people having different obligations."</p> <p>"Lack of briefing of people assessing meeting 2 (told not to do Powerpoint and then expected to present our ideas from the front)." (x2)</p> <p>"[Discipline 4s] had less knowledge than [Discipline 5s]. Were unhelpful and did not answer any questions. Unsure why they were there." (x2)</p> <p>"Difficult to work in big teams."</p> <p>"Lack of organisation of the module as a whole." (x2)</p>

	<p>"Hard to organise people and lack of effort from people who it didn't matter as much for."</p> <p>"Large group, and one mark for everyone encouraged laziness."</p> <p>"Low standards of ability/work ethic from other courses."</p> <p>"Group was too large. Too many people to co-ordinate."</p> <p>"Standard of work level from other courses was abysmal. With so many people it was too easy for people to sit in the background."</p> <p>"Not well organised – needs improvement."</p> <p>"Groups too big."</p> <p>"Some of the introductory lectures were of little use and repetitive."</p>
Disc 4	<p>"Too many people in a group. People not participating throughout the project."</p> <p>"Yes, too many people to work as a group and no accountability. This encouraged lateness and no work."</p> <p>"The background knowledge given for the specified area is limited."</p> <p>"The full design vision of other groups may too generate for us. Some parts of the water issue were missed."</p> <p>"Our research was limited by the other groups."</p> <p>"Time frame for the project was a bit too short, coupled with the fact that we had other modules to cope with"</p> <p>"Lack of guidance/framework for assessed work"</p> <p>"Learning objectives and aims were not as clear as they could be"</p> <p>"Groups wished for data that we had no access to i.e. flood heights, capacity of water/sewer networks." "A lot of new ideas largely self-taught on water side as lectures not water specific."</p>
Disc 3	<p>"Full day meeting whilst having dissertation/lectures"</p> <p>"Need more time to work on project"</p> <p>"The group was a bit large. Hard to give everyone work to do."</p> <p>"The timing – we have dissertations to hand in next week."</p> <p>"The difficulty in ensuring all work aspects are covered with so many things to do and each person having their strengths/weaknesses."</p> <p>"Miscommunication between different parties, time constraints on deadlines between people."</p> <p>"Difficult to get consensus on decisions between different disciplines."</p> <p>"The large group made it a bit chaotic."</p>
Disc 2	<p>"Large group size –hard to get things organised."</p> <p>"Some of the interaction days lacked purpose and direction. Particularly day 1."</p> <p>"Lectures are too long"</p> <p>"It has been very challenging to reach consensus on this project, as it has involved people think and working in different ways."</p> <p>"Social skills are clearly not the strong point of [Discipline 3/5s]."</p> <p>"Didn't spend enough time on site"</p> <p>"Being last group to present!"</p> <p>"The time to produce a poster was the same as a vision and masterplan. Not really appropriate. At least 1 more week should have been incorporated to allow for a better produced end product"</p> <p>"Trying to hold people back from being too site specific too early."</p> <p>"Contrasting views in things from different lecturers."</p>

ADDITIONAL COMMENTS:

Disc 1- Mod 1	-
Disc 1- Mod 2	"It was not very specific as to who has to do which work. But that would focus thoughts, so it was a good project."
Disc 5	"Thanks to all the staff involved." "No [Discipline 5] report, seems pretty pointless after making a poster." "All [Discipline 1s] in our group were foreign students, which made communication with the [Discipline 1s] very difficult." "Thoroughly enjoyed the project!" "Too big group, it is hard to show personal ability." "Everything has been about right." "Good buffet on final day!"
Disc 4	
Disc 3	"[Discipline 4] people didn't give a huge amount of input" "Didn't seem to be that much to do from a [Discipline 3]perspective. Often had to learn a bit about other disciplines to contribute fully."
Disc 2	

SUGGESTED IMPROVEMENTS:

Disc 1- Mod 1	"Timetable for the project is a little bit hectic. More time would be delightful..."
Disc 1- Mod 2	"Reduce the number of students in each group as it may become difficult when it comes to making decisions. i.e. one student from each discipline should be effective." "More designs." (x2) "Integrating more departments in the project. Like [Discipline 6]." "Everyone in the project should know in which stage they will take place then there can be real and really sustainable development project for HUMAN BEING." "Fewer people in groups." "Should have been earlier in the academic year (start of term, not the end)."
Disc 5	"Peer assessment above departmental level. i.e. PA for whole group." "CONSTRUCTIVE criticism needed in meetings/presentations to staff." "Beginning lectures are left to specialist areas, as opposed to entire group. Can be reflected later." "Reduce group size." (x3) "Include peer review – eliminates people who don't work." (x2) "Foreign students should have been split up so that we didn't have 4 non-English speaking architects in one group." (x2) "Smaller groups."

	<p>"More organisation by staff prior to start of module." (x2)</p> <p>"Spread out assessment to one a week."</p> <p>"The conferences, although, should have been splitted in more days."</p> <p>"The lectures on the first two days may have been better spread out."</p> <p>"Maybe split into smaller groups."</p>
Disc 4	<p>"Use peer review to create fairness amongst students."</p> <p>"Smaller groups" (x3)</p> <p>"Constructive criticism from meetings with staff."</p> <p>"We needed more info sooner."</p> <p>"More advice on legislation."</p> <p>"Take more lecture for each part of the sustainable design."</p> <p>"Take more good co-operation between different groups."</p> <p>"Clear initial stated role for [Discipline 4s]."</p>
Disc 3	<p>"A little more structure to the project."</p> <p>"Most work was squeezed into last week."</p> <p>"I felt there should have been some input on <u>how</u> to do interdisciplinary team work!"</p> <p>"The timing was awful- put it in weeks 1-3!"</p> <p>"Have a longer period for it. Possibly put an extra group day in after the site visit."</p> <p>"A percentage effort mark so each individual has to work harder and not rely on everyone else."</p> <p>"Would be nice to work on a project that isn't already under development."</p> <p>"The project should have a longer time span."</p>
Disc 2	<p>"Make each discipline have equal credit value."</p> <p>"Could be run in a longer period of time."</p> <p>"It would have been beneficial to undertake this course earlier in the degree programme –perhaps not to the same degree of detail, but it would have been help to learn about other disciplines from an earlier stage."</p> <p>"More structure is needed and roles of each discipline better defined from the start in order to make group work more productive."</p> <p>"More guidance on [Discipline 2s'] role at the start."</p> <p>"Organise so that everybody can make all the sessions."</p> <p>"Fewer people in groups would make the overall project more manageable and the project should have started earlier in the semester."</p>

(iii) Transcript of Student Focus Group 1 (2007)

Participants = Evaluator and 8 students.

All students in this discussion were members of the same team for the collaborative design project.

Discussion duration = 34 Minutes

[??] indicates where section of recording cannot be understood, due to inaudibility, talking over, unclear accents etc.

Evaluator introductions: explanations about purpose of the discussion, assurances about confidentiality of attributed quotes, securing informed consent etc.

Evaluator: The first thing I'd like to ask you as a group is how you chose to organise working together to fulfil your design project? How did you go about organising what people did, and your time, that sort of thing...

Student 1: Well we just basically met firstly, and [name] told us what to do! (Laughter...). Yeah, we just all met up and straightaway we decided what tasks we needed to do. We had to make a Masterplan, and it said on the brief, it said [Discipline 1s] make the Masterplan and the [Discipline 2s]. But there was stuff in there that the [Discipline 3s & 5s] could do.

Evaluator: So you were given clear roles in the brief as to who would do what initially?

Student 1: Well yes. But we just ignored it. Because the Masterplan had things that we could as [Discipline 3 and 5] help the [Discipline 1s] out with. So we just thought, 'right we'll scrap that and just do our own Masterplan'.

Student 2: We got all the [faculties?] to pitch in the design, and just put the [Discipline 1s and 2s] in the [??]

Student 3: With this project, we already had the solution. So the [Discipline 1s] already had a solution. So we went with the solution that everyone would just modify [Discipline 1]'s solution.

Student 2: I'd just like to say at this point that what we have done in our group is quite different from the other groups, because in the other groups the [Discipline 1s and 2s] talked to the rest of the group in their design. So they had some discrepancies amongst their group. But what happened is I already had a site plan ready. So we discussed everything to decide what we would do with it.

Evaluator: So you mean you had the site plan ready before you even knew about this project? It was something you'd been involved in before as part of your course, earlier in your course?

Student 2: Yes

Evaluator: And was that the same for all the groups?

Student 2: It was the same for all the groups, yes.

Evaluator: So you all just decided to go along with that then?

Student 4: Well it probably changed quite a lot. But we had the one idea pretty much, and we worked round that.

Student 3: So in the Masterplan of [Student 2] there wasn't a lake. And we built on the area one lake. And the centre of our concentration was a lake.

Student 1: Back to your question about how we all met. We just met when we needed to really, didn't we?

[Agreements]

Student 1: We just emailed out to everyone saying meet here at this time, and we'd all get together. As [Discipline 3s and 5s] we didn't have to come and see the [Discipline 1s] every day. So we just met as [Discipline 3s and 5s] separately to do our bit. Because it's quite hard for everyone to just come into the group every day.

Student 5: It was also quite difficult as well, because obviously we don't know each other. Someone has to kind of take control and say 'right we'll meet here, or we'll meet then'. Because we don't know each other it was 'right, where shall we meet? Maybe no one really kind of...We eventually worked it out, but that was..

Student 1: Time management was quite important as well. Because a lot of people had got different projects going on. So we had to make sure everyone was free.

Evaluator: What did you use those meetings for? Did you use them to decide tasks and go away and do them? Or did you actually do some of the work together?

Student 4: Only towards the end did we really start completely. We did a lot of the work together in the first two [interaction] days. But we had to do a lot of work together in the end, when we delved deeper into the problem. Like, initially, when it was an overview, we all did it together. But then we all delved into it deeper. I think was all kind of open, until the end.

Student 3: The project divided into sectors. Like with this sector the [Discipline 5s] could help, or with this sector the [Discipline 1]. We split it into sections.

Student 4: Even when it's come to specific tasks though, a couple of the professions have said 'could you help me with this to start', and that's been really useful.

Evaluator: And did you decide on the tasks you would do based on your disciplines? Or were there other factors that came into play to influence that?

Student 1: There was like a list of things you should include. You should include these things, plus anything else you can think of, in the Masterplan. And that was one of the first things we did, wasn't it? We looked at the tasks and said, 'that's a [Discipline 1]'s job, that's a [Discipline 3s] job'We went through them and split those jobs up.

Student 5: It was kind 'we don't really know about that, but..'

Student 1: Exactly.

Student 3: It was really good. Everyone took part in everything. So if everybody has an opinion about something there was time to say. It doesn't matter the discipline, everybody took a part in everything. So that was the best project approach.

Evaluator: So what do you all feel you brought to it that was different? What do you think were each of your strengths and weaknesses in the group work?

Student 1: I don't know really. Obviously the disciplines we brought to the group.

Student 5: If someone suggested something. [For instance [name] suggested hyperventilation. And I could say, 'well no, according to the current planning advice about...'. So it was quite interesting.

Student 4: Different people's priorities were in different places for the different disciplines.

Student 1: You could just sit around and just chat, and then [name] would say something to you and you'd say 'you can't do that because of this'. You learnt so much just sitting around.

Student 4: You don't realise what you learn in the course. And I think that's really good. The interdisciplinary dimension. I think that's one of the benefits. Because some things I just wouldn't think of as a [Discipline 3] as opposed to a [Discipline 1].

Student 6: Even with the specifics like that. Our main focus was the lake. [Name] came up with the lake idea. But then you were saying 'oh, as [Discipline 3/5s] we are now going to see how we are going to fill the lake, or how we are going to manage flood control'.

Student 5: And then we thought 'right, we could make it into a well', and there's maybe different aspects of that...

Student 3: But that's the best part of the module. You are coming now to the [job] market and you've got to work in a big company, and it's multidisciplinary, the company, and you don't know how to communicate because you never learnt this. With this module it helps you to have an image of how a team works. If you are working on a project.

Student 1: We did a project in second year on [subject]. We did a project with [Discipline 1s]. And it just helped you so much just to know how their mind works.

Evaluator: Does everybody feel that's a positive thing, to have that perspective of different disciplines? Or have there been any negative aspects do you think?

Student 3: In this module. If you are in your 4th year, then definitely yes. Because you know what you are doing as a [Discipline 3/5] or as a [Discipline 2] or [Discipline 1]. But if you are in your 2nd year, then you don't have any clue what your role is, because you are just doing general things. It's not going to be really useful, because everyone has the same knowledge in everything. After your 3rd year, when you start building your [Discipline] profile and you know what's happening you can participate in a multi-task project.

Student 1: If you think about the point of a degree, it's to get you ready for the business world. I think it's absolutely essential. You just learn so much. I mean you can sit and look at your notes and revise for an exam, do an exam, and forget about it after a month, but with this, you'll remember it when you go into a job.

Student 6: It's not specifically a sustainable development thing. You shouldn't think that.

Student 3: The [??] project was really good.

Student 4: It just shows you how many aspects are involved in developing something sustainable. It's not just one thing, you know it's not just architecture, it's not just engineering, you've got to have all aspects.

Student 1: The thing that I learnt as well with sustainability is that it's not just the [Discipline 1] or the [Discipline 3/5]s role to make sure everything is sustainable, everyone has to take part in it. Everyone has to think 'sustainable'.

Evaluator: And do you think you got the balance right within your group? Did everybody do that?

[Agreement]

Student 5: I don't know. There were 3 [Discipline 3/5s] and there was an awful lot of work for us to do. But I was conscious that there was one [Discipline 2] doing quite a lot of the work. I don't know if you felt you were a bit on your own, or if you felt you'd like there to be more [Discipline 2s] on a team?

Student 2: Actually what happened with the [Discipline 1s] was we had this as part of another project. So we had already started working on the [vision?] of the site. Which was an advantage for this project, because we knew exactly what the site was like and how we could do the design. But this is not the case where [??] the [Discipline 1]. So we just had one [Discipline 1] and one [Discipline 2]. It would have been very difficult, because we had only a time-span of 2-3 weeks for the project. That's not really enough time.

Student 5: It doesn't really answer your question. But it was a really bad time for 6 of us who have dissertations due in next week.

Student 3: Although, the amount of work that we have to do for this project...

Student 5: I've been working on it for weeks, solidly!

Student 2: It's not really [??] clear how much work [??] at the start. But what causes [??] depends officially on the presentations. We don't really understand what the jury are expecting from us. So that becomes another problem.

Student 4: Some groups are focussed on different things. Others have been more [??] with this. It's not really clear how specific we are meant to look at it, or how general, how wide the scope should be.

Evaluator: So are you getting the feeling that you may have put in too much work, for the amount of assessment weighting that's allocated?

Student 3: Basically, what [??] was to have the Easter holidays a big break. And the project was the week before the Easter holidays. If it was [??] we probably didn't do the same as them. It wouldn't be a problem then, because it would finish earlier.

Student 4: The thing I was going to say was ..I've forgotten now!

Evaluator: What I'd like to do, is just go round the table and ask if you've each got something to say about what worked well from your perspective, and if there was anything you felt that worked less well. If you think there is anything that might be improved.

Student 6: From a [Discipline 3] point of view, there's a lot of work previous to just this project. We had to do presentations and reports, and a website. That wasn't a lot of work in itself, but then added to *this*, it is quite a lot of work for the whole project. So maybe that's quite a high workload. But I think it's a really good module. I do. I think it's really good.

Evaluator: So it doesn't seem too onerous, given what you got out of it?

Student 6: No, but it was quite a lot of consistent work. For the [Discipline 3s] specifically.

Student 3: It's not just our project, what he means, it's our module.

Student 4: But is yours 20 credits?

Student 1: I thought the module was really good. And I think we were quite lucky because we all seemed to get on together, to 'click' with the same ideas. We didn't disagree about a lot of things.

Student 4: None of us actually like [name]...(Laughter)

Student 1: In the brief at the start, I think it said something like your assessment will be a poster and a presentation, and that's it. And then ..I don't think it said the percentage of each. So, we were like.. (1) we don't know what to include in them, obviously a lot about sustainability. Do I put [type] calculations in? What? It came to, what was it? The last week? And we got email saying..it told us the weighting and then it said 'Oh, and so the [Discipline 5s] you also have to do a report, a 20 page report'. So while we were preparing for this poster and presentation we now have to do a 20 page report. It just came out of nowhere. And that's in for Monday, which is fair enough.

Evaluator: You said earlier that you weren't sure what the criteria were, that you were being judged on. Is that right?

Student 1: Yes, but that's not all a negative thing.

Student 4: As a [Discipline 2], and I'm hopefully going into it next year, it's a good launch pad basically. Because this is the type of work as a [Discipline 2 practitioner] I'd be doing pretty much in a job all the time, going through each stage of the process. So I'd say that this is a really good launch pad for going into it. And just hands-on experience for my profession basically. Hopefully what it's going to be like in the future.

Student 3: As a [Discipline 3], yes I agree with the previous [Discipline 3]. But, the only thing is it should continue for [Discipline 3] because then we have something from 'building services'. The whole degree is concentrated in industry, so ...industrial space and industrial management. So it doesn't have anything about building services. So if you are interested in getting a job in building services you have to do your own research. It's quite difficult.

Student 4: So it's like opened up new opportunities?

Student 3: Yes. It opens different opportunities.

Student 2: The project was quite good actually, and the good thing about it was that it was a real site which we had to handle. And as a [Discipline 1] it was very important because we had so many different aspects which were [??] with the design. The sustainability issues, and economic issues and all that. What was also good was two of our lectures by [organisation name]. Because [??] didn't think about maybe. So actually we understood the types of things that were being talked

about. And another good thing for us was that we got to interact with the other disciplines as well. And we had some good positive input. So it was good overall.

Student 7: First of all I must apologise to all of my group mates. Because [??] I can't check my email in time so I maybe missed some assignments. And secondly I like to [??] of them because they helped a lot.

Evaluator: You found it a supportive group?

Student 7: I really appreciated them. Sorry for [??]

Student 8: Firstly I'd like to say, I wasn't quite sure what we needed to do for assessment. Also, as you mention about the 20 page report, I didn't find out until late, so it's pretty tough.

Student 1: The thing with that, as well, was the assessment as well. It's weighted as structural [??] and sustainability. But it's not really what we do. We do a lot of sustainability, but when we were planning the report we really just needed to speak to [team member] about this because we don't know all this. It was 50% on sustainability., and only about 25% on the structural..

Student 5: [??] Creativity, 15 for sustainability..

Student 1: Yes but there's structural calcs and there's technical drawings. Which is what we do. But when it comes to sustainability, this is the only module we've ever done on it.

Student 5: And obviously we can't do all the structural calcs in 20 pages...

Student 1: Well that doesn't matter [??] That's another important thing. When it comes to [Discipline 5], there's always a load of c**p that goes into the appendix. So you want to specify whether this 20 pages includes all your calcs and everything like that.

Evaluator: I think a little bit more clarity is what you are implying.

Student 5: Good stuff. Creativity. I think the way they just encouraged us to just to go crazy and be creative was a good thing.

Student 4: Really? (Laughter)

Student 5: I liked the site visit and the introductory lectures were pretty useful as well. And also the interdisciplinary stuff that we've already talked about. Bad stuff. I don't think the 20 page report thing has been particularly well thought through. It would have been nice to know about it sooner.

Student 1: I think it's just been lobbed in as an afterthought.

Student 5: It kind of feels a bit like that, yes.

Student 1: It was because everything we do, we also have to write a report. If we [??] we have to do a report. He said in his email didn't he, 'don't think you are getting away with it'.

Evaluator: I did think of a quick question while you were talking. In terms of how this links in with other things you are doing within your course, have any of the ideas influenced, for example, your dissertation work? Or project work you might be doing for other courses? Or is it not really connected?

Student 2: Actually we have that problem, because some of the lectures are clashing with other courses. So we couldn't attend the lectures for this project. And even [??] the same thing happened, because it wasn't properly co-ordinated.

Student 4: Because they are full-day things. Specifically I've got a [subject] lecture on Tuesday and Thursday. And lots of these days have been on Tuesdays and Thursdays. So I've hardly gone to any of those lectures, just because it's an all-day thing.

Evaluator: I've actually put some questions about that on the questionnaire, because I thought it might be an issue.

Student 4: I know it's reasonably specific about this project, but you know they said about creativity, but realistically, there's economic issues to consider, and they didn't really bother with that.

Student 5: I think that depends on the marking though. If they come back in their marking and say 'great, you've been really creative' but if they come back and say 'well it's not economically viable'

Student 2: [??????] We could also have maybe someone from economics, or from that background. Like even from Psychology. Because these issues are all relevant. [??] As I understand it, when it comes to the [??] these factors are very important.

Student 3: It would be really nice, as a project, if we have a budget, if they say 'respect this budget'. But as a consultant, you say 'What are you going to use for the construction?'

Student 6: Basically. Because there weren't that many [Discipline 2s].

Evaluator: To give you some constraints for what you were doing as well?

Student 4: Because quite a lot of our part is economically viable development, basically. But then if it's not economically viable, is not worth building, is it? They just said ignore the economically viability of the area. And the development. Just go with your creative thinking.

Student 6: But that was wrong I think.

Student 2: [??] if they expect us to go into economics and things like that, they will have to give us more time to think about things like that. I mean it's not possible in such a short time.

Student 3: The best thing would be to move the whole module to the first semester, when everybody's not really busy with their dissertations.

Evaluator: Would that suit everybody? If it had been earlier?

Student 6: A lot of [Discipline 2s] were put off doing this module because all the classes were at the end of term when all the work was in. So I could decide whether to write an essay, or go to a workshop.

Student 3: The timing is quite tricky. Because everyone has a dissertation to hand in in May, and this module you cannot have a year earlier. You need to be 4th year to realise what you are doing. So for me, first semester would be the perfect timing.

Student 6: I was going to say, on the [Discipline 5] course we have project after project. We don't have specific modules where we go to a lecture every week. We have one major project, then another one. At the start of this semester we had 5-6 weeks, and it was so long. It's an

international competition where every Uni gets the whole year to do it, but we had to cram it into 6 weeks, and it was agony. So it would have been nice to have the Easter holiday for that. So if you swapped them round, but first semester's just as pushed really.

Evaluator: Can I just ask you what you thought about what you managed to achieve? Were you pleased with what you managed to achieve?

[Humorous banter]

Evaluator: What do you think are the key things that have helped you achieve what you've managed to achieve?

Student 3: It was the good spirit of the team.

Evaluator: Did you make use of any of the resources that were made available to you online? The WebCT resources?

Student 5: There's an awful lot of them, and they do get buried.

Evaluator: Did you find some of them were more useful than others?

Student 3: Depends [??]. Most of them were really useful for general enquiries. But then you were concentrating in a specific area.

Student 6: The [??] programs were useful, like SPEAR. That's one program. I'd never used that before, and me and [team member] were going through it, mostly [team member].

Student 2: One of the things about the information uploaded on WebCT was I think there was too much information about planning laws and things like that. I'm not sure exactly if we had to go through all that information and apply it to the design.

Student 4: I think they pretty much said 'ignore all the planning [??].'

Student 5: Didn't they say the Yorkshire Forward one's were quite useful?

Student 4: Yes, Yorkshire Forward's and Leeds City Council's. So you'd like to ignore the UDP and Yorkshire Forward's plans of the area etc. So there'd just be on national guidance. Which doesn't really make sense.

Evaluator: So do you think there is anything, apart from the planning laws, that you could get rid of in future, or...Because I think one of the things they were asking is was there just too much that it just overwhelmed you.

Student 5: I probably read about half, and that took a good couple of days.

Student 6: [Discipline 3s]- we used them quite a bit for our previous presentation.

Student 1: It might help if they split it up into resources for your discipline.

Student 4: We had a separate one.

Student 3: If they had given us a guideline of why we have to do the project, they might be really useful information. But At the moment, you know, we never had a guideline – what was the target? 'Just do this in general and don't care about the budget. Just do your idea, don't bother about the [??]'

Student 4: [??] very general. How viable is it economically? Or with planning restrictions etc.

Student 6: I think we'd have to plan this project a bit more on reality. There's no point dreaming about something.

Student 2: the program has to do better to find..On WebCT it has to be at the level of the programme. The [??] to the programme was very ambiguous, because we couldn't understand what was required of us. And there was too much information on WebCT. There was information, but it was too much. So we didn't really know exactly what to do with it.

Evaluator: So was there so much that you couldn't even say at this stage what to get rid of and what to keep?

Student 3: Exactly.

Student 3: Can I make a small comment about the future? Basically, if they would like to take the project every year so – next year it's not going to be [site name], just find a different area.

Student 6: I think they were planning on doing that weren't they?

Student 3: Well there's more research in terms of new ideas...

[???

Evaluator: It would be new for them though, wouldn't it?

Student 4: But at the same time, there could be a poster hanging around, or '*here's my masterplan from last year, and I got a first for it.*'

Evaluator: If you were asked to give some advice to next year's students taking this course – what might be the one key piece of advice you might give them in terms of how to organise..?

Student 5: Show them one of the posters, so they get an idea of what they are supposed to be.

Evaluator: You mean an exemplar of some kind?

Student 5: Yes.

Student 6: It wasn't that ambiguous.

Student 5: Perhaps they didn't know themselves exactly what to expect from multi-disciplinary teams. Maybe next year, now they know what students can possibly achieve they'll have more of an idea...

Student 6: If they want us to do a presentation, don't make us not be assessed, because there's no point.

Evaluator: Could you clarify:

Student 6: They made us do two presentations. We did a presentation, then a detailed presentation pretty much on the previous presentation, and they both weren't assessed. And now we've got another presentation which is to detail both those presentations. Maybe they should all be assessed or don't do them at all.

Student 4: I quite would have liked, instead of a poster, or maybe as well as the poster, to have some sort of written report.

[Humorous objections from some of other students]

Student 4: [??] something to show to an employer with 'oh we worked on this area of [site name], and this is what we came up with'.

Evaluator: So it's something to take away with you.

Student 4: Yes. There's one thing I should say a bit harsh on that, because there was a lot of work involved with them [the presentations] but they were really good. They made you think quite a lot.

Student 3: Yes. They were really good.

Student 6: It was a good introduction to the [site] because we didn't do transport, and landfill regulations, and things like that, which gave us a good introduction to [the site]. We could use what we learned from them.

Student 3: It just put open our ways of work.

Evaluator: Are these the presentations you all did to each other? [Agreement] In what ways did they make you think? You just said they made you think of things from a different angle. Is that what you mean...or..?

Student 6: Our disciplinary module is [??] from the other disciplines. So what they had to do first is to look at different aspects. I looked at [??] regulations. He looked at agriculture. So we looked at each background, and we looked at what is happening in Sheffield, and then we were given [the site]. So it was a good start.

Student 3: It was a really good introduction.

Student 6: We had a few ideas floating around from the previous research we'd done.

Student 1: We tended to miss out on that, didn't we? A lot of it had been done for us, which is great. I didn't really get a chance to get into this one, compared to other projects that I've done.

Evaluator: Well you've all been very helpful. Thank you. And all very talkative, which is very good. Before we finish, because I don't want to keep you too long and I know you are all itching to get back to preparing for your presentation. Is there anything you'd like to say about this year's that you feel you've not had chance to say that might be helpful?

Student 6: Just encouraging more people to take this module. A lot of my friends... this is the real thing, and they just want the traditional study for exams, coursework assessment etc..

Student 4: [??] his speciality has to take this module. I think it should be, if you want to go into building services, it should be [??].

Student 5: I was looking out of the window of the Information Commons, and there's all these developments going on, and I was thinking 'that's not sustainable, why are they doing that?' It would make everyone think sustainable. Just encourage everyone to take this module.

Student 4: People just don't realise how good this is going to be.

Evaluator: Then you would definitely recommend it to others?

All: Yes.

[End of discussion]

(iv) Transcript of Student Focus Group 2 (2007)

Participants = Evaluator and 6 students.

Students in this discussion were members of different teams for the collaborative design project.

Discussion duration = 33 Minutes

[??] indicates where section of recording cannot be understood, due to inaudibility, talking over, unclear accents etc.

Evaluator: Just to get started, I just wondered why you chose to do this module? For those of you it was an option for, why did you choose to do it?

Student 1: For me it was that by week 9, we wouldn't have an exam. And we were told it would only take up the time that had been allotted. The specific 3 days of interaction days and a few lectures before that. And there were a series of lectures which were before Easter as well. We had enough time to do them then. But since we've come back it's been a bit ...We've been told it wouldn't take up much time for us, because it's not that big a part of the module. But the work has been...I'm one of the people that really likes to get involved and definitely do my share, if not more, of the work. And I've not been able to do that because of the fact that we've had so much other stuff on. For the [Discipline 5s], they've not had anything else on. So its become more [Discipline 5]-lead, even though that's not how it was intended to be.

Student 2: It would be better in the Autumn.

Student 1: Yes, in the previous semester it was like a holiday for us. We didn't really have that much to do.

Evaluator: Would you agree with that? Although you are a [Discipline 5] I guess the timing has been less of an issue. Would it be an issue for you if it was moved back into first semester?

Student 3: No. We've had it pretty easy all year really.

Student 4: For my year it's optional. Which is [Discipline 2]. I chose it because of having to reach other discipline people, and because my Spring timetable finish at week 7, week 6 really. So after that I'd got nothing to do except assessment to hand in, and I thought it would be a good chance for me to have time to do it. And it's my final year, so I would have a good experience.

Student 2: I just thought it would be an interesting module. It's a little bit different to standard modules.

Student 1: It's also what's [??] building services. I think a lot of people in our year are now looking into going into building services as a career, and it incorporates quite a few issues that you will experience when you go into that industry as well. In terms of use for employment, quite a lot of our modules we'll never use again. I mean we learn certain things, but you are never going to apply it directly. It's one of those things which is quite a lot of skills which you will use again. And it brings together a lot of things I've learnt about group work, and all that sort of thing. I think potentially it could be a very good course, but especially for us the timing's been bad.

Evaluator: [To latecomer] I just asked why you initially chose to do this module.

Student 5: Partly because there's no exam. And it's one thing which is good fun. However, as to the timetable, 3 days wasn't enough to approach the problems that came up.

Student 2: The days were also very compact. They started at 10, and judging everything was beginning at 1. We didn't actually get much time for work on it.

Student 1: And especially on our second presentation about the masterplan, I don't think it was very clear about what we had to present. It said 'masterplan', which we went in presenting our masterplan, and the way they cut us down quite a lot was saying 'you need to do this, you need to do that', but we'd already presented that in a previous presentation. And so we felt that, had we have done exactly the same presentation again we'd have got on better than having done the one we'd worked on that day.

Student 5: But the idea of those meetings at the end was to get you to actually produce and develop after each day so they give you an objective to go to the other day, and you've actually done some work.

Student 1: Yes, but we did that, and it didn't seem to be what they wanted, from what that actually given us to do.

Student 3: We had to rush as well to do everything. And everyone wanted to do it better, do it more professional, consider more issues. It actually took a lot of problem, because we took a lot of time, and they chose not to do it. [??] and they want us to use those lists of things for [??] buildings. But we don't actually know how the structure in there, or how it's going to lay out and [??] no idea how we going to use it because we didn't go into it anyway. But they expected us to use them or [??]. And so the flooding issues as well.

Evaluator: So you are saying that what they were asking of you was not very clear?

Student 2: There were so many issues.

Student 1: [??] one specific thing instead of the thing as a whole.

Evaluator: Did you know about the inter-disciplinary design project before you chose to do the module? Was that very clear at the outset?

All: Yes

Evaluator: To what extent would you say that influenced your choice of module?

Student 1: I don't think it really influenced it. Every single term we have a different coursework module, which is with a chosen random group within our course. We've probably worked with the majority of the people on our course in different groups. So you know what it's like, the group work. And it has been pretty much the same as all the [??].

Student 5: But if you are someone that's aware of your career path, and the fact that you're going to be going into a multidisciplinary area then you want a taster of it, and you haven't had any experience, and you [??] your module properly then you'd certainly go 'well I pretty much should handle it'. I think it's been structured well to give you that flavour.

Student 4: But that didn't affect my choice, I did think after having done the module it was good work involved.

Student 1: I'm quite surprised about how we have worked together and got on. Except for a couple of people saying 'I've got too much on, I can't actually do what we need to do', people have kind of 'mixed in' and stuff. Again, I don't think it was really fair on the [Discipline 5s] because they've been the only people that have had the time to do the most work.

Student 5: You say you guys came together and you worked well. How was it formed? How did you form as a group? In my group we have, and we still have very much problems in the structure of our group. We have no natural leader, which when you look at the project as a whole, it should..well it seems obvious that the [Discipline 1] comes in and takes the lead role and he defines the vision. But then if you've got the leader who simply misses the point or something like that, then you end up in a whole world of trouble because they can't appreciatethis is the problem we had. They couldn't appreciate the sustainability issue. From the start he decided to wipe it all out and do this amazing development, which would have been brilliant. But that's...We had to take his vision apart, and then we had to start to develop more of a working model, and then we eventually..

Student 1: We started working together from the beginning. We just consulted everyone all the time.

Student 3: In my group, another problem it was a big difference if each group only got one [Discipline 2] and possibly 3 or 4 [Disciplines 3/5s]. Also imagine that to find a leader, and to start from the scratch, the most likely [??] to start with [??] and then the rest of them were following the same leader. It was difficult, because of the conflict between different disciplines and different ways of seeing things. It does have problems, but it was one OK.

Evaluator: Did anyone find in their group, because there was a skewing of certain disciplines that that dominated the way the project went? Was that a dominant perspective?

Student 4: Yes, because [Discipline 5s] obviously had more time. We had a problem in our group where the [Discipline 1] believed they were only doing a 10 credit module, so they literally told us they were unwilling to do any more work. They actually left it from the basic design stages to be developed by the [Discipline 3/5s].

Student 3: It was also because of different credit and different marks that it carried a different workload, it also affected the way ..how much they were willing to contribute. It was lucky in my group that the [Discipline 1] was really good and did things all the way through. Even though it carried only 10 marks for the presentation, in total 10 credits. Not everyone would do it. And also for the whole project [Discipline 1s] play an important role, because they need to prepare the Masterplan and the building as [??] and the part of [Discipline 3/5s] is to make it happen. All the important issues to make it more sustainable, in a way. But [Discipline 1s] play an important role.

Student 1: You are creating an A1 poster, something people will look at, a lot of visual stuff. They always say 'Oh well, we aren't going to mark you on your computer skills', but you do get marked on your computer skills, you do get marked on how good it looks. And when our [Discipline 1] said 'we are not going to do this, you get what we've done initially', a block drawing, and you have to work to that. And that's what we had pretty much from the outset. So without those skills, you are drawing on other disciplines to get to use those skills. But none of us had been trained on what they had initially done it on, so we couldn't even improve it.

Student 3: Also, in terms of using different programs to create the poster, possibly the [Discipline 1] would be more good at doing all the design [??], the Masterplan and also the block plan. [??] Whereas no one knew how to use it.

Evaluator: did you not find you were learning from each other though, these skills?

Student 1: That would be great. But it would take a *long* time to learn. If you go into industry and worked you going to have to do a 6 day 9-5 course to be able to...

Student 5: [??] to do those blocks, to change those blocks into 3 days. That would really help, just to get it started.

Student 4: I think the graphics side of its really important though. Not every group had someone who was really good at that, yet the groups that did..

Student 1: Yes, you can tell the difference in the posters. It happens every year. We had a group assignment to do last year and, depending on if you've got someone who just happens to be someone who's played around with CAD in their spare time and enjoyed doing it, then they can make everything look really good. It shouldn't happen, but if they're in your group you're like 'Yes! Our poster's going to look awesome'. You know that they can play around with computers for ages and make it look terrific.

Evaluator: Have you been told if there are any marks riding on how pretty it looks?

Student 1: That's the thing. They always say it's not, but..

Student 5: There is!

Student 1: If you're choosing a poster's going to be entered for a competition to win £1,100, you're not going to choose the poster that's got the best content but looks bad. You are going to choose the poster that looks the best. Aren't you?

Student 3: Also, in a way, it's the representation as well.

Student 1: I mean yes, if you look round the ones that are here today, it's so obvious.

Evaluator: So what do you think you've gained personally from taking part in this project?

Student 2: Total frustration. Absolutely [??] so crucial that people are....I don't know. I guess more of us stress on how the meeting's going to run before you get there. So the [Discipline 1s] have more of an idea of what they are doing. We had no idea for ages and we ended up battling again. I guess that's what we are meant to be learning i.e. this whole thing. And that's the idea of it, but it simply doesn't work in the time frame or the structure that's been given if you don't have the structure of group already in place. That's one of the problems. The other one is that there's a lot of work. You're asking 4th year students to produce work. We're all of an expectation that this work has to be absolutely immaculate and now everyone's been told that you're not meant to put that much effort into it. And I've said that 'well you're talking to me and I feel that the sort of level of work you're asking involves this amount of time and I simply don't believe that I'm working at GCSE level anymore. So we were encouraged to come outside our own time, which was fine from the point of view that we've not got any lectures on the topic. But the amount of [??] it takes outside your time is ridiculous, considering that we've already mentioned the fact that we've got more project work to do. Sorry, it's the same for everyone. I don't really know.

Student 4: We thought we were completely devoted to just this one thing of producing the poster but the last week we were told, on Friday we were told, we've got another submission for it which is a report, which would have been good to know from the start.

Student 6: We weren't given that brief until we [??]

Student 1: If you know from the start, then you know what to keep, what to document from what we've already done from the start. Whereas you probably just kept the presentations and [??] that were discussed, and then you've got to write a report of it. Great! Where do I start from? I've not got it anymore.

Student 2: We come back to the briefing there. Absolute mayhem, real mayhem. No clear intentions. Like you say, you haven't been let know what sort of work's expected. The time frame was brilliant like that. We've known where to be when, but the briefing about the expectations of each day, and in particular the work that's expected...

Student 3: We had no idea [??]

Student 1: Like last week we went into our meeting thing, and they were saying 'I think the idea was more to take one theme and run with it, you develop one little area'. But from the beginning they've also said that everyone's just done the same sort of thing and 'just put this here, this here, this here...'. But the fact that everyone's done it clearly shows that that's what everyone got out of what we'd been told to do. So they can't really cut us down for doing that, and saying we've done it and everyone's come up with it. When the way they've presented it is they want a solution that works. The fact that you are bringing [Discipline 3/5s] and [Discipline 1s] together is like saying 'do your bit of work', to do something that you can actually put in practice. Which is what I find more useful. But then they were saying 'it's not creative enough, it's not got this really big thing, and we'd like you to do something different'. But it's like – 'yeah' – 'but you're not going to be able to do that in real life!'

Student 4: And we were stressed that it was going to be alongside Yorkshire Forward and using current planning methods and that kind of thing. And then we received an email from [name] saying [?talking over]. What an absolute crock! That ruined my two painful days where we had already spent producing all this work and trying to get to a common consensus.

Student 3: In order to get along with it, you need to consider all the policy and what other visions they have been creating, to try to create a similar structure or similar [??]. But then at the last minute he says that you can broaden your creativity and do whatever you want you have to think well 'How realistic is this?' For me, even as a [Discipline 1] there was big pressure because I was thinking 'you can't realistically go through everything'.

Evaluator: Would you have felt more comfortable if you did have some boundaries?

Student 4: A budget or something. At the beginning particularly in [Discipline 2] you found this, but in the beginning we were told we were doing..and then they changed their minds half-way through. I felt like saying 'well what do you want? Come on!'

Student 1: In terms of the actual course though, what they've actually provided for us has been really good. It's really different to anything else we've done. Like the fact that we got..Like starting with the trips to go and see what it was like and stuff. We got a talk and a presentation from Yorkshire forward about the place, and then we had those days where there were presentations from each department. That was quite good. Because if you did that, if you had time, it explained what people's roles were and things like that. I think it was a really good way of doing the beginning. It's just when it came to doing the interaction days we needed more clarifying..

Student 2: I think the trip was really beneficial. It would be good if everyone could go on that.

Evaluator: Was the attendance not good for the trip?

Student 1: Not brilliant. I'd say a good 3 or 4 people from our group couldn't go.

Student 6: I think our [Discipline 1] went in their own time.

Student 1: Really?

Student 6: Yes. Our [Discipline 1] went in their own time.

Evaluator: What about the electronic resources? Did they help what you were trying to do, or did they hinder you in some way?

Student 3: There was too much.

Student 1: Way too much, yes.

Student 3: Even when we tried to read it at the beginning, and they started giving us national policies, and then we were down to regional, local and then more focussed on [the site]. I don't think it's necessary to really consider that big stage. I think it could be narrowed down and say 'these are the key documents that will help' and would be the guidelines as well. Whereas now you're trying to ignore certain things.

Student 1: Like they gave us all the Yorkshire Forward stuff, their design for [??] and everything like that. And then to give you all that and say later on 'don't take it into consideration, do your own thing', is really contradictory.

Student 3: I think in a way they wanted us to be realistic but also have more creativity at the same time. Which is really hard to balance.

Evaluator: What about the amount of material you had for trying to get the different perspectives of the different groups that were involved, like the community and the planners? Because there were some community interviews there as, well. Were they helpful or not? Or could you just not filter them out because there was too much?

Student 1: I don't remember looking at them.

Student 2: I didn't know they were there.

Student 4: Too much already.

Student 1: We got shown a few in our initial lectures.

Student 5: Community-wise, when we were being asked questions, {name?}- or whoever they were, they said that we were the only group that had considered major..that we predominantly based our whole design on the community issues. ...Er? Where was I going with that? The resources. We were aware of them, but I was more aware of the community interviews. That's all.

Student 3: Also aware of where they are and when the site's written, so it's more prominent, to listen to those community views.

Student 1: All those interviews, as well, all you can hear is the same buzz words coming out from anything, from anyone from the council, or anyone from Yorkshire Forward, anyone like that. You

hear word 'sustainable' about a million times, you hear the word community about a million times, integrated, things like that. It's just [??]. I think that's all I got from it.

Evaluator: You say you got a lot from the site visit. Did you feel you needed to revisit any of the images or anything, to help you recollect what was there? Or did you remember fairly well without need to do that?

Student 6: We had to take photos.

Student 1: Yes we took photos. For [Discipline 3] we had to produce a website, with about 6 photos of sustainable issues that should be addressed. And that was quite good.

Student 5: It looks beautiful, the photos.

Student 4: I did go on for a bit and try to work out what was on the site.

Student 3: Perhaps it would be better if they provided more pictures rather than..[??] but just looking through the angle. And they've got one looking at the viaduct, and it's completely blocked by the [??] And you just can't see anything anyway. If you didn't go, you'd have no idea how it had been. You can't rely on the individual photos.

Student 1: They did help, [??] things you could use, looking round the site. But it's very difficult to work out. I worked in Leeds for the summer, right. And we parked at one end of the site and we walked through the site along the beck every day for 8 weeks. Even I couldn't place them from the description. I didn't think it was that good. I think you really need to go there.

Evaluator: In terms of things you think the course leaders should focus on to improve next year, what do you think are the main things? Because there are a number of things you've drawn to my attention. What do you think are the key things they need to think about?

Student 1: When we did our first presentation, we just did it just to someone from [Discipline 3]. And I don't think we got good feedback really, for our design. He just like 'Oh yes, that's good'. And from a [Discipline 3] point of view, because I think that presentation was quite [Discipline 3 lead] from the way we had written the slides. I think it would have satisfied people's questions on the [Discipline 3] side more. So fair enough, it's probably fine. But had a [Discipline 2] sat in on that, we probably would have got a lot more feedback which would have been more useful for the next week. Then again, we had predominantly [Discipline 2s] for the second week, and then we got a lot of feedback from that side and nothing from the [Discipline 3]. So we had the two views, but at different times, and it didn't really help us develop it as a whole.

Evaluator: That's useful.

Student 4: I would probably ensure that everyone was going to get the same marks for the project so you can expect the same amount of work from everyone, and hope that they have sufficient time to devote to it as well. So you get that input from your [Discipline 1] and everybody throughout the whole procedure, rather than getting to the point where..

Student 1: Maybe have a specific day for poster and presentation work. Because I know that the groups have their own time to do it, but had we been aware of that being part of it when we signed up for it, well I know I wouldn't have signed up for the course. I definitely wouldn't have done. So by providing a separate day for it, it lets you know it's going to be that time, it's going to take at least one day on top of the separate interaction days. I don't know about you, but I was under the impression that the first day would be to come up with your idea, the second day

writing it down, preparing a presentation, the third day presenting it. And then it would be done. But the way it worked out, it wasn't like that. We had quite a lot outside of it.

Student 6: I think it would maybe work a bit better if the [timescale?] was a bit longer. Because it's a lot more detailed.

Student 3: I think the masterplan needed it as well. Because you can't really do a detailed masterplan in a week, or in day either. And for the arrangement, you've got 3 weeks holiday in between. It will be difficult. You can't force people to stay in Sheffield over 3 weeks and then to meet up and do the masterplan. And also, for the first presentation, I think it's a bit rushed. I think we should have a day before. At least people will know which group they are. Because we are on the day, unless you know who your group members are and actually..

Student 2: Like team building.

Student 3: Yes. At least to know each other beforehand, rather than wasting the day getting to properly know each other. Then maybe a day to get the presentations done, and then maybe the presentations.

Student 1: Those lecture days, I thought maybe the time wasn't great. We milled around for quite a lot of it. We could have used some of that time a bit more productively to introduce the groups, even if it was just half an hour. Because that's all it would take really, before the first interaction day. I think the first two interaction days were quite good in terms of what you produced, what you were required to produce. I felt they provided us with enough to then produce enough to then be able to make the poster and the presentations. So I think in terms of that it was quite good. It's just that having the extra time to make the poster and presentation and bringing it all together.

Evaluator: Would it have helped to have had the project brief any earlier?

Student 1: I don't think so, not with everything else going on.

Student 2: Perhaps if the [Discipline 1s] had better preformed ideas and taken a leadership role.

Student 3: Or maybe make the course compulsory, to have more people involved in it. So like the numbers are very...Some of us only have one [Discipline 1], others have got two. And if it was compulsory for certain groups of people then that would guarantee the numbers of people in the course. Some people say that to take the module at the beginning, but they can always change the module. The caused some of the people to leave.

Evaluator: Some people dropped out?

Student 3: Yes

Student 4: The group sizes are a bit large as well.

Evaluator: Do you think you would have been able to achieve the same thing with smaller groups though?

Student 6: I think so, yes.

Student 5: With the presentation stuff it did usually end up with one person completing [??]

Student 1: Yes, you can't .. I think two from each discipline would be quite good. That's the thing as well. It comes down to the individual. Without being harsh, there's always going to be people who are going to do more, it's in their nature they do more work. Or some people take it because they think it's an easy ride. So if you ended up with one person from a specific department in your group, and you've got that person who takes the easy ride and doesn't bother then great! You've just got someone whose not going to contribute much to the group. Whereas if you had two people from each department, then chances are it's going to balance out. And then you're also not overbalanced. We had three [Discipline 3s] and three [Discipline 5s]. And then it's quite a lot of the time either me you or [name] sitting there and there's not something for everybody.

Student 5: Yes.

Evaluator: I get the feeling we've focussed quite a lot on the negative, which wasn't my intention. I just wonder if, before we leave, because I don't want to keep you for much longer really, if each of you have got anything that's really positive from the experience. Or.. if you haven't that's fair enough. I don't want to go away thinking you all had a negative experience. Was there anything positive that you got from it?

Student 6: I did enjoy learning a bit about the other disciplines. What they do and what they put into a project.

Student 3: I've been with friends so... it's been quite different our disciplines. It's actually knowing how the thing, it actually gets done. Because when you are with friends, you don't really know exactly what they need to do now.

Evaluator: So that's getting things done for design work, you mean, as a team?

Student 3: And all the engineering as well.

Student 4: [??] quite good really. I'm quite happy with the way it all turned out. In the end.

Student 1: In the time, as well. I think our group, I don't know about anyone else's, I think we worked together really, really well. We've been in groups just within [Discipline 3]. I think this has been much better than how I've got on with groups within [Discipline 3]. We've actually got on with it and produced what we need to produce. It's taken a lot of time, outside of what we thought it was going to take. But it hasn't been ridiculous.

Student 5: I think I represent the other half of that.

Student 1: You can be independent, but it depends on how you work together.

Student 6: It would be good to have half individual work and half group. Because people who aren't working hard in the groups..

Student 1: I think maybe a peer review would be quite useful. I've always thought they were a rubbish idea. Like in our [Discipline 3] groups everyone ends up giving each other more because you feel guilty. But as long as you decide it as a group, and you have to sign for it, you agree it together. But I think it would definitely...I mean I don't think our [Discipline 1s] would even argue with the fact that they haven't contributed very much, you know?

Student 6: They told us it wasn't worth any more to them.

Student 3: [??] a ridiculous amount of work for my group. The [Discipline 1] who work on it, they put loads of effort in it even though they know..and we appreciate that. But it's really varied.

Evaluator: Thanks participants, closes discussion, explains what will happen next/answers questions etc.

[End of discussion]

(v) **Transcript of reflective discussion with teaching team, 2007**

Participants = Evaluator and 7 members of teaching team (including project leader and project co-ordinator), Visiting Professor, and two other departmental stakeholders.

Discussion duration = 1 hour and 17 minutes

[??] indicates where section of recording cannot be understood, due to inaudibility, talking over, unclear accents etc. The day of the meeting was a warm summer day, windows were open and construction work was being undertaken outside.

TM= team member

VP = Visiting Professor

OS = Other Stakeholder

Evaluator – Initially summarises key issues arising from data generated from other sources, and explains purpose of being involved in discussion and importance of learning also to wider learning & teaching community.

TM2: ... Most of the negatives come out of how hard it is to organise it, when to have it, and how long to spend on it. And a lot of these negatives are things that students moan about all the time, in lots of other modules.

TM4: We should have put them in groups before they went [on site visit]. We didn't give them the time or space to just get-together in their little group before the field trip. In the morning they just got on the coach.

TM2: We could have some kind of team building exercise on that day, for an hour in the centre we went to for example.

VP: A kind of ice-breaker..

Evaluator: I'm just highlighting the things the students say, I'm not suggesting that these have to be accommodated. It is for you as a team to decide how significant this is. Is it something they are going to have to deal with in the real world, so let's leave it? Is it part of the learning process?

VP: Is it going to help them? That's part of the challenge.

Evaluator: And as I said earlier, there are some things that will just not be feasible because of the complexity of organising the different disciplines.

TM2: Something like the timings, for example, will be difficult to improve.

TM4: It was a bit awkward this year because we had the one week, and then the three weeks when they couldn't really talk to each other, and then the two weeks after Easter. Next year is a very odd year. There's only five weeks before Easter, and then three weeks of Easter. We managed in weeks 7,8 and 9 this year [??]. I guess we could start maybe in week 6. Start in week 7 properly, but maybe have something in week 6 where they could get to know each other.

Evaluator: That point did come up in some of the [students'] suggestions, possibly starting a little bit earlier on, or having the project brief a little bit earlier so that they could think about it a little bit longer maybe.

TM2: This issue of clarity. In all the design modules I run I give very vague design briefs, but I give the students the opportunity to come back to me with a list of questions. They almost clarify it themselves. That is certainly something we could quite easily do with this. We give them the brief, get them working together in a group and maybe the first thing they do is ask all those questions. They had the opportunity to ask them last time when we had those sessions with them. But if we gave them it as a specific task, and highlight to them that it is being clarified.

Evaluator: There was certainly not an issue in terms of the type of support and help they were getting from people from they asked for it. They were very positive about that. There wasn't an issue with members of staff being approachable if they had a problem. They could come and clarify it from their perspective. I think if sometimes they asked a question they felt they did not get a clear response.

TM2: We have to be careful though, or we end up doing it for them. Which is what they want.

Evaluator: In terms of how you felt, did things more or less go according to plan, or did you have to change anything?

TM4: Not everything went according to plan. Some things we had to change. One of those things was rooms. We ended up running around at the end trying to find appropriate rooms. [??] We could be faced with the same problem next year. I'm guessing we will have about 100 students.

TM2: They are doing room bookings now in our department. We need to get in now and actually We could actually do with somewhere like [Name] Hall, but that is very difficult to get.

TM4: When I tried I couldn't get anywhere.

Evaluator: Did you have a problem finding places to be able to do what you wanted to do?

TM4: Well we needed two forms of space. One was a lecture theatre style for weekly lectures. And there wasn't anything left in the University by the time I got round to booking. The other type of space we needed was with tables and chairs where people could sit around in groups and work. We ended up with no single space big enough, not even the [Space name].

Evaluator: No the [Space name] isn't that big is it?

TM4: So, it was a bit of a struggle really, to find space. So that was one problem with rooms. The other was with the [design] vision, and this has come up in some of the comments from one or two of the students, that the {Discipline 1s} and [Discipline 2s] would take the lead at the beginning, and would come up with a vision, [??] ideas for the site, and the other people would also be thinking about it, but separately. And that didn't happen in the end. They all got together and they all started working together. There were just one or two students who said it would have been a good idea if they could have spent some time together initially to develop some overarching framework. So that didn't happen.

VP: In a way that's a bit of a cop-out really. Quite often you get everyone. It's quite nice to have [Profession 1s] and [Profession 2s] to tell you what to do.

Evaluator: And did it have any impact in terms of what the students were actually able to achieve?

TM4: Not so far as we could see.

TM2: I think there might have been too many conflicts. Given what did happen.

TM4: It seemed to work OK...

VP: What did happen?

TM2: In some particular groups, the [Discipline 1s] weren't very popular.

TM4: But that's real!

TM2: Well I know it's real, but...

Evaluator: There was an issue that came up in one of the groups saying that their [Discipline 1s] had actually been very helpful and that they had put in probably more work than they were expecting. And what I didn't get a chance to explore was what the impact had on *their* learning. You know- that the [Discipline 1s] had actually put in more work than they could really afford to do. Because that could have had a negative impact on their learning, despite the positive impact on the other members of the group.

TM4: The other thing that didn't work was the way in which the [Discipline 4] students were made available to act as consultants and asking the other students to work with them.

TM3: I think that was for a number of reasons. I don't think they were very clear about their role. The same with all of the students. But also there were four of them, and none of them were [??] anyway. They were fairly reticent characters, so for them to get in amongst all the groups ...and the groups didn't know each other either. It was quite daunting for them to do that. I think they latched onto one group because they already knew someone from within that group, and worked really well with them. But again, I think this 'get to know you' is needed...

VP: It started so well, [??] being consultants. I thought they were fantastic.

TM3: They did really well, and their work was good, and the group that they worked with, they worked really well with. But maybe it was too much, because there was only four of them. And the others were also quite big groups. It's just that our group wasn't really big enough to make it work properly. If there had been maybe a dozen of ours, they could have gone and worked within all the other groups.

TM7: There's also this issue about whether groups with people like [Discipline 4] [??]. We talked a bit about, after the [Discipline 4] students had done their presentation, whether their analysis worked through the timescale of the development. And I don't think our groups were necessarily ready to answer the question. If we had said 'because there is an issue with the cost of development over time and how do you manage and cost that management, [??] and the different solutions you could have had.' Then they would have had to seek out the [Discipline 4s]. I think they didn't have to seek out the [Discipline 4s]. And the best groups addressed the water problem in a more imaginative way. I think there is an issue for us now how we set that as a problem. We probably could have set that up as a bigger problem. We hadn't talked about the costs. We could have had 'do nothing' and pick up the costs of flooding in the future, or positive options, and perhaps steer them. There are loads of issues around problem solving that we could perhaps steer them towards. The group that had [??] in was set the task of [??] but weren't actually clear about how they were addressing this. That would be something I'd have to think about. How you begin to push students particular problems that either have to be addressed in terms of trade-offs

between different solutions. That's what I'd like to have the [Discipline 4] group do. You could cost that particular solution and compare with another. And the groups didn't do that enough. There were various ways of solving issues at that site. Technical solutions, behaviour change, I'm not sure we pushed them, steered them enough until the end. There was a lot of work went in the last week.

Evaluator: One of the problems you mention did come up in the focus groups. Some of them said they would like to have seen a little more in terms of 'boundaries'. I could sense there was some tension between this and the remit to be completely creative, but thinking perhaps there should be more boundaries on that. They weren't quite clear on what those were. That to me is what you are suggesting here.

TM5: It was something we did talk about a little within the actual groups themselves. It was restrictive in that we did give them [Development Group's] and [Planning Council's] vision and not explicitly, but implicitly constrained the project to that vision. And we talked about releasing them from that constraint. I don't know if that means it makes it even more difficult to [??] or not. We were muttering when we were looking at the poster that there wasn't a lot of 'thinking outside the box', because we'd given them this constraint. But there was certainly not a constraint in terms of what the elements needed to be incorporated into their overall design. In that respect it was sort of laid down, codified that they could be more innovative and free. If they didn't have to do that, then there's no boundaries. They could have made it quite bland. They could have made it a [?] plan, they could have made it a high-rise and anything in between. I don't know which is easier, but I know which is more interesting.

VP: But one of the things you were trying to get them to show you is innovation from working with different disciplines. I would be inclined to take off boundaries and see what happens.

TM5: That was my instinct too actually after looking at the posters. That perhaps we did constrain them a little too much, and perhaps it would be nice to let them just run wild, but in so doing they might just get bogged down in their groups and not [??] their visions. Some of the groups might struggle in that respect. But then again, group learning is kind of the point of this exercise.

VP: I think innovation is part of it too. I think you could make that come out.

TM5: I've reminded any number of students from any of the disciplines that came to talk to me to 'go back and look at the title of the course- this is about sustainable development, and we are trying to be innovative so let's not try to be conventional. You've done 4 years on [discipline] or whatever it is. Try it, but don't cut and paste it out of the courses you've taken.' That's the guide I've been trying to give them to 'use your knowledge but push the boundaries a bit'. I'd like to market this course as a 'boundary pushing' exercise.

VP: Just as an aside too. I'm working with a rather large contractor called [Name], and I described this course to them and they want your graduate NOW. I've {??} as the most fantastic course. I've been asked to get them students who will work in either Britain or Canada. So their employability and marketability and [??] is fantastic. You are trying to get them jobs. That must be one of the great things. They are biting my arm off to get them to come and see them. I need to talk to someone here about that. Who would that be?

TM2: Me.

TM1: I wonder if they felt empowered enough to make the difficult choices and make decisions about trade-offs, to say that 'ok- if you are going to [??] plan, ok you can do it, but you are going to

have to justify in terms of the expectations of the clients. I think we could have empowered them a bit more to be free. [...] I was a bit surprised that they didn't say well 'here's how we did it, and made this choice rather than doing x, y and z because we are confident the social benefits or the environmental benefits or the economic benefits – and we have calculated them and we can demonstrate the benefits in this way.' So almost to say you can push through but you will be expected to justify in social or ecological terms your design was better than a conventional design. I'd be sympathetic to them coming back and saying 'this is how we've really pushed at the boundaries and we feel that we get a better design. Whether it's because we deal with flooding in a certain way or we thought that there were certain issues that had to be treated in a certain way.' I just feel we could have done more to make them feel confident about doing that. I think it is about 'where are the points of freedom?' and whether we just completely free things up. But we were never clear I think. We were somewhere in the middle about freeing things up and...'

TM5: I don't know. I think the brief was free. I think it was well constrained in the sense that the information we gave them should have led them to definitely satisfying the vision of [name], which was social housing ..you know, in that formula. There was a formula. But most of them tried to squeak all governments in a classic { // } sort of thing. So if we want to take that away from them it will certainly broaden the brief, but we will have to constrain it by using some of the ideas that you had, you need to specifically give them flooding, or you need to have at least one structure over three storeys, or something like that.

TM4: We were inconsistent really.

TM5: I think we did sort of switch canoes part way through the race.

TM7: Well because they were producing [??] work. But I'd like to see more role play. To give them more of a sense that they are teams of consultants if you like, and they have got to sell their ideas to us, whoever we are. I wasn't in the presentations, but I didn't get the impression that they were 'making a pitch' for their ideas and their ideals. You know what I mean?

TM5: They are students and did what they do. In that respect there was a staged pitch in a sense, but there wasn't really so much of a pitch as an academic presentation. Perhaps it could have been more of a commercial pitch of their idea.

TM1: The second presentations I found were more of a pitch. They got shaped up the week before, didn't they? They put quite a lot of work in to present them in a dynamic, holistic sort of way, as in the design brief.

OS1: Was it specifically stated what the purpose of the presentation was? It seems to me that there is a bit of 'woolliness' about what you wanted and the students had to second guess what was required. I've found in the past that if you give them a very specific brief and say 'I want you to imagine that we are part of the client or council or whatever and it's your job to present your ideas to us as a competition with others. You might be a project developer or whatever'. But they generally focus on that quite well. Whereas if you just say 'make a presentation about what you've been doing for the last few weeks' it's very difficult for them to know what the requirement really is.

TM4: It could definitely be sharpened up and made more positive and explicit next year.

TM6: Some of them got the idea, and some were more technically focussed. It all depended on who they chose to make the presentation. Some of them started with 'This is our vision for the area' and those tended to be more the [Disciplines 1 &2], but if someone from one of the other

disciplines was presenting they would tend to jump more into the technical mode.[??] I think what confused them a bit was that their first presentation was about the whole site, so they knew they were talking about the Masterplan. And they thought that the last presentation was about the specific site they had chosen. They just thought they didn't have to go through the whole thing from the beginning. So they weren't really trying to sell their ideas in the presentation. [??]

TM5: Quite a few of them did say they were using their element, whatever it was, as an example of sustainable practice...

TM6: Some of them got it right. Some of them understood how the design fits within the whole project. Some of them were more technical.

OS1: I didn't see the brief, but it sounds as if there was some lack of clarity about what we wanted the students to do. I've been in this position before where you get a student who does something that's quite constrained but they do it very, very well. But you think it's a bit boring. You've seen it before. And what you'd like them to do is something that's more 'left-field' or more imaginative. But if you haven't told them that that's where they should be directing their efforts, or perhaps told them that if they stick to the conventional and do it very well then they're constrained in their top mark to 60% or something. Whereas if we can get them to come up with something more imaginative and creative and that's where the marks are, then they'll go after that. But it's not clear.

TM4: No. I think we did send out some mixed messages. But we can obviously learn from that and improve it next year.

Evaluator: It has to be said that despite that, one of the comments in the focus groups was they had all come up with the same kind of thing anyway. So there obviously wasn't that much of a problem with interpretation because they'd all interpreted something, and they were all pretty similar in terms of what they had come up with. I don't know if that was a good thing or a bad thing from your perspective? Or is just that they talk amongst themselves, and perhaps go 'off piste' a little bit, because of their discussion rather than trying to get a feel for what you'd like to see?

TM4: I don't know how much they talked to each other between groups about their ideas.

TM5: They were fairly protective of their ideas. Certainly the innovative ones. They were doing a little bit of 'What are you guys doing?'. I think there was a little bit of damage control, at least on the [??] days. Running round saying 'wow! We need to think about it this way or that way'. What was written was probably consistent with what was said, in general. That's probably why [??]. The last day was reasonably consistent.

TM4: What do people think about the idea of an extra day when they can get together? Or is 3 days enough? The extra day would be to focus on the poster more.

TM5: If that's the only day they're getting it together then they are not doing it right. We gave them three weeks! I take the point that we should get them together a little earlier so that they are in their groups, and maybe they can do the [site] trip having had at least a day beforehand. The trip was on the first day of the module wasn't it? We could invite them in for one more session on the first day of the module before the talks start and to get them segregated so at least they are sitting together and can have coffee together or something. Rather than an extra day. I'm wary that we are on a schedule.

TM2: I guess the problem this year was they spent the first day getting to know each other, did some work on the second day, and the third day was the day of the assessment so they already had to have the poster ready by then.

TM5: The three days was scheduled for us *all* to get together..

TM2: Oh yes. They needed to get together in between those times.

TM4: There was a point about the shortness of those days that [??] and we had to put the presentations after lunch, about 3, and that didn't give them much time to do anything. I think what they tended to do was divide the work up, didn't they? And say 'Well you go off and do the graphics' or 'you do the technical bit'.

TM5: That appeared to be the case. I don't know about the other disciplines, but certainly in [Discipline 5] in weeks 7-9 they've got that module only and there's nothing else they have to do. [??] it really depends on whether everyone else is similarly available. If they weren't, then they may well have struggled to get time outside the interaction days. And if they did, they could really explain why they struggled to get [??].

TM4: In [Discipline 3] they are working on final year projects and doing other modules as well.

Evaluator: I got the impression there were some timetable issues in terms of getting time together to actually meet.

VP: Would it be a good time to run it in the Autumn, or is that a whole new timetabling problem?

TM2: It probably would be.

TM5: Last year in [Discipline 5] this ran in weeks 13-15, and 'to a man' they weren't satisfied with that at all – running it late with the exam period. Not popular at all. At least from my end they were much happier this year.

TM4: The issue that comes out a lot is the credit weighting, isn't it? Some people saying it meant a lot to us in terms of credits, but other people it meant less to and therefore they felt less inclined to put in as much work.

Evaluator: I think there was a perception that that was what was affecting people's willingness to put in equivalent contributions. For some of them they were saying that they could understand why that's the case, but maybe a peer assessment component would recognise this when it came to the assessment mark.

TM4: What do people think about peer assessment?

TM2: What was the weighting for different departments? I thought it was quite high? I know it was 100% for [Discipline 5], it was 50% for [Discipline 3].

TM7: The poster and the presentation were 32% and their [Discipline 5] individual reports was 18

Evaluator: It was 10% for [Discipline 1].

TM6: They were very angry.

VP: Were they?

TM2: 10% isn't much. You can't get anyone to work hard for 10%. Can we persuade them to up that a little bit?

[Silence – no representative present from Discipline 1]

Evaluator: In terms of what they achieved, you've said a little bit about what they achieved, but how does this match up to what your expectations were of what they would be able to demonstrate at the end of the course.

TM6: We went through the reflective essays that students wrote. And I think they all recognised {??}, and in the reflective session we had afterwards they actually said maybe it's not about the disciplines themselves, it's about the people. I think that was something else that they learnt. Because they don't get those kinds of reactions or that sort of interest because of the different disciplines [e.g. Disciplines 1, 3, 5], it's the different personalities involved they learnt to work with different people. And some of them decided to assume the leader role, others were fact finding [??] They learnt something useful, but it was not about [??].

TM5: Thinking about that in the context of Peer Assessment – it will be dangerous. Classic group dynamics is that there is always going to be a leader and there's always going to be followers. The followers don't necessarily 'chip-in' less (certainly in terms of intellectual input). And yet Peer Assessment often reflects the hierarchy in the group itself, because the leaders drive that issue as much as anything else. There's good and bad of Peer assessment, and am wary of it because of that. Especially in a group where there's 8 or 9, there will always be 2 or 3 on the fringe. They won't get rated as high because they won't stand up for themselves.

VP: And we need the kind of people who will do the work as well.

TM5: Yes, you need people too who will get in the trenches if groups don't work. If you've got 8 leaders, they fail.

VP: Exactly.

TM1: My sense from our students was that it was mainly the [Discipline 1s] who were the issue, due to the credit rating of their..., possibly not pulling their weight. I think they felt that [Discipline 1s] were so important, or maybe the difference was whether the [Discipline 1s] entered into the spirit of it or just going through the motions. I think that would be a significant improvement if [Discipline 1s] were embedded more to make sure they were pulling their weight.

TM4: I think there are a hundred things going on here.. But one of the [??] was the graphic skills. And although I think [Discipline 5s] do..[??]. They were very central to.. [??] and yet at the same time they were conscious that they'd got this big design project. This was just a small part of it. They were doing the design work back in our section, and they were obviously trying to give it an appropriate amount of time. And the other thing is that the [Discipline 1s], and I think I'm right in saying this, have had two years out, or a year out in practice. Then they come back and do this project. Whereas students like [Discipline 2s] haven't had any time out. And they are a lot more confident and a lot more experienced, the [Discipline 1s]. That leads them to take on a leading role. So there's this contradiction between their role in the group and the amount of time that they feel they feel it deserves really. And that leaves everyone else feeling a bit vulnerable. A good example of that was on the second [interaction] day, when one group was sitting there feeling glum. I said to them 'What's wrong?' And they said, 'Our [Discipline 1 team member] hasn't turned up. And he's got all the graphics and everything on his computer.' And we had to give them a bit of space, and say 'well you've still got a brain, you can still think about it'.

VP: But when we had [??] we didn't have [Discipline 1s].

TM4: No we didn't.

VP: And the graphics that came out were very good, you know.

TM4: Yes

TM5: If they are pushed, the [Discipline 3s and 5s] can do graphics. They can do it.

VP: That's a good point.

TM5: I don't think it's the graphics that is necessarily the issue with the [Discipline 1s]. It's their vision, or their ability to incorporate innovative design into whatever it is they're thinking of putting on the site I guess. But I was just wondering if there might be some way..I'm thinking [Discipline 5s], week 7-9, this is their thing. This is their world for 3 weeks. They think nothing else. 'Cos there's nothing else to think about, except maybe their dissertations. And most of the time, what they do is their dissertation is reflected in this project anyway. A proportion of it. They are doing SUDS, or whatever it is, structural things. It turns up in both places. [??..] It's not like they are wasting their time. Where some of the other departments or disciplines are carving of 10% of their time, or whatever it is. I don't know how we could construct this in the groups, but maybe engineer the groups such that everybody's not expecting the [Discipline 1s] to pick up more than 10%. Maybe we just be transparent and say 'well you're a [Discipline 5] this is 50% of your mark, or 60%, if that's put in the brief they will all know the [Discipline 1s] are going to invest 10% of their time and maybe nothing more.

VP: But that will relate to the real world. You know. You've got [??] and [Discipline 1s] and ...[??]

TM5: I'd love it if students thought that this was 'real world'. But they're more pragmatic than that. They'll put in the bare minimum to get through.

VP: Yes, but if they know your bare minimum relates to your job budgets, then that's the same kind of thing. Are we having [Discipline 6s] next year?

TM2: I hope so.

VP: Because that would help a lot if you had [Discipline 1 and Discipline 6s]...[??]

TM1: But also there were ways that the brief was set out that did give up [??] of students. So ...{??} I think they all found they were working as equal status in terms of picking through how you might deal with that site and what you might want to put on it. We probably suggested that [Discipline 1s] would have a slightly greater role in doing that. I think I'd like to challenge that, and say well ' [Discipline 1s] aren't the only people who can think about how people [move through?] estate. We all do it. We've all got our own knowledge. And I think that also changed as the project went on, was that notion that it will be based on a particular site, the final design, which I think privileged the [Discipline 1s] then, as the [??] as to how you think about the site as relating to the wider site. And if you are saying that the site design should encompass or encapsulate some [Discipline 1 component] then it was [Discipline 1s] that took on the role of providing the building. Whereas that one project doesn't necessarily need to be a [Discipline 1's] project. It could be a different way of thinking through space. In the presentations we were trying to get them to say 'don't take a building, take [tran]section through the site, or think about connections as your focus', which I think took away from having to wait for the [Discipline 1's] to come up with the big idea. Whereas some of the other groups that hadn't had the [Discipline 1s] coming up with a

landmark building as a centrepiece of the presentation, which changes what was particularly effective as a whole.

VP: Surely one of the things you are trying to get is, and I'm talking off the top of my head here, is a respect for other disciplines, and that you can start on day 1. You don't have to wait for a [Discipline 1 practitioner] to tell you what to do. And I think it's much stronger then. Because that's what's [Company name] are suggesting. You get all the skills in at the beginning so you don't treat [??] as a book on the shelf. [??]

TM5: I think it's certainly worth reminding ourselves that the sampling we have from the feedback is a single sample from one year. It's not exactly a statistical representation of the quality of the course so.. We need to keep that in mind.

TM4: It could be exactly the opposite next year.

TM5: It *could* be exactly the opposite next year, or we could make changes and they won't like it anyway.

TM4: One of the reasons we were [??] was that there were requirements on some of the courses to demonstrate the technical aspects of design. And I'm not sure we are there yet. There's a [??] that the [Discipline 1s] were the source of that.

TM5: It's a combination of the two. I think its was predominantly...Well I asked them to give me a structure. It didn't have to be a building. It could be anything as long as you show me sustainable 'cradle to grave' considerations.

TM1: And I liked it when they did a structure rather than a building. Because when they justified why they chosen that structure in the context of the site...

TM5: In the reports that I've marked I could see where they selected a structure they are actually happier, because they've done buildings to death in our department. They've done them since year 1. So they were doing something else. And you could see in the writing they were far more enthusiastic about it, and maybe put a little bit more effort into it. In order to satisfy the [Discipline 5] component ...

TM4: [??]

TM5: Of course it could. So we repeatedly mentioned monorail, or things like that. It incorporates all the structural elements. I mean we repeatedly pushed transport and not many people spent a lot of time thinking about it. I think there's an electric bus or something in there.... Instead of something more innovative. Such as a local transport system fuelled by the local rat population or something..anything!

[??]

Evaluator: What did you think of the posters? Did they come up to your expectations? Or were they disappointing?

TM5: I don't know about being disappointing. They were decent quality. There were a couple of different takes on 'poster'. Some of them were 3D, which is quite interesting. Although they were a little hard to read. They put in little panels, and when you opened the panels ..

VP: Fantastic!

TM5: Some of them were better than others in terms of their layout and that kind of thing. But I don't think I was disappointed. There was no bickering this year about the cost of doing them, or anything like that.

TM4: That's because we paid for them.

Evaluator: Is that something that you'll continue to pay for, or will it come back in that students will have to pay for them themselves?

TM4: No, I think we'll pay for them. I think one of them cost £20 or so. [??...]

TM4: I think hearing everyone's comments who were on the judging panel about the presentations, they were pretty positive mostly. There was obviously some criticism about the most of text [??], but they weren't saying [??]

Evaluator: I think one of the things that came up in the discussion with students was that they were worried because the potential winner would be entered into an external competition, that clearly one of the criteria, despite the fact they were told that it would be the 'prettiest' that that would be something that would be taken into consideration in the marking that it would be shown externally.

TM4: The idea was that they would have some time after the presentation to prepare for the poster competition. Some students are actually doing this at the moment..working on their poster, taking into consideration the comments from the judges about the []. Obviously they are not as enthused about that because they do have other things to do.

VP: I'm sorry are you [??] they don't communicate them? They should do them well.

TM4: Well they did, actually.

TM1: I was impressed by the quality across the board. I think they were better than we could have expected given the time constraints and the way they were working between times. Particularly in that last week between having to do the presentation and the poster. What they produced meant them having to work quite quickly, sometimes changing their ideas, quite radically I think on the basis of the problem given.

VP: But that's great.

TM5: It's sort of ironic that three years ago this course ran in week 7-9 right, and all the students reflected favourably on the Easter break that it had given them extra time to put more 'value-added' in. Last year, and the year before last, it was in weeks 13-15 and they had no time to do any [?] before that. This year they had that extra two weeks and not one of them said that they benefited from that extra time, which I thought they'd use. But they didn't. I think that if next year we make it quite clear that they make use of that two week period they might benefit. I don't know, they might. There certainly was a lot of panic in that last week.

VP: Can I ask a question? What did you guys think was most memorable for your teaching? Was it more fun, or boring? What was your experience?

TM5: I quite enjoyed it. The interaction days were quite good. Sometimes the groups disappeared and we didn't see what dynamic was going on. But for the ones that stayed in the room they came, they asked questions that they needed to, so they were useful for them that there was somebody around to answer some questions. I didn't see any [??]

VP: It was that time in the morning that gives it away.

TM5: I believe strongly in the core content of the course. It's got all the elements. I think the lectures that I managed to see this year,(and its going to be the same problem next year because i teach two modules at the same time, so I'm in and out all the time), the ones that I saw were fantastic. And I tell you, [Name]'s talk about flooding caught their imagination like you would not believe. Because they all thought they were flooding.. [??]

VP: 'We're going to drown!'

TM5: I think it's very inspirational right across the board for them.

TM4: I thought the lectures were excellent. They were really focussed on what they needed to know.

Evaluator: I think there was mixed feedback about the programme. I didn't think the [Discipline 5s] really liked it, but the [Discipline 1s] did.

TM4: There was a poor turnout sometimes. I don't know why that was, whether people had other classes or not.

TM2: I don't think the location really helped our students, because they were having to go to other modules at the same time, and it wasn't easy just to pop down there. So hopefully next year we will have something better sorted.

TM1: I think attendance went down slightly, but that was [??] it got a bit long. But there is a lot to cover.

TM5: And there could feasibly be two lots of lectures next year.

TM1: Now we've got a lot of lectures on the WebCT site. So if they miss anything next year they can still catch up on it.

TM2: What might be better anyway, is to put them in groups beforehand, there's ways of using that with events so that when you do break it up over the term [??] and they've got to be there..

Evaluator: Can I just ask about the site visit? That was one of the things that the students who went said was really helpful in giving them an insight to the project, seeing the location. But from what I heard from some of the students, the turnout for that wasn't good. I don't know about the exact numbers.

TM4: About two-thirds.

Evaluator: OK. I just wondered if there was some issue that prevented some students from going, that would have prevented them from benefiting from the trip?

TM2: I actually had an assessment on that day that students had to do, that was part of my wider module. They had to build a website and put some stable features of [site name] on it.

TM5: That first week, it's all provided for information. It's all provided for the project, but it's not assessed. So there are plenty of students who are saying 'if you are not going to test me on it, why should I?' There will always be a proportion of students that will think 'Bob's going- I'll think about it later on. I'll stay at home and cover my Maths', r whatever it is they need to do. There's always going to be that.

TM2: That's why having some group activity that they have to be there for is a good idea.

TM1: I was surprised by how many people didn't go back. I am shocked that they would only think of going to the site once. [??] They didn't bring the site to life. It could have been a site anywhere. And yet...[??]

TM6: They wanted us to organise more field trips. They were very over-reliant on us to organise another [go?] for them.

TM1: Maybe we could recommend, that once they are in their groups together, they might want to go back again and..

VP: Have you been clear to them that it's not all going to be fed to them, you know, that they *can* go back to the site on their own, and they *can* work together outside the interaction days? Because you're asking them to find out a lot of technical information and apply it to something practical. But there are kind of mixed signals. And that's the bit...

TM2: They are in their 4th years. They should be used to having to do that. They will have had to have done it in all projects that involve group work.

TM5: I think they have spent three and a half years, don't take any offence, but being somewhat spoon-fed. They go through modules and it's all written. There's not a lot of that kind of freedom. It's not the first time they've worked in groups, but it's the first time they've worked in a multi-disciplinary group, where the initiative is on them to get together. And I don't think a lot of them [??] that. I don't know why, but they phone each other on a Friday evening and say 'Let's go down the pub' and they all manage to get there. So they can do it.

VP: It's an alien skill!

TM5: In other words, it's not impossible for them to do, but it didn't occur to them. I suppose we could forgive them that. But it does seem rather obvious, doesn't it?

Evaluator: But the issue was that the [electronic] resources that were created were so that they didn't necessarily have to go to the site to get some insight. And clearly they didn't make that much use of them either. Whether it was because they got buried? Quite often they were more reliant on their own pictures that they had taken, so they didn't necessarily need to look at the pictures that were on the [WebCT] site. But I did look at the WebCT stats, and that of all the things that were used, those have been more used than anything else. But I think that may be reflective of the fact that a lot of the things you can visit really quickly and print off. Whereas with those sort of images you maybe have to stay in there to ...

TM2: I've actually been using them in lectures to explore the interdisciplinary project. I've a feeling that a lot of the students wouldn't have known too much about them, but next year we need to, early on, make them aware of what's on. We need to reorganise it a bit anyway, I think. There's a lot of stuff on there, and we need to make the more important stuff stand out a bit more.

TM4: You just hope, don't you, that they might go and look at it themselves.

TM2: At least if we showed them, they might go back and find it.

TM1: One thing we could do with them is a bit more site analysis work, so they have to explain to you how the site's working. It does relate back to the question about 'do you enjoy the teaching?' I really enjoyed the teaching. I'd like to have done a lot more, but I found that it required a huge

amount of input. I did go along to a lot of the working days, because it helps you when you see their presentations. I would have liked to have spent a lot more, particularly the amount of time I've spent with them and how we worked. I think that its [??] just being there to help give advice about one or two issues, or help with site analysis. So we could give them help to think about what was going on in different parts of the site. To see if they have understood the site, and to keep pushing them so that they have to go back. I think that's the thing. If you say 'Well how does this area work?' and they don't know, you end up sending them back and saying 'you've got to work, you've got to understand this'. As I said, I would like to spend more time doing it, but ..whether we could all spend the amount of time that is required to do that?

VP: It seems to me that a lot of it is giving them the right signals at the beginning. You know 'this is the amount of information that's available. You always get a lot of information, and half of it's c**p. Part of the skill is finding out what's usable and what isn't'. [??] You need to create a [??] project. Give more signals.

TM5: We need to do it earlier on too.

VP: Because I've spoken to other people apart from [Company name], and you know if you are putting out graduates like this, this year, with this experience, they will be at the top of the list to get jobs. [??]

TM2: So we can tell them at the beginning of the course?

TM5: Are we jotting this down so that we can use it? [??]

VP: and the other one is the Academy of Sustainable Community. [Person's name]. He thinks that this course is the best, and it's the only one that's been really [done?]. You know if you can get your reputation up, and you tell your students that this course is key to them, and they all have difficult choices, then maybe they'll have more [fun?] and they'll listen.

[????]

VP: I really think that might be the answer. Saying to them that 'doing this course is really good because you'll be more employable, for these reasons'.

TM2: When they signed up, I think they appreciated that. They've got options. They come to this because of that. What I'm thinking about is promoting this course not only as an element of the 4th year, but of the whole course. Our graduates get jobs, but with this course you're 'the golden child'.

VP: Yes. I'm sure I can get someone from [Company] to come and do something with them. [??] I mean I've got people asking for [Discipline 2s] now as well.

TM5: A person like that to talk to them would be good, before they are making their selections for their 4th year. Not necessarily that I want to be grading all their reports, but as far as I'm concerned we'd take the entire 4th year class. I'd be happy. The structure's in place for it.

VP: It's interesting that this is the first time you've done it with so many disciplines. And I'm getting such a good reaction from the employers. You know they haven't even seen your lectures. But they haven't seen another University that's doing them. So that must be a positive.

TM2: Even people in the Royal Academy Scheme aren't doing anything this interdisciplinary.

VP: It's amazing! That must be the way to attract more students [??] ..more funding. [To TM2] Did you enjoy it as well?

TM2: I did. This is the first time I've done something in terms of teaching that I wanted to do. Something I put forward. All the rest of the time ..[??] I've enjoyed the first bit I did as well. I had my students something else with their other 50%, doing web sites, we did a mock planning meeting. They really got into it. Again. They'd chosen it as an option. I got the students that really wanted to do it. But not just that. They were some of the top students in the year as well, which was good.

TM5: Courses like this develop a reputation very quickly. They will be self-recruiting in time.

TM2: What's interesting as well, is that a lot of our students, our top students, are going on to work in building services. And I've never seen this happen before.

VP: Really?

TM2: No. We don't teach anything for it. So..I hope it's because of doing this module. For some of them it is.

Evaluator: Yes. Some of them said specifically in the focus group that they thought it would be a really good compulsory module for people thinking of going into building services, and that if students were thinking of that as a career direction then they really should be steered towards this module.

TM2: I don't think we'll be able to make it compulsory. There's nothing compulsory in the 4th year except the final year project so...[??]I just tried to keep the numbers down this year because I've got too much teaching.

[???

TM3: Well I think it's a great course. I've enjoyed being involved with it again. But it was a little bit frustrating because, working with our students who were working as though they were supposed to be a consultancy company. Just because they were on the edge of things. There was only 4 of them, and they weren't kind of 'embraced' by the other groups. That was perfectly understandable, because they hadn't worked with each other either. The groups themselves were having a hard enough time trying to get on with what they had to do. But I don't know how you would address that. Maybe if we had a bigger group.

VP: Maybe that's another thing you should put into the beginning brief. Here we have this group of consultants, and you have to negotiate and work with them as well.

TM3: I think it does need to be made more explicit what their role is. I don't know if it needs to be directed though. They have to have 10 minutes consultancy with them, or something, and they've got to take notes of that meeting.

VP: 'We are aware that the client has already taken on a consultant and you have no choice, you have to talk to them'.

TM3: There needs to be some direction to become more involved with them.

TM4: Do you think it will happen again next year, because [name]'s message seems to be a bit ambiguous about whether ...[??]

TM3: Yes, if we can get it more organised, get it to work better. Because the other thing that happened was, of our students, all 4 of them tended to work individually. They didn't work together as a group either. So I think it needs work from both ends. It's the first time we've done that module.

TM4: So you'll know later in the summer what you've got to do for next year?

TM3: Yes. But I think we can restructure.

TM5: Certainly it becomes more straightforward if there's one for each group [??]

TM3: Yes

TM5: It would be great if we could get the number of students to match the number of groups we have. And if we increase our numbers as well. We need to have more groups or bigger groups. Maybe that's defined by the lowest representation from the discipline. We can't have 8 groups if we've only got 6 [Discipline 2s].

TM1: I think we are going to make it [??]. What we are going to do I think is run another integrated project, and over the weeks students will have to take one of the two. As it stands at the moment they take a free choice option. What it will mean,.. would be we will have more this year but at the end of the course they finish everything else. We will run those two in parallel, so that all students have got to be here at the end of term. I would think we would be up to around 10-15.

VP: [Asks TM6 if she enjoyed the teaching]

TM6: I think I got more learning out of it because [??] I've got an interest in group work. How they actually work together. And we talked to them about what were their actual perceptions before they actually worked together, and what did they get out of it. And just looking at [??] just to see how they think about the problem. Whether they looked at it in a more innovative way, or whether they just decided to {????}

TM1: They wanted to do more work, didn't they? We set them a reflective essay. But they said they would have liked to have written a report which presented the [Discipline 2] perspective on what happened. We should perhaps do that with them, as well as the reflective element next year.

Evaluator: Yes. That came up in the focus groups too. All the other students in the group laughed when somebody suggested it should be made compulsory for them. [??] I think it was an issue of them having something concrete to take away to show an employer and say, 'this is what I've been working on'. With the posters they couldn't do that because there is only one, and we've already talked about the expense of producing them.

Evaluator: I'm conscious of time. I've got one more question I'd really like to ask, and then I'll sit in on the rest of the discussion in case there are other things you want to discuss that might give me insight into the evaluation if that's all right. What I'm particularly interested in is what advice you might give to other groups of staff coming together for this kind of interdisciplinary project. What kind of issues have you had to face and how have you overcome them.

TM7: We needed an accountant.

TM2: It's taken us a long time to reach this point as well. Don't imagine that you're going to do it quickly.

TM5: Inspiration.

Evaluator: How long *has* it taken to get to this point?

TM4: Four years I think.

TM2: And we had other goals in the lead up to this. It really is about introducing sustainability into the curriculum, not just running this interdisciplinary project.

VP: [?????]

TM5: I can say I detect it reflected in their outputs necessarily, but I can't say it didn't affect their thinking. I know a few of the students from last year have gone on to do graduate work here on these topics. So I suspect they have been swayed somewhat. So if you take 10-15% of the graduates and turn them into something else because of the inspiration this project has provided, then I think it's done its job.

VP: I think so too. Although sometimes it's quite hard to get {??}

[General discussion about who were speakers and which were particularly inspirational]

Evaluator: Will you use those speakers again?

TM4: Yes

Evaluator – thanks for contribution etc...

[End of discussion]

(vi) Key points from discussion with teaching team, 2008

Evaluator was invited to attend a team meeting. A recording of the meeting was not made.

Present were 5 members of the teaching team and the evaluator.

Following a summary of the key issues arising from the student feedback in 2008, notes made from the meeting recorded the team's reaction in relation to:

Group composition

The team discussed the difficulty of getting the team size right. With the small groups of 2007 there had been issues with some personalities dominating the group. This did not happen in 2008 with the larger groups, but this allowed people to hide instead.

The determinants are:

- (i) the number of students in the smallest group (in 2008 14 students in Discipline 2 allowed for 2 per group).
- (ii) the number of staff available, and the time available for judging the posters.

The team thought that to handle more groups they would need either more time [full day] with one judging team, or two judging teams and more space so that there can be parallel presentations. The latter would mean some inconsistency in marking between teams. The team therefore decided that in 2009 they would try to get a room for a whole day so that there could be more groups.

Pattern of teaching/interaction

It was noted that in 2009 the pattern would be to have the site visit and first two interaction days before the Easter break, with the final interaction day after the Easter vacation.

Participating departments

It was reported that [Discipline 2] might not be involved in 2009. It was more peripheral to their curricula. However, [Discipline 6] were still interested in coming on joining the collaboration. The team intended to use the student feedback from 2008 to try and persuade them to come on board. The team thought they should advise them that they would need a minimum number of students to make this worthwhile, so that there can be at least one [Discipline 6] student per group, and also so that it would be worthwhile for the effort they would need to put in. They suggested around 12-14 would be viable.

Assessment

The team also decided that they might try peer assessment after all in 2009. [Discipline 5 students were in any case doing this for other group work. Evaluator gave the name of Educational Advisor who may be able to help find/provide further info.]

Resources

Finance for 2009 was highlighted as an issue, as there would be no further funding from BiC. This funded things like the site visit, visiting lecturers, and the project co-ordinator's salary. The team decided they needed to do a cost analysis and ask each department to allocate some of their

budget to the project. [Again student feedback could be used to demonstrate how worthwhile the students find the course.] It was suggested that a postgraduate student might become involved in the teaching team to do the co-ordinating work.

Finding a new site was also becoming an issue. The team would use [original site] for one more year, but need to have agreed a new site by Christmas 2008 (hopefully in Sheffield) and start developing the resources over 2009. There would be some costs associated with this, but hopefully some efficiency gains as the team now know the kind of information needed, what works, and how to go about putting the resources together.

(vii) Student tracking data from VLE, 2007 (excludes Discipline 4)

Student	First Access	Last Access	Sessions	Total Time	Web Links	Content Folders	Files
					Viewed	Viewed	Viewed
001	08-Mar-07	08-Mar-07	2	00:29:01		5	
002	05-Feb-07	18-Apr-07	11	03:49:42	2	132	85
003	04-Mar-07	16-Apr-07	5	01:10:14	4	153	94
004	22-Mar-07	22-Mar-07	1	00:01:38		6	2
005	20-Feb-07	20-Feb-07	7	01:08:22	14	17	10
006			10	02:09:22	23	47	15
007	07-Feb-07	17-Apr-07	15	02:16:46	20	83	29
008	22-Feb-07	13-Apr-07	11	01:48:32	6	51	6
009	24-Mar-07	14-Apr-07	3	01:54:25	1	56	26
010	06-Feb-07	11-Feb-07	10	00:42:17		34	15
011	06-Feb-07	22-Mar-07	2	00:06:26		5	1
012			4	01:14:05	13	32	11
013	14-Mar-07	14-Mar-07	1	00:05:07	2	11	4
014	13-Mar-07	28-Mar-07	2	00:42:24		14	6
015	13-Feb-07	13-Feb-07	3	00:05:16	3	6	
016	07-Mar-07	07-Mar-07	4	00:06:00	1	10	4
017	25-Mar-07	19-Apr-07	6	01:53:03		14	10
018	15-Feb-07	17-Apr-07	5	00:10:55		31	12
019	17-Apr-07	19-Apr-07	4	00:22:53		19	12
020	03-Mar-07	19-Apr-07	11	01:49:58	6	51	49
021	06-Feb-07	21-Mar-07	8	02:22:20	8	63	42
022	05-Feb-07	19-Apr-07	5	00:27:49		50	13
023	22-Mar-07	22-Mar-07	1	01:03:26	1	30	6
024	23-Mar-07	18-Apr-07	3	01:13:33	1	57	17
025	15-Feb-07	19-Apr-07	6	01:31:14	2	11	3
026	20-Mar-07	20-Mar-07	1	00:45:02	1	9	17
027			3	02:03:49	11	18	2
028	13-Apr-07	20-Apr-07	4	01:23:28	1	56	28
029	18-Mar-07	18-Apr-07	17	02:02:00	7	79	28
030	17-Apr-07	17-Apr-07	10	02:20:00	8	49	43
031	16-Mar-07	19-Apr-07	6	03:01:59	1	66	111
032	04-Feb-07	18-Apr-07	5	00:11:20	1	56	10
033	20-Feb-07	17-Apr-07	8	05:13:55	3	92	33
034	15-Feb-07	19-Apr-07	16	03:20:32	2	140	68
035			4	00:06:56		11	6
036	16-Mar-07	04-Apr-07	3	00:05:50		12	7
037	15-Feb-07	15-Apr-07	10	02:07:51	2	90	35
038	02-Feb-07	02-Feb-07	4	00:25:06		14	10
039	06-Feb-07	21-Mar-07	10	02:06:55	7	101	47
040	23-Mar-07	06-Apr-07	8	00:46:05	1	83	38
041	03-Mar-07	15-Apr-07	17	10:07:38	18	169	100
042	22-Feb-07	19-Apr-07	9	00:37:00	3	40	17
043	18-Apr-07	18-Apr-07	5	00:15:13		34	6

044	07-Feb-07	12-Mar-07	17	02:09:00	11	57	24
045	22-Mar-07	17-Apr-07	10	02:07:00	3	84	50
046	15-Feb-07	19-Apr-07	4	00:07:21		17	12
047	22-Mar-07	28-Mar-07	3	00:22:11	2	65	19
048	04-Feb-07	04-Feb-07	1	00:03:15	1	2	1
049	14-Feb-07	10-Apr-07	8	03:13:00	8	132	93
050	22-Feb-07	22-Feb-07	2	00:04:31	1	3	2
051	07-Mar-07	17-Apr-07	7	01:57:08	5	150	73
052	06-Feb-07	21-Feb-07	14	04:34:00	8	84	51
053	21-Mar-07	18-Apr-07	7	01:27:34	1	38	53
054	22-Mar-07	18-Apr-07	11	03:04:09	7	221	64
055	06-Feb-07	16-Apr-07	8	03:28:47		111	63
056	26-Feb-07	13-Apr-07	7	01:03:49	7	75	54
057	08-Feb-07	08-Feb-07	5	00:19:00	11	26	11
058	18-Apr-07	19-Apr-07	3	00:51:57	1	38	14
059	19-Feb-07	16-Mar-07	9	00:22:36	8	61	14
060	08-Feb-07	05-Mar-07	14	01:06:18	8	48	23
061	12-Mar-07	21-Mar-07	9	02:09:00	5	32	19
062	07-Feb-07	18-Apr-07	9	00:34:23	5	39	19
063	07-Mar-07	15-Apr-07	4	00:38:34		40	28

Appendix 4

Summary of other case studies

	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 4	Level 1* UG Students (38 2005, 80 2008)	To enhance students' understanding of the design process, and the use of a personal 'sketch journal' within this process to record reflection and sources of inspiration.	To provide access to resources intended to stimulate creativity and discussion about the creative design process. Resource captures design processes of different professionals which cannot be replicated year-on-year by face-to-face contact.	Multimedia DVD	Evaluation planning meetings and telephone conversations with project leader 08/05 & 09/07 Student questionnaires 12/05 & 5/08 Email from tutor experience Observation of project materials and activities Reflective discussions with project leaders 12/05 & 07/08. Informal conversations with educational developer and learning technologist.	Notes from meetings and planning documents 37 & 60 responses respectively Summaries of feedback Bidding documents, recordings and observations from 4 discussion classes and a presentation class, prototype & final DVD Written summaries of discussions Pre-bid report and final report

	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 5	M Level* UG and PG students (86)	To help students develop understanding of aerodynamic design principles and skills in using simulation tools	Interactive computer-simulation tools to help students to visualise, apply and experiment with aerodynamic design concepts	Web-based interface to an aerofoil design tool with accompanying tutorial, flow simulation animations, videos of aerofoils in wind tunnels. All embedded in virtual learning environment.	Evaluation planning meeting with project leader 1/06 Student questionnaire 4/07 Observation of project activity & documents Reflective discussion with project leader 4/07 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting 24 respondents Summary of feedback Bidding documents, observed lecture in which resources introduced, VLE tracking data Written summary of discussion Final report

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 6	Level 2* UG students (154)	To engage students in a customised learning experience.	As a tool to enable students to self-evaluate their own learning to inform the planning of their study and revision. As a tool to enable the learning facilitator to evaluate student learning to inform the planning of a customised learning experience.	Interactive web-based quizzes embedding a range of multimedia	Evaluation planning meeting with project leader 9/06 Student focus groups x 2, 5/06 Observation of project activity and documents Student questionnaires x 2, 11/06 & 02/07 Reflective discussion with project leader 12/06 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting Written summary of discussions Bidding documents, completed quizzes 71 & 39 responses respectively Summaries of feedback Written summary of discussion Final report

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 7	Level 1* UG students (70)	To help student understanding of elementary concepts in computer programming	As a tool to help learners visualize dynamic concepts	Multimedia animations & audio commentary used in lectures and embedded in virtual learning environment	Evaluation planning meeting with project leader 9/06 Observation of project activity and documents Individual discussions with students in lab classes 10/06 Student questionnaires 1/07 Reflective discussion with project leader 12/06 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting Notes from class observation, bidding documents, VLE tracking data Notes from discussions 48 responses Summary of feedback Written summary of discussion Final report

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 8	Graduates preparing for entry into M level* PG course (6)	To improve students' understanding of statistics.	To provide access to curriculum content and interaction with other participants (staff and students). Course run entirely by distance learning.	Virtual learning environment, including discussion tools	Evaluation planning meeting with project leader 12/06 Observation of project activity and documents Student questionnaires 5/07 Student & staff discussion group 5/07 Reflective discussion with project leader 7/07 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting Project bidding documents, VLE contributions and tracking data 6 responses Summary of feedback Written summary of discussion Written summary of discussion Final report

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 9	Level 3* UG students (20 2007, 10 2008)	Helping students develop (i) improved perceptions about working with service users (ii) improved awareness of the issues surrounding the involvement of service users in research and evaluation, (iii) critical inquiry skills, and (iv) confidence in their application in contexts that involve working with service users.	To capture and make available to future students, the first group's experiences with service users (since this could not be replicated every year)	Multimedia resources (hypertext, audio, video) presented on CD-ROM	Evaluation planning meeting with project leaders 4/07 Observation of project activity and documents Student focus group x2 5/07 and 5/09 Student questionnaires 5/07 Reflective discussions with project leader 6/07 & 6/08 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting Bidding documents, CD resource, student presentations & activity in class Written summaries of discussions 7 responses Summary of feedback Written summaries of discussions Final report and case study

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 10	Level 2 & 3* UG students (37)	To help students to engage with and understand the historical context of recording and how this is constructed from different perspectives	As a tool to give lecturer and student seamless access to a range of copyrighted audio files and written documents	Multimedia embedded in virtual learning environment	Evaluation planning meeting with project leader 9/07 Observation of project activity and documents Student questionnaires 3.08 & 5/08 Reflective discussion with project leader 6/07 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting Project bidding documents, produced multimedia and VLE tracking data Problems with online questionnaire – relied on depts questionnaires Written summary of discussion Final report and case study

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 11	Level 0 pre-sessional UG students	To improve non-native English language speakers' listening skills in English	To give students access to simulated access, at lower cost than using 'live' lectures	Multimedia (video and associated materials) on CD-ROM	Evaluation planning meeting with project leader 3/08 Student questionnaires 5/08 Telephone discussions and email correspondence with tutors 5/08 Reflective discussion with project leader 7/08 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting 10 respondents Summary of feedback Notes from discussions and emails Written summary of discussion Final report

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	Learners	Purpose of learning	Role of technology	Technology used	Data collection methods & approx dates collected	Data available
Case 12	Level 3* UG students (35)	To help students understand the equipment and techniques involved in drilling boreholes in different contexts	To make more accessible existing video of borehole drilling methods. To allow students to learn new concepts at their own pace.	Multimedia embedded in VLE with tutorial content	Evaluation planning meeting with project leader 1/08 Student questionnaires 5/08 Reflective discussion with project leader 7/08 Informal conversations with educational developer and learning technologist.	Planning documents and notes from meeting 25 responses Summary of feedback Written summary of discussion Final report/case study

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