

**Napier University**



**The Managed Learning Environment  
in Scottish Higher Education: A  
Socio-technical Exploration**

**By David Edwards**

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## ABSTRACT

This thesis presents a socio-technical account of the adoption and development of Managed Learning Environments (MLE) in three Universities in Scotland. The term 'development' is used here to refer to the way that MLE initiatives evolve over time as the MLE framework is introduced into the universities discussed here. MLE is a technology framework that has been advocated by Funding Agencies and the Joint Information Systems Committee (the government body responsible for developing information systems in UK Higher Education) as a way of creating an institutional technology platform through which a University can create more efficient and effective online teaching practice and student management processes. This involves integrating all University information and learning systems into one standardised institutional system.

Introducing a large-scale I.T. initiative, such as MLE adoption and development, into the University is far from straightforward. Sectoral research indicates that MLE initiatives have not, in general, achieved the level of standardisation and integration of systems advocated in MLE policy. It suggests this may be because MLE initiatives have underestimated the social and technical complexity involved in MLE adoption and development. This has led to a call from within the Higher Education sector for more in-depth case study research of MLE initiatives in Universities in order to better understand what constrains them.

The research reported on within this thesis adopts a socio-technical approach to understanding MLE adoption and development. This aims to understand the processes of interaction between technical and social elements involved in MLE initiatives. In particular, it analyses the influence of the broad social, political and commercial context of MLE advocacy on MLE initiatives in the case studies as a way of accounting for their different trajectories of MLE development.

The thesis presents an examination of the way that actors in the case studies develop and construct expectations of MLE in practice that can drive MLE initiatives but, it is found, also constrain them. As a way of investigating how

expectations for MLE adoption and development are constructed by participants in the case studies an analytical framework is developed that includes Technology Framing (Orlikowski & Gash, 1994), Computerisation Movements (Iacono, 2001) and an Ecology of Games (Dutton, 1995).

The study develops several key insights regarding MLE adoption and development in the case studies that relate to the influence of the broad social, political and commercial context of MLE advocacy. It finds that advocates of the MLE framework bring MLE expectations and artefacts into the University through engagement with wider networks of influence in this broad MLE 'landscape'. In an alternative pattern of socio-technical interaction, some groups counter frame MLE and seek an organisationally autonomous approach to technology practice.

The MLE framework is found to be shaped in multiple locations, multiple levels and across a trajectory of events and interactions. In this pattern of technological development, the research demonstrates the key role of boundary dynamics and gate keeping within Universities, as MLE actors negotiate the boundaries between the University and the dynamics of the wider MLE 'landscape'. It is found that this process challenges established University gatekeepers and boundaries of socio-technical practice. In the Higher Education sector, rather than creating a 'level playing field' in UK Higher Education between well resourced and less well resources Universities, as first envisaged in MLE related policy, MLE adoption and development is found to be associated with defining distinctions between the case study Universities.

## Contents

Table of Contents.....	i
List of Figures .....	iii
List of Tables .....	iv
Glossary .....	v
Acknowledgements.....	vi

## Table of Contents

<b>1 Introduction.....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 Research Rational .....	1
1.3 Research Aims .....	3
1.4 Methodology .....	4
1.5 Structure of Thesis .....	5
<b>2 Evolving Trajectories of Managed Learning Environments in the UK Higher Education Sector .....</b>	<b>7</b>
2.1 Introduction.....	7
2.2 The Managed Learning Environment Framework.....	7
2.3 The Higher Education Context of Managed Learning Development .....	12
2.4 The UK Higher Education Landscape .....	15
2.5 The Scottish Context.....	37
2.6 Summary of UK Higher Education Managed Learning Environment Landscape .....	43
<b>3 Evaluation of Socio-technical Literature .....</b>	<b>46</b>
3.1 Introduction.....	46
3.2 The Adoption and Implementation of Information Communication Technology in the Organisational Context .....	47
3.3 Evaluating Case Studies of Information Communication Technology Adoption and Implementation in the University .....	53
3.4 Developing the Theoretical Framework .....	63
<b>4 Research Methodology .....</b>	<b>91</b>
4.1 Introduction.....	91
4.2 Research Approach .....	91
4.3 Undertaking the Research .....	98
<b>5 Case Study N: The New University .....</b>	<b>112</b>
5.1 Introduction.....	112
5.2 Trajectory of Educational Technology Development.....	114
5.3 Technology Framing.....	122
5.4 Managed Learning Environment Computerisation Movement Technology Framing .....	123
5.5 Managed Learning Environment Computerisation Movement Structural Influence .....	126

5.6 Managed Learning Environment Development as an Ecology of Games...	127
5.7 Summary .....	140
<b>6 Case Study M: The Modern University .....</b>	<b>144</b>
6.1 Introduction.....	144
6.2 Trajectory of Managed Learning Environment Developments .....	146
6.3 Technological Framing .....	149
6.4 Managed Learning Environment Computerisation Movement Technology Framing .....	150
6.5 Managed Learning Environment Computerisation Movement Structural Influence .....	158
6.6 Managed Learning Environment Development as an Ecology of Games...	163
6.7 Summary .....	167
<b>7 Case Study A: The Ancient University .....</b>	<b>170</b>
7.1 Introduction.....	170
7.2 Technology Framing.....	171
7.3 Trajectory of Managed Learning Environment Development.....	171
7.4 Managed Learning Environment Computerisation Movement Technology Framing .....	179
7.5 The Framing of Managed Learning Development at University A.....	182
7.6 Managed Learning Environment Computerisation Movement Structural Influence .....	185
7.7 Managed Learning Environment Development as an Ecology of Games...	186
7.8 Summary .....	198
<b>8 Discussion of Analysis.....</b>	<b>201</b>
8.1 Introduction.....	201
8.2 The 'Managed Learning Environment Game of Commercialisation' .....	201
8.3 Key Insights .....	209
8.4 Summary .....	218
<b>9 Conclusions .....</b>	<b>219</b>
9.1 Introduction.....	219
9.2 Revisiting the Research Aims.....	219
9.3 Research Challenges .....	224
References.....	230
Bibliography .....	240
Appendices.....	245

**List of Figures**

1.1 Elements of MLE	10
2.1 MLE Trajectory in the UK Higher Education Landscape	36
5.1 MLE Game Trajectory at University N	141
6.1 MLE Game Trajectory at University M	168
7.1 MLE Game Trajectory at University A	199
8.1 Resource Flows between MLE Games	204

## List of Tables

2.1 Aims of the MacFarlane Report	19
2.2 MLE Constituents	44
3.1 MLE as a 'Standard Model' of Organisational Digitalisation	50
3.2 Technology Adoption and Implementation Processes in Local Context	63
3.3 Technological Adoption and Implementation Processes with Technology Framing	68
3.4 Structural elements of an MLE Computerisation Movement	72
3.5 Evaluation of the MLE as a Technology Action Frame	74
3.6 Evaluation of CM Framing Processes	79
3.7 CM Master Analytic Framework	82
3.8 Dimensions of an Ecology of Games	87
3.9 Illustration of the Alignment of Computerisation Movements and Ecology of Games perspectives	90
4.1 Research Approach	93
4.2 Case Study Methodology	98
8.1 Array of MLE Games	202
8.2 MLE 'Hierarchy of Games'	202
8.3 'MLE Game of Commercialisation'	208

## **Glossary**

Becta - British Educational, Communications and Technology Agency

CM - Computerisation Movement

DfES - Department for Education and Skills

HE - Higher Education

HEA - Higher Education Academy

HEFCE - Higher Education Funding Council for England

ICT - Information and Communications Technology

JISC - Joint Information Systems Committee

MLE - Managed Learning Environment

SHEFC - Scottish Funding Council for Higher Education

SFEFC - Scottish Funding Council for Further Education

SFC - Scottish Funding Council

VLE - Virtual Learning Environment

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## ***1 Introduction***

### **1.1 Introduction**

This thesis presents a socio-technical account of the adoption and development of Managed Learning Environments (MLE) in three universities in Scotland. MLE is a technology framework that is concerned with creating an institutional platform through which a university can develop e-learning capacity. The term 'development' is used here to refer to the way that MLE initiatives evolve over time as the MLE framework is introduced into the universities discussed here. The MLE framework is advocated by UK and Scottish Government Higher Education Agencies and Economic Development Agencies as a way of structuring technological development in universities to create more efficient and effective teaching practice and university management. Seventy percent of universities in the UK are or have been engaged in MLE related developments in the period from 1998 to 2006 (JISC, 2006).

MLE development is a large scale and complex IT endeavour involving the integration of university systems both within universities and between universities. This research explores the way that three different universities in Scotland have adopted MLE by considering the way that MLE initiatives in each university are shaped by a range of interactions between people, groups, technology and organisations.

### **1.2 Research Rational**

MLE development has not, in general, achieved the kind of standardisation and integration of systems envisaged by the MLE framework. This may be because MLE initiatives have underestimated the social and technical complexity involved in creating an MLE. In their study of MLE developments in UK higher education, for example, Glenaffric Ltd (2004) found that cultural and organisational issues were far more complex and time-consuming than technical developments (P3).

In general, research concerning the adoption of MLE in higher education (Glenaffric Ltd 2004; Boys, 2002; Holyfield, 2003) shows MLE adoption and development as involving a predominantly technical approach to MLE initiatives in universities which has tended to sideline social issues: resistance to culture change associated with MLE was a frequently cited problem. This included concerns among staff about their ability and willingness to engage with technology in their teaching, as well as more general concerns about the impact of MLE development on the institutional culture (Social Informatics Research Unit, University of Brighton 2003). Glenaffric Ltd (2004) have argued that for MLE to progress, there is a recognised need in UK higher education institutions to explore how institutional commitment to the whole (technical/pedagogic/organisational) MLE process rather than just 'technical' solutions may be encouraged (Glenaffric Ltd, 2004).

Studies of MLE development have charted a range of circumstances, constraints and issues that may contribute to MLE development in general (Social Informatics Research Unit, University of Brighton 2003, 2005), and have argued that there is a need for more in depth case study analysis in order to draw richer insights concerning the range of social and technical challenges involved in MLE adoption and development.

Outcomes of large-scale I.T. initiatives reflect social and technical interactions that are culturally and historically situated (Avgerou & Madon, 2004). The research study reported within this thesis contends that situating case studies of MLE initiatives in their cultural and historical context can yield richer insights concerning MLE developmental processes. This is done by utilising socio-technical theory that theorises this wider social and technical milieu involved in large scale IT projects such as MLE. The research within this study draws upon two main bodies of knowledge within the socio-technical research tradition. These are, firstly, the Social Shaping of Technology (SST) (Williams & Edge, 1996; Mackenzie & Wacjman, 1985) and, secondly, Social Informatics (SI) (Kling, 2000). Within these bodies of work, research has shown that technology and social organisation cannot be treated as separate categories (Williams &

Edge, 1996). In other words social settings shape technologies and technologies in turn shape social settings: how a technology develops is not shaped by just technical rationality, though this may be a part, but a broad range of social and technical interactions (Kling 1996; Kling, Sawyer & Lamb, 2000).

In order to understand the dynamics of ICT development in universities, researchers point to the need to broaden analysis beyond the way academics interact with technology to examine the way that a range of key university groups influence local ICT configuration (Dutton, Cheong & Park, 2004; Kling & Hara, 2000) . Their interaction with the wider socio-political context of ICT development is a key influencing aspect of this process. This involves their participation in the broad innovation process as well as local interaction, what Williams and Edge (1996) describe as:

*... 'economic and political' processes in building alliances of interests (amongst, for example, supplier firms, technologists, potential users, funding bodies, regulators) with the necessary resources and technical expertise, around certain concepts or visions of as yet unrealised technologies. (p10)*

These considerations have led to the formulation of the following research questions and aims.

### **1.3 Research Aims**

The research study reported in this thesis aims, first, to evaluate the global, national and higher education context of MLE developments in order to evaluate key dynamics that may influence MLE adoption and development in order to evaluate the key dynamics that may influence the three case studies. Secondly, to explore and evaluate socio-technical theory in order to develop a theoretical framework that can help to understand the case studies and the influence of the broader MLE context. Thirdly, the research study reported within this thesis aims to investigate MLE adoption and development in three case studies in Scotland

and account for their trajectories of MLE development, thereby, drawing insights into the nature of MLE development in the study.

With these research aims in mind, and based on an evaluation of literature the study is based on three sub questions:

1. How has MLE evolved as a sectoral phenomena and how has this influenced MLE adoption and development in three Scottish Universities?
2. How is MLE as a socio-technical phenomenon experienced by those involved in its adoption and development in particular contexts of use?
3. How does this knowledge help to understand the adoption and development of MLE in the Universities studied in this thesis?

The study aims to make a contribution to the socio-technical body of knowledge regarding the adoption and implementation of a generic technology framework, such as MLE, in local university contexts in the UK.

## **1.4 Methodology**

This section sets out in brief the methods utilised for the fieldwork and analysis, which are discussed in more detail in Chapter Four. The research study reported in this thesis involved three comparative case studies of MLE adoption and development in three Scottish Universities. The Universities were chosen following an evaluation of literature that suggested that different types of Universities may experience different trajectories of adoption and development (Social Informatics Research Unit, University of Brighton, 2005) Three case studies of a 'new', 'modern' and 'ancient' university were undertaken.

Data was collected from a range of sources, namely: documentary sources for the historical analysis of MLE, as well as specific to the case studies; in depth 'semi

structured' interviews with University staff who have been involved in MLE related work.

Through an evaluation of socio-technical theory, an analytical framework was developed that situates MLE development in the case studies in a broader context of sectoral MLE development. This involved incorporating insights from an evaluation of socio-technical case studies, Technology Framing (Orlikowski & Gash, 1994), Computerisation Movements (Iacono 2001; Kling & Iacono, 2001) and an Ecology of Games (Dutton, 1992, 1995 & 2005; Firestone, 1989).

Data was analysed using Content Analysis (Krippendorff, 1980). This was undertaken using qualitative analysis. In support of this analysis the research utilised textual analysis software (QSR version 6) as a tool in the development of analytical categories to aid the exploration and interpretation of the data.

## **1.5 Structure of Thesis**

The remaining chapters of the thesis are structured as follows. Chapter Two presents an evaluation the MLE context. This involves evaluating the evolution of MLE in the context of relevant international and national higher education political, cultural and commercial dynamics. Also, it involves an evaluation of research concerning MLE initiatives in Universities. Insights drawn from this evaluation inform the evaluation of socio-technical research undertaken in Chapter Three.

In Chapter Three relevant socio-technical research and theory is evaluated and it is argued that this can be utilised to gain rich insights into the MLE adoption and development process. Socio-technical research involving MLE related developments in universities is evaluated in order to draw insights regarding MLE adoption and development. An evaluation of socio-technical theory then leads to the development of a theoretical framework. Chapter Four presents an evaluation of research methodology and describes the methodological choices that were made in the course of this research study.

Chapters Five, Six and Seven present the case studies of MLE adoption and development in three Scottish Universities that have been categorised for this thesis as 'ancient', 'modern' and 'new'.

Chapter Eight presents the discussion of analysis which compares and contrasts the case studies in their broader context to provide key insights into the dynamics of MLE related interaction the universities. Chapter Nine concludes the study by evaluating the research progress in terms of the research aims.

The next chapter of the thesis presents an evaluation of the evolution of MLE across the UK Higher Education sector. This includes an evaluation of the global, national and sectoral context of MLE adoption and development in the case studies.

## ***2 Evolving Trajectories of Managed Learning Environments in the UK Higher Education Sector***

### **2.1 Introduction**

This Chapter of the thesis evaluates the context of MLE development. Through this evaluation we aim to situate the case studies of MLE development within a cultural, political and historical context. This results in an evaluation of the interaction of interests and the history of technological commitments that form the broad 'landscape' of technological innovation in which local developments take place (Williams & Edge, 1996).

Following an introduction to the MLE framework, this chapter first considers the relevant global and macro level trends that are associated with MLE development. Second, the chapter evaluates major actors in the MLE landscape who play a key role in MLE development. Third, an analysis of how MLE was first envisaged in key higher education policy documents that first advocated the systematic approach to ICT development in higher education now associated with MLE. These represent policy 'visions'. Such technological 'visions' are important resources for proponents and developers of technology as they seek to mobilise support for innovation and shape commitments and expectations around a new technology (Williams & Edge, 1996 ). They include a view of form and features of technology, its functions and benefits and a new socio-technical order in its domain of application (Sorenson & Williams, 2003). We evaluate how the MLE framework has been advocated by national and sectoral agencies. Then evaluate research concerning the adoption and development of MLE in universities.

### **2.2 The Managed Learning Environment Framework**

The term MLE first emerged in 1999 through several conferences organised by the Joint Information Systems Committee (JISC), the government body with responsibility for developing technology in higher education in the UK (JISC

MLE Infokit, 2006). MLE emerged as a broad term for a new systematic approach to implementing IT in the further and higher education sectors. JISC describes MLE as a way of thinking about:

*...processes and standards, not software products. It provides a framework within which choices about software, training and above all support for learners and tutors can be made (JISC, 2003, p3).*

This systematic approach was concerned with creating whole institutional systems through 'joining-up' or integrating several separate university technological systems. For example, the Student Record Systems, Library Systems, Management Information Systems, Virtual Learning Environments (VLE), timetabling systems and so on would inter-operate to create an institutional system in a vision of one standardised inter-operating institutional IT system.

This systematic institution wide approach to the management of separate systems is reflected in a core definition of MLE provided by the JISC:

*Managed Learning Environment (MLE) refers to the whole range of information systems and processes of an institution (including its VLE if it has one) that contribute directly or indirectly to learning and the management of that learning. (Social Informatics Research Unit, University of Brighton, 2003, p3)*

MLE development has involved managing the integration of new technologies with existing university systems as is noted by Holyfield (2003):

*The MLE is concerned with the joining together of a range of pre-existing and separate Information Technology (IT) systems (legacy systems) within HE and FE institutions, along with newer, and fast changing, systems such as VLEs, into one larger integrated system. (p3)*

Underlying the MLE framework is the notion that the university can be one manageable system: a systematic 'learning environment' that can be created to fulfil the needs of the learner. Such an aim is reflected in a second definition of MLE provided by JISC:

*MLE is the taking advantage of the potential of new technology based learning environments to integrate information systems around the learner. These learners may be working in different modes at different times, on campus, off campus, part time or full time. To support this, information systems will need to be student centred and fully accessible from multiple locations. They will need to be integrated at multiple levels, ensuring inter-operability between administrative and financial systems, learning support and learning environments, and between collaborating institutions. (JISC website)*

In a 'learner centred system' university processes are designed around the perceived needs of the student. This 'student centred' system aims to provide the student with a highly flexible system of learning which is geared to individual life and learning styles: the student is situated in the centre of all institutional processes which respond to student needs.

The MLE framework integrates university processes (learning processes and administration and management) around a Virtual Learning Environment (VLE). A VLE is fundamental to MLE as the electronic interface between the student and the institution's learning and administration processes. JISC (2002) refers to the VLE as the central component within an MLE that provides the online interactions of various kinds which can take place between learners and tutors, including online learning. In addition, because it can also provide access to administrative systems, it becomes a self service interface with university administrative and support systems. In this sense the VLE can be described as the front end of MLE and its operability mirrors the inter-operability provided by the MLE.

As the VLE enables a broader range of possible interactions with learning and administrative processes of the university and external agencies connected to the

educational process it becomes a 'portal' through which students can 'self manage' aspects of their learning process.

Figure 1.1 shows a diagrammatic illustration of MLE used by JISC and JISC sponsored research as a representation of MLE (JISC MLE Infokit, 2006; Glenaffric Ltd, 2004; Boys, 2002; Holyfield, 2003) It shows the VLE at the centre of a range of interconnected systems such as learning resources and student records.

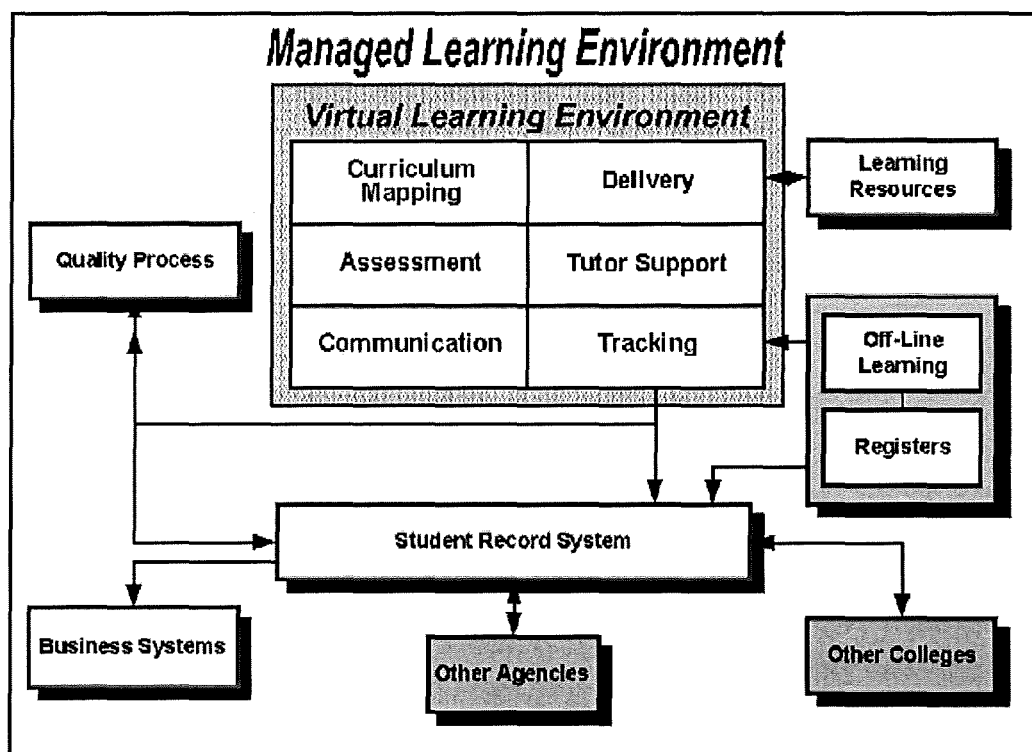


Figure 1.1 Elements of MLE (Becta, 1999)

Figure 1.1 illustrates how MLE aims to create a system that links between institutions as well as intra-organisational systems. By linking the MLE systems of separate universities together, MLE is envisaged as an approach that creates a sectoral level information system. At sectoral level, MLE is envisaged as a national information system that can support national educational initiatives. For example, the JISC Lifelong Learning Programme (MLE for Life Long Learning, JISC website, 2006) is exploring ways of providing support for learners to make a 'smooth' transition from school to college, university and work. Here the vision

is a systematic approach to IT across educational institutions that will enable inter-institutional delivery of education services to students so that individuals can manage their life long education needs through a personalised 'learning portal'. In effect, the 'learning portal' becomes the stable interface between the learner and education, as the physical university entity becomes secondary to this virtual interface.

In summary, the term MLE represents a new systematic approach to technological development within and across educational institutions. It is a generic framework for technological development in the further and higher education sectors. In the university, it involves integrating or 'joining up' university systems (IT systems and non IT based processes) to create a 'student centred' learning environment that allows a learner to access university services instantly and from any networked location. University processes are transferred to an internet based network that is a platform for a VLE (now often called a 'student portal'). This is envisaged in the MLE framework as a central site of interaction for learners and staff rather than the physical campus of a university.

The systematic approach bundles technology into a suite of systems to form an institutional system and aims to be a platform for the institutionalised use of e-learning. It is therefore said to be a 'transformational technology' that will radically change the way that universities are organised. The next section of the study evaluates the global and national context of MLE development.

## **2.3 The Higher Education Context of Managed Learning Development**

The twentieth century has seen a large worldwide expansion of higher education, rising from 1 % in 1900 to 20% worldwide cohort in 2000 (Schafer & Meyer, 2005). This has been accompanied by increased pressure on funding and changes in the ways that a government funds higher education. In the UK, one in three now participate in higher education as compared to one in sixteen at the start of the 1960s. Government has pursued a continuing policy of increasing the number of students in higher education to 50% of each cohort by 2010. This expansion is associated with changes in the management of higher education that have encouraged universities to seek greater numbers of students at ever lower cost. Blanden and Machin (2004) note two significant changes in the organisation of higher education in the last twenty years that are connected to this expansion in higher education. In 1993, the government established the principle of university financing following the student. This aimed to encourage universities to increase their income by attracting more students and providing them with an incentive to expand at lower cost. The second change was in the early 1990's when former polytechnics were put under the same funding arrangements as the universities, creating the flexibility for the sector to respond to rising demand. Blanden & Machin also note that the cost of the recent rapid growth in participation has in part been met by a reduction in the funding of student support arrangements and universities charging student fees.

A second trend has been the process of globalisation, characterized by increasing global economic inter-dependence and international competition, has led to the emergence of an international higher education market in which a growing number of traditional and new types of higher education providers compete with each other (van de Wende, 2002).

From a global perspective, the growing demand for higher education can be distinguished into two main trends. On the one hand the rapidly growing need for the widening of initial access to higher education. And on the other hand, there is

the increasing need for diversified and flexible types of higher education, including lifelong learning, corporate training, etc. In Western countries this trend is often combined with an ageing population, which underlines the need for lifelong learning. An increasing proportion of students are older and studying part-time in combination with full or part-time employment. This “earning and learning” market, in which substantial growth is already occurring, is predicted to grow exponentially (Collis, 1999).

The fact that the growing and diversifying demand for higher education is not always being sufficiently met by national higher education systems, creates market opportunities which mainly Western providers are pursuing. This ‘borderless education’ or ‘global e-learning’ is linked to a growing commercial interest in higher education. The growing global market for higher education goes hand in hand with the emergence of new types of providers, including virtual universities, corporate and for-profit providers and is threatening the monopoly of the traditional university.

Within the national policy context in which these developments are taking place the following trends are important to consider. In many countries the expansion of higher education access has been associated with a decreasing per capita funding of higher education, resulting in a call for more cost-effective solutions and mixed (public-private) funding arrangements. The great promise of ICT in achieving such cost-effective solutions is often discussed in this context (van de Wende, 2002).

In the context of this expansion of the market in higher education, both nationally and globally, governments have stimulated universities to generate more income. Deregulation of higher education, enhancement of institutional autonomy, and the introduction of more market mechanism types of steering are used by governments in a number of countries, e.g. the US, Australia, the UK, Germany and the Netherlands, to stimulate higher education as an important source of national income (van der Wende, 2002). The same author comments that other parts of government than the departments or ministries of education are leading

this agenda and that departments for commerce, trade and industry are the new stakeholders influencing this area.

There is also a sense that the association of MLE with expanding into the e-learning markets is born of the huge enthusiasm that accompanied the dot.com boom of the early nineteen nineties. This is illustrated in research into attitudes to MLE within universities. The review of JISC funded MLE activity, (Glenaffric Ltd, 2004) carried out in-depth surveying of higher education staff attitudes to the development of MLE. It finds that initial attitudes to the concept were heavily influenced by the dot.com boom:

*'There was a sense that enthusiasm in the sector for MLEs to some extent mirrored the pattern of general interest in online business practices exemplified in the so-called dot.com boom and bust at the turn of the millennium (Glenaffric Ltd, 2004, p13).*

In summary, MLE has emerged in a substantially changing higher education landscape. Changes in higher education student profiles are associated with the expanding global e-learning and domestic part-time markets. Western governments are keen to raise additional income from selling educational services in the global market. Whilst national policy has been directed to a greatly expanding higher education, resource per student has declined, putting pressure on the sector to seek income generation through other means than public subsidy. E-learning in general and distance learning in particular are seen as ways for higher education institutions as a way to pursue these growing markets. The need to become more 'business like' has also been associated with a drive to modernise universities.

The next section of this chapter evaluates key policy technological 'visions' concerning that associated with meeting these new challenges.

## 2.4 The UK Higher Education Landscape

During the 1990s higher education policy makers were promoting a new, more systematic approach to university management procedures related to computer systems and e-learning (White, 2006). The MacFarlane Report (MacFarlane, 1992) was of major significance in mapping a systematic approach to computing systems in higher education (Hartley, 1995; Martin, 2002). As Martin comments, the report: *despite its Scottish origin and focus was seen throughout the UK as pointing the way forward. MacFarlane insisted that for higher education to move forward, a whole perspective on the nature of the learning environment must be maintained, with more student-focused learning approaches matched by a suffusion of C&IT across curriculum and pedagogy* (p5).

This approach was underlined by the publication in 1993 of another key report, that of the Joint Funding Councils' Libraries Review Group (Follet, 1993), known as the Follett Report. This drew attention to the need to develop substantially the ways in which IT departments could support the functions and use of university libraries, and which libraries themselves could contribute to holistically perceived learning environments.

Taken together these reports put forward blue prints for the use of education technology in higher education that are seminal in the development of a nationally managed approach to technologically led changes in higher education. These reports are now discussed in greater detail.

### 2.4.1 Report One: The MacFarlane Report (1992)

The MacFarlane Report, titled *Teaching and Learning in an Expanding Higher Education System* (MacFarlane, 1992) was a seminal report in framing a central role for integrated technology in higher education. It provided a set of recommendations which would allow for a much expanded provision in higher education in Scotland and the UK as a whole. The recommendations aim to make

teaching and learning more productive and efficient by harnessing interactive technology (p12).

The report, which was published by a working party of the Committee of Scottish University Principals, asks fundamental questions about how to manage a substantial expansion of higher education: how can high quality environments for the support of expansion be created and maintained? What role does technology play in this? How can the costs of expansion be contained? And, how can the status of teaching and research be raised in higher education?

It has two main dimensions. First, it offers an analysis of what will be required for teaching and learning support within the context of an expanding and increasingly heterogeneous student cohort associated with the major trends in higher education. Second, it considers what changes need to be made to organisational structures at national and institutional level to establish a technological solution to the problem of expanding higher education whilst curbing costs. The report offers a 'radical' approach, submitting that there was an urgent need to introduce new approaches and structures, together with new technology.

The overarching theme of the report is a call for the re-organisation of higher education for technology implementation, both nationally and within institutions. Through this reorganisation, the computer management of education could be achieved, giving scope for development of 'just in time' teaching methods. The analysis takes a systematic view of the learning and teaching process, encapsulating the whole of the university's (and sector's) processes as one system or 'learning environment' (p12). Hartley (1995, p1) comments that this reflects the 'new pedagogy of the 1980's: a flexible, learner-centred approach, emphasising student control of their learning, that is assumed to be highly compatible with computerisation and therefore computerised automation and decision support systems, for example .

The report anticipates scepticism towards the ability for technology to transform higher education by asking why, given the limited impact of educational

technology on education in the past, should anyone believe that radical changes are now possible in teaching and learning in higher education with modern technology? The answer is that new network technology revitalises the distance learning frame, making new levels of interaction possible within a distance learning context. With the correct approach, distance learning that harnesses new technology could, the report suggests, support new levels of efficiency and quality (p12). One reason for optimism was the new sophistication of applications, demonstrated by the new intra-universities communication network, the JANET network, which creates communication between universities and the exchange of educational material. Distance learning could, for example, be delivered to large number of students from several institutions sharing material, thus avoiding duplication of effort for universities (p12).

The report surveyed the educational technology landscape and concluded that the major barrier to further educational technology innovation was the lack of compatibility and portability between university ICT systems (p63). A high degree of standardisation of systems is advocated that would allow the necessary scaling up and integration of systems within and across institutions to form one nationally managed ICT system. The major focus is on the development of standard systems and platforms to support the learning process that are capable of sharing the provision of educational material across institutions.

This includes the creation of a system to share educational material between institutions. Such a system requires the creation of standard teaching material and the development of a standard delivery system capable of delivering education material to students across institutions and then within institutions.

The policy calls for greater cooperation between universities to reduce duplication and develop standard procedures. A new Teaching and Learning Board would, it advocates, work in conjunction with the computer industry to help develop standard platforms and equipment. The report also recommends that funding arrangements should reward institutions that participate in the programme. Such a willingness to participate should first be demonstrated by institutions publishing a detailed teaching and learning plan.

In summary, the MacFarlane Report created high expectations regarding the benefits of a coordinated approach to ICT innovation in the higher education sector. It contends that, at the time of the report, technological innovation lagged behind this ambition.

It envisaged a highly co-ordinated and co-operative landscape between constituents in the innovation of ICT in higher education: between groups in institutions and between institutions, government and industry. The presumption was that all constituents will align with the vision the report advocates. Such benefits are only possible if a new co-ordinated and systematic approach to educational technology is achieved. However, there is no practical experience of such an approach to innovation and the authors commented that there actually was no model for institutional implementation of such a vision (p39). Viewed as a broad technological vision the MacFarlane Report re-orders both human/social elements and technical elements through higher education policy and structures.

The recommendations of the MacFarlane Report appeared to be driven by a vision of what new technology can do, rather than experience of what educational technology can. There appeared to be a gap in knowledge concerning how to create the necessary processes of technological innovation within specific institutional contexts in the HE sector. Instead, there was a reliance on centrally co-ordinated action and funding incentives for creating organisational change.

This evaluation of the MacFarlane Report is summarised in Table 2.1 describing the framing of educational technology in the MacFarlane Report: the aims of educational technology innovation advocated by the report and the management structures recommended at national and institutional levels to achieve these.

**Innovation aims of educational technology**

- Standardised educational material delivery across and within institutions
- Computerised communication between student and institution
- Computerised managing procedures: e.g. automation, decision support etc.

**National management of innovation**

- New co-ordinating national body
- Participating institutions rewarded through funding
- Government partnership with computer industry
- Co-operation between institutions

**Institutional management of innovation**

- Centralisation of computer management
- Centralised data management: centralised database, centrally managed networks to configure with new laptops, networked 'data less' workstations throughout the campus.

Table 2.1 Aims of the MacFarlane Report

#### 2.4.2 Report Two: The Follet Report (1993)

In 1993, an investigation into how to deal with the pressures on library resources caused by the rapid expansion of student numbers and the world-wide changes in the production of academic knowledge and information was undertaken by the Joint Funding Council's Libraries Review Group. This investigation resulted in the Follett Report (Follet, 1993). It recommends radical innovation in the way that libraries operate, advocating rapid innovation in networking library services to create a sector- wide networked information system.

Recommendations are set against a problem area involving a serious short fall in space and materials. At the time of publication, higher education had experienced a rapid growth in student numbers (70% over the last 7 years), increases in the cost of library stock at a time of perceived growth in the potential of IT. Also, the growth, as noted earlier in this chapter, in part-time students and mature students, who make different demands on the library service. The review had also taken place at a time when many other developments in HE were creating a new environment for those aspects of library and related provision which support teaching. The development of learner-centred, flexible teaching approaches and

the modularisation of the curricula, for example, are cited by the report as requiring parallel, coherent development of learning and information resources.

The report includes recommendations for change across a spectrum of socio-technical configuration: artefacts, industry structure, social and legal relation and university management. Actions of universities, funding bodies, quasi public funded bodies, publishers and the IT industry are prescribed in such a way as to achieve these changes. These are premised on the vision of the 'virtual library': a networked information library system that broadens local interactions across a network of connected libraries that pools library resources across universities.

As an answer to the problem of shortage of space in an expanded higher education sector, innovation was to be based on the vision of the 'virtual library' and its central role in the university. The vision of the 'virtual library' is premised on a view that traditional teaching and research is no longer adequate when information is available from many different media and locations. The report contends that this shifts the emphasis from holding information in a physical library to facilitating access to information from many different locations. This representation of the virtual library envisages users engaged in computer mediated interaction in which actions, processes and systems interact 'seamlessly' across the university network.

In a survey of library facilities the authors find higher education library provision is very uneven across the sector. Rising costs and funding selectivity mean that it is not feasible for every library to provide the full range of research facilities through their own library. In these circumstances, each institution's information provision will differ, depending on the nature of its activities, on its inherited provision, and on other factors. In the new environment some institutions will meet the needs of their users by providing access to information most of which is physically located elsewhere. To the user, the place where data is held is said to be relatively unimportant. Other institutions will be major suppliers of information which is located within their institution, and their position will be very different. Most institutions will, the report contends, fall between these

extremes, combining internal and external sources of information to meet the particular needs of their staff and students.

Here the report advocates a commitment to sharing of resources through collaboration. The result should be a sector wide information system made up of networked universities giving equal access to the entire information resource to every student irrespective of their institution.

To encourage this innovation the report advocates increased funding for strong aspects of library provision in return for the commitment of universities to share their resource across the system: host institutions would be required to provide free access to all bona fide researchers from within the UK.

It was recommended that all the UK funding councils should jointly invest 20 million over three years in support of a series of development projects designed to further the use of IT in selective areas. Most of these recommendations would be implemented within an IT oriented libraries initiative under the auspices of the funding councils' Joint Information Systems Committee (JISC).

The system that emerges in the report is focused on the delivery of material across a network. Efforts were to be directed at three areas that may facilitate this: standardisation of equipment and material, the development of network artefacts and databases to store material for sector distribution. The report states that information requirements have hitherto been addressed by a variety of customised approaches which are usually incompatible. The flexibility of future solutions would be limited unless standard communications, applications and data interchange services are developed.

Collaboration between universities is paramount. Here the report recommends the establishment of subject-based consortia to collaborate in developing electronic document delivery routes: metropolitan and regional consortia to collaborate in similar document delivery services and the development of the necessary technical tools which might be used by libraries to send and receive electronically transmitted articles.

In the area of database work, it recommends nationalising consortia databases through the intervention of JISC. For example, the bibliographic database established and maintained by the Consortium of University Research Libraries (CURL) with the aim of sharing and reducing cataloguing costs. The university libraries of Cambridge, Edinburgh, Glasgow, Leeds, London, Manchester and Oxford currently meet its development and running costs in full. Use of the database for reference only was at the time free to non-members, although charges for use of the full records for cataloguing purposes by non-members were introduced in 1992. Adoption and extension of the CURL database would be a valuable contribution to the Review Group's proposals for a co-operative approach to research provision, exploiting more fully the research facilities which currently exist.

The Review Group recommends that the JISC should fund the setting up, operation, and development costs of the CURL database as a national OPAC service. This would be mounted at a national data centre which would be free at the point of use to the academic community.

In summary, the report views a networked system as a vehicle for 'levelling the playing field' between the varying strengths of universities. It recommends consortia work to standardise data transfer and artefacts so that material can be transferred through the system. This drive for the a sectoral effort to standardise is undergirded by the compelling vision of the 'virtual library' and the way it would integrate with a new type of learning environment such as that envisaged by the MacFarlane Report.

The vision of the 'virtual library' is a strong element leading the report. This involves the characterisation of the university as an information system. This appears to relegate social/softer elements of higher education as secondary. As Hartley (1995) comments systems thinking and bureaucracy tend to relegate these aspects of higher education. However, culture, morality, ethics and values intervene in the production process of higher education. The same author suggests that the report is driven by an ideology of efficiency in education which has historically had a focus of monitoring, quality, efficiency, standards and

national structures rather than equality of access. This work of creating a national structure and standards indicates the central and primary role of JISC in the plan. This emphasis on standardisation and national structures is resonant of the MacFarlane Report, illustrating the similarity of these technology complexes.

As with the MacFarlane Report, a secondary element is any proven way of implementing the necessary changes. There is, according to the Follet Report, no such model of implementation because of the difficulty of using any particular blue print of implementation in such a heterogeneous sector.

### **2.4.3 The Post Follet Report Higher Education Landscape**

Having evaluated key policy visions for the reorganisation of higher education for e-learning, we now chart the post Follet UK Higher Education landscape. We have demonstrated how these policy visions are predicated on various degrees of co-operation and standardisation between a wide range of constituents at macro and meso levels as well as within universities. In the following section the various alignments and understandings of MLE in the HE sector are described. The MLE landscape is constructed from policy and research documents that have been initiated through JISC. It offers a picture of the process of alignment and mis-alignment to the MLE vision as actors in universities struggle to make technology work and achieve their aims.

In general, the data shows that patterns of alignment are changing within the MLE landscape. Major players are emerging where, for example, a heterogeneous playing field was expected, (MacFarlane, 1992). This is the case, for example, where fewer suppliers and standard 'off the shelf' systems have come to dominate the landscape. The first section considers the emergence of key players in MLE evolution.

#### ***2.4.3.1 Key Players in the Managed Learning Environment Landscape***

JISC was created in 1993 under the terms of letters of guidance from the Secretaries of State to the newly-established Higher Education Funding Councils for England, Scotland and Wales, inviting them to establish a Joint Committee to deal with networking and specialist information services. The criteria agreed for JISC's activities were to explore a national dimension to providing these services, exercising vision and leadership in bringing about developments for the benefit of the sector (HE) as a whole (JISC website).

The role of JISC was established to support the newly unified higher education sector comprising of the ex-polytechnics and higher education colleges, along with the universities served by the JISC's predecessor bodies, the Information Systems Committee and the Computer Board. JISC's user community was further expanded in 1999 when the further education funding bodies became funding partners.

JISC strategy is to promote and develop the uptake and effective use of ICT to support learning and teaching, research and university management. It aims to represent higher education communities, assessing their needs, providing a technological vision and funding network infrastructure, Information and Learning Technology and information services, development projects and materials for education (JISC, 2007).

JISC, together with the Higher Education Academy (HEA) and the British Educational, Communications and Technology Agency (BECTA) is the Government's key partner in the strategic development and delivery of its information and communications technology (ICT) and e-learning strategy for the schools and the learning and skills sectors. It has responsibility for taking forward national e-learning and their work is carried out in the context of the Department for Education and Skills (DfES) National e-Strategy and equivalent strategies in the devolved countries.

JISC has been the major player in the promotion of MLE in the UK since 2000. In that year, The Follett Review (Follett, 2000) of JISC advocated a number of

developments that required the JISC to change both its governance and its management arrangements. These developments were cited as the major growth in the use of digital teaching and learning materials, and the possibility of the provision of content to millions of students through MLEs. The report prescribes that JISC must focus energy and resources upon developing MLEs and ensuring that systems exist to deliver learning materials to the desk top.

The JISC Five Year Strategy (2001) identified as its key priorities for 2001 to 2005. These include the role of a facilitator of ICT development and innovative ICT co-operation across the sector. Specifically, it identified the commitment to 'help institutions create and maintain Managed Learning Environments (MLEs) to support students' (JISC 2001, Executive Summary). JISC took principle responsibility for taking this priority forward through a programme of discussion and debate, awareness-raising, and development activities in colleges and universities.

In 2005, the Higher Education Funding Council for England published (in conjunction with JISC) their strategy for e-learning (HEFCE, 2005), an implementation plan for supporting higher education institutions to develop and embed e-learning over the next 10 years. HEFC strategies are cited as highly influential for institutional MLE strategy in the 2003 survey of MLE activity (Social Informatics Research Unit, University of Brighton, 2003) in the UK. It is worth noting that the HEFCE strategy does not use the terminology of MLE and in general criticises the association of e-learning with distance education and the predominance of technology led approaches to e-learning it perceives in the HE sector.

JISC has been committed to a data standards-based approach as the best way to create inter-operability between university systems. In the development of MLE in the college sector, JISC noted that vendors would find this attractive since no one supplier is able to supply all the systems needed and everyone needs to be able to integrate their systems with one another (JISC, 2003, p6).

It was reported at the time that there were no dominant MLE component vendors in post-16 education:

*Unlike the commercial IT sector, which was originally driven by market giants such as IBM and Microsoft, there are no dominant MLE component vendors in post-16 education that might impose a similar approach. (JISC, 2003, p6)*

As a consequence, JISC has coordinated an agreement between vendors on a suitable approach to creating a data standard that would work with all vendor systems (JISC, 2003, p7)

JISC align the interests of suppliers with MLE. The bespoke approach to MLE system development rather than the standards based approach was at this time thought to be disadvantageous to vendors as future development and expansion of these systems would be considerably more expensive than standard systems and therefore less likely to be undertaken by institutions. Also, a proliferation of bespoke systems would drive down vendors' license revenues. It was therefore reported that a standards-based approach holds out the promise of significantly reducing the complexity and cost of achieving multi-way inter-operability (JISC, 2003, p6).

Though there were no dominant vendors at the time of this report in 2003, there was a note of warning that this may happen in the future. It was noted that one of the challenges to MLE development in the sector was the limited availability of appropriately functional systems, and that in this context the VLE market was generally US-led and dominated by two principal proprietary products (JISC, 2003).

There was an indication in 2003 of a growing trend to collaborate with commercial suppliers with 26% of the responding institutions collaborating with commercial partners on software and applications development and customisation. 33% of universities planned future collaboration with commercial partners at this time (Social Informatics Research Unit, University of Brighton 2003). In contrast with this growing alignment with commercial vendors, there is

a significant trend related to in-house bespoke VLE development in pre 1992 universities with a rise in such developments from 21% in 2003 to 52% in 2005, more than double the amount in post 1992 universities.

The 2005 survey of the MLE landscape shows that there is a trend towards domination of VLE suppliers in the higher education sector by Blackboard and WebCT, with the former having a 58% market share of post 1992 universities and 42% market share of pre 1992 universities. WebCT is more popular with pre 1992 universities than post 1992 with a market share of 47% and 21% respectively. First Class and Noodle are the next most significant suppliers with First Class suffering a significant downward trend in use between 2003 and 2005 (Social Informatics Research Unit, University of Brighton 2005).

The 2005 JISC survey of MLE activity in the UK includes data that shows strategies from professional bodies or agencies have a major influence on MLE strategies in universities. These are professional bodies relating to the educational, library and C&IT professions (Social Informatics Research Unit, University of Brighton 2005, p43).

The Higher Education Statistics Agency (HESA) is the central source for higher education statistics. The agency has standardised and streamlined the data collection and publication processes in a way that influences the kind of data demanded from universities and therefore the types of information systems that universities are encouraged to develop.

Having evaluated who are the major players in MLE evolution we now consider how universities have experienced MLE development.

#### ***2.4.3.2 UK Universities Experience of the Managed Learning Environment Framework***

This section of the evaluation of the MLE landscape focuses on how universities have experienced MLE led development. The first question of interest is to what

extent has MLE influenced ICT development in universities? Are there alternative ways of framing MLE development in universities? What are the criticisms of MLE? Next, the experience of MLE related development in the UK HE sector is described through a consideration of socio-technical alignment (Fleck, 1999). These findings illustrate a changing trajectory of development in the MLE landscape which sees the splinting of development into two different paths, one associated with MLE practice associated with standard 'off the shelf' systems and the other with an alternative bespoke approach to systems development.

Data concerning the MLE landscape is drawn from a JISC sponsored research based on the outcomes of the JISC-funded programme which was of three years' duration and concluded in July 2003. The aim of the programme was to explore developments that test, evaluate, and prove (or in some circumstances disprove) the generic deployment of MLE technology. The programme aimed to develop good practice and shared ideas and experiences across HE (and FE) sectors. Its aim was also to advocate MLE as a way to enhance and support learning and teaching, and the advantages of MLE for service provision in general. As a way of learning about a generic approach to MLE, it aimed to inform about cultural and organisational issues involved in developing MLE and create technical and organisational guidelines. Subsequent research covered areas such as the organisational problems associated with MLE (Boys, 2002), attitudes to MLE (Glenaffric Ltd, 2004, 2005), the development of a generic technical infrastructure (Browning, 2003), and the difficulties of diagramming MLE (Holyfield, 2003). Also, the two broad surveys of MLE developments across the higher education sectors in 2003 and 2006 (Social Informatics Research Unit, University of Brighton, 2003 & 2005) already referred to.

Amongst a list of 24 possible drivers for MLE development in universities, the leading driver for MLE development in higher education was 'enhancing the quality of learning and teaching'. 'Improving access to learning for students off campus' and 'widening participation/inclusiveness' were second and third respectively. The fourth most popular was as a way of 'standardising across the

institution'. (Social Informatics Research Unit, University of Brighton, 2003, p17)

Amongst the least important drivers reported were efficiency and co-operation with other institutions in the sector, two cornerstones of the vision for systematic innovation of ICT through MLE (MacFarlane, 1992; Follet, 1993). 'As a cost and efficiency saving' is second least popular and 'to help standardise across our institution with others' and 'availability of relevant standards' come at the lower end of drivers (Social Informatics Research Unit, University of Brighton 2003, p17).

This data indicates that the MLE vision of a sectoral MLE based on the efficiency of a revitalised distance learning frame is not generic across the sector and that a more popular view is that MLE can create greater access to learning material beyond the walls of the university.

Glenaffric Ltd (2005) explored issues associated with developing learning environments to support the movement of the learner between and across education sectors and institutions. This programme involved developing an integrated system approach to MLE advocated by JISC. They found that 'cultural and organisational issues were far more complex and time-consuming than technical developments (Glenaffric Ltd, 2005 p3). MLE projects were found to be challenge established institutional hierarchies and barriers of accepted methods of working. They suggest that to establish real shifts in the organisation of the university for MLE:

*Experiences in exploring learning, teaching and administrative processes for lifelong learning in a multi-institutional context exposed the need for a whole-institution approach to organisational change through technology (Glenaffric, 2005, p3)*

Boys (2002) identifies two basic 'articulations' of MLE at institutional level. First, an evolutionary approach to MLE sees it as relatively uncontroversial, technical and an ad-hoc addition to other strategic initiatives. This involves a

generalised need for a 'culture shift' because of the current lack of experience of ICT rather than specific institutional issues about organisational/educational change or the integrative demands of scaling-up.

This contrasts to a transformative understanding of MLE development that sees it as necessarily challenging to existing pedagogic and administrative organisation of the university which uses MLE as a driver of wider management of change towards improved educational and organisational provision.

The first articulation is associated with what may be called a 'softer' approach to MLE development, with progress dependant on negotiation between stakeholders and the resolution of barriers to change overcome through debate and resolution. The second articulation involves a 'harder approach', characterised by imposition of systems rather than negotiation. This involves the management of communication and persuasion. Barriers to MLE development in this articulation are seen as the need to overcome resistance to new technologies and the inertia of existing working practices to the need for change (Boys, 2002 Summary).

The following section evaluates research that addresses the 'progress' of MLE development in the UK HE sector. In the MLE landscape surveys MLE progress within universities is associated with specific achievements regarding migrating university processes online. Inter institutional MLE progress is associated with institutional commitment to the aim to create data transferability between institutions through data standards and standardised systems.

JISC-funded activities have provided an impetus for the further development of inter-institutional MLEs. However, in 2003 most institutions were developing bespoke integrations of their administrative system components according to their individual institutional priorities and merely paying lip service to standards whilst putting organisational functions first (Social Informatics Research Unit, University of Brighton, 2003). One of the key recognised outcomes of JISC MLE activities was the awareness-raising in the sector about the use and implications of IMS specifications. However, from a pragmatic perspective, functionality was found to be more important than standards.

The 2005 survey of the MLE landscape shows the extent to which universities have made progress in transferring their processes online to allow personalised access to course material, academic support and administrative services. There had been considerable progress between 2003 and 2005 in all areas of migrating processes online. The survey shows that post 1992 had made greater progress compared to pre 1992 universities in all area except one. Compared to pre 1992 universities, the post-92 universities show the highest increase in personalised online access to all e-learning and support resources (6% in 2003 to 24% by September 2005) (Social Informatics Research Unit, University of Brighton, 2005).

By the end of this review period JISC was advised that future funding of projects takes into account the relatively early stages of development across the UK HE and FE sectors; for example, by supporting smaller scale feasibility studies and by exploring mechanisms for enhancing institutional commitment to the whole (technical/pedagogic/organisational) process rather than just 'technical' solutions (Social Informatics Research Unit, University of Brighton, 2005).

Research indicates that MLE tends to involve an over emphasis on technical outcomes. There is common agreement in JISC sponsored MLE research (Glenaffric Ltd, 2004; Boys, 2003 & Hollyfield, 2003) that at a technical level, inter-operability may be relatively straightforward, but that the human and cultural impact of MLE is far more complex and complicated than may first have been appreciated. The 2003 review of JISC sponsored MLE initiatives in higher education found that, in general, initiatives concentrated on technical issues: *"leaving the sensitive organisational and pedagogic issues unresolved"* (Boys, 2003, p1).

In the practice of MLE development, universities can often focus on technical issues at the expense of cultural or social issues. This tendency can be accentuated through the process of working with vendors. The focus on technical systems development through working in partnership with the external companies skewed MLE project focus away from the identification of business processes and development of administrative applications that would have been

of genuine and lasting benefit to the participating institutions (Glenaffric Ltd, 2004).

This emphasis on technical systems may allow institutions to avoid more difficult re-thinking of their educational and organisational processes as an essential part of MLE development and make student-centred approaches central to that development (Boys, 2002). In some universities, this apparent unwillingness to fully engage with cultural and organisational change aspects of MLE is associated with a trajectory of MLE development involving focusing on the goal of creating a particular visible technical artefacts rather than substantial organisational change. This is the case where some form of web-based portal for students and staff is increasingly becoming the 'standard' mode of joining up the previously separate components of student data system, VLE and learning support services (Boys, 2002). The same author comments that such an approach is led by technical staff and is extremely pragmatic – organisationally, technically and financially – but a very limited model for educational or organisational change, since key issues can easily become marginalised due to the technical emphasis of the development.

Boys (2002) observes that in a trajectory of MLE development successful implementation can involve the defining of both 'quick wins' and longer term goals. 'Quick wins' tend to involve technical achievements, visualised by technical teams providing them as demonstrators of what an integrated on-line system can do. MLE development may thus become the additive accumulation of 'reactive and piecemeal solutions', based on what is doable rather than on what is preferable within the context MLE.

A key issue identified was the need for a shared understanding among managers, technologists, administrative and academic staff of the goals, purposes and institutional vision for the use of technology for educational business processes. There was further recognition that the long-term sustainability and institutional embedding of developmental activities depends on the support and direction of both senior management and operational specialists. Glenaffric Ltd sum up the lessons learnt from the MLE development initiatives:

*Initiatives do not succeed if they are applied from above or outside, or are peripheral to the operational reality of the institution, or indeed if they propose a developmental rate that is not in keeping with the speed at which organic organisational change can realistically take place. (Glenaffric Ltd, 2004, p15)*

For some in the sector, the proposed development and implementation of MLE has been found to be ‘slightly insulting’ in its implication that institutions were not being managed appropriately if they did not have a ‘thing’ they called an MLE (p17, Glenaffric, 2004). Here the idea that a generic MLE system is needed and can be advocated as a better approach than local innovation is questioned. Holyfield (2003) comments that, in general in the UK HE sector, the common representation of MLE (see Figure 1, Elements of MLE) is thought to be misleading because it is over simplified and only represents one view of MLE. The same author notes that MLE brings together professionals from a variety of practical and professional fields, who bring with them a wide range of approaches to representing systems. Professionals from the same field may hold very different and even conflicting views – this is particularly true in teaching and learning, but also in IT. Confusion is further compounded by the apparent availability on the American market of proprietary systems called MLEs that contain many of the elements that one might expect to see in a learning management system, but make no reference to integration with other systems in an institution, region or collaborative consortium.

Despite the bounded and precise MLE concept depicted in the MLE diagram (Figure 1), there is still a sense that MLE remains an ‘unsorted’ idea, and one that is regularly renegotiated in institutional and project settings (Glenaffric, 2003).

This issue which relates to the application of the systems approach inherent in MLE is the applicability of this kind of thinking to the educational context. Holyfield acknowledges the problems this may cause for defining university processes:

*Further complexity arises from the fact that some of the systems to be integrated involve relatively concrete, if complex, activities which may be described in flow charts such as the admissions process, the payment of fees or the timetabling of lectures and rooms, whilst others such as the learning process cannot be described in these terms (Holyfield, 2003 p2).*

The 2003 MLE landscape survey (Social Informatics Research Unit, University of Brighton, 2003) indicated two predominant approaches to managing MLE development in universities. A predominantly centrally managed model of development (40% pre 1992 universities and 56% of post 1992 universities) and an institution-wide initiative with responsibilities devolved to departments and units within the institution (33% of pre 1992 universities and 21% of post 1992 universities). The survey suggests that these data result from a larger number and wider range of legacy systems in the older (and frequently larger) universities, resulting in more pre-1992 universities finding ways of building upon existing initiatives and devolving responsibilities to already active departments. In contrast, a higher percentage of post-1992 universities are starting MLE development from scratch.

In 2003, there was a sector-wide swing towards more co-ordinated and centrally managed development. By 2005, MLE development, however, had increased as an institution-wide initiative with devolved responsibilities (up from 27% to 42%), almost equal to the centrally managed method of development. The percentage of Post '92 universities reporting a model of devolved responsibilities within an institution-wide initiative had gone up since 2003 (from 21% to 55%) (JISC, 2006).

According to the 2005 survey of MLE activity high degrees of consultation on MLE development in institutions has been undertaken with the following groups in the university: Academic, Administrative, Learning Resources/Library, IT Support, Senior Managers, Learning Technologists and students. According to the 2005 survey universities have consulted with all groups to a high degree. The notable exception was the lower incidence of consultation with Learning Technologists, compared to other named groups.

In summary, this evaluation of the evolution of MLE has established the following key points:

1. Research relating to the MLE landscape shows a difference between universities aligning with MLE as an efficiency development and those viewing it as a measure to improve quality and off-campus access.
3. Research relating to the MLE landscape shows a difference between universities adopting MLE management practice and those using a devolved responsibility method.
2. Research shows that MLE development is rarely seen as a collaborative project.
4. There is a trend for bespoke system build in pre 1992 universities.
5. Research shows that Post 1992 universities are more likely to implement standard 'off the shelf' systems.
6. Two different trajectories of development are represented by two articulations of MLE: 'Evolutionary MLE' and 'Transformational MLE'.

The following section illustrates the evolution of MLE through the concept of socio-technical alignment (Molina 1995, 1997). Molina (1999) describes alliances of interests (amongst, for example, supplier firms, technologists, potential users, funding bodies and regulators) with the necessary resources and technical expertise, around these visions of as yet unrealised technologies as 'socio-technical constituencies'. Socio-technical alignment illustrates how innovation is a process of forming 'socio-technical constituencies' through the alignment of social and technical elements:

*Socio-technical alignment is what social constituents try to do (however consciously, successfully, partially or imperfectly) when they are promoting the*

*development of a specific technology either intra-organisationally, inter-organisationally, or even as an industrial standard. (Molina, 1997, p4)*

Linking socio-technical elements (e.g. artefacts, actors, practices, articulations) as two socio-technical constituencies shapes the evolution of MLE around two developing socio-technical constituencies. The evolution of these alignments represents a forking of the MLE trajectory into two paths, one associated with MLE standard 'off the shelf' systems practice and the other with an alternative bespoke approach to systems development. This forking of MLE trajectories as two different emerging socio-technical constituencies is illustrated in figure 3. We then go on to explain these two forking trajectories in greater detail.

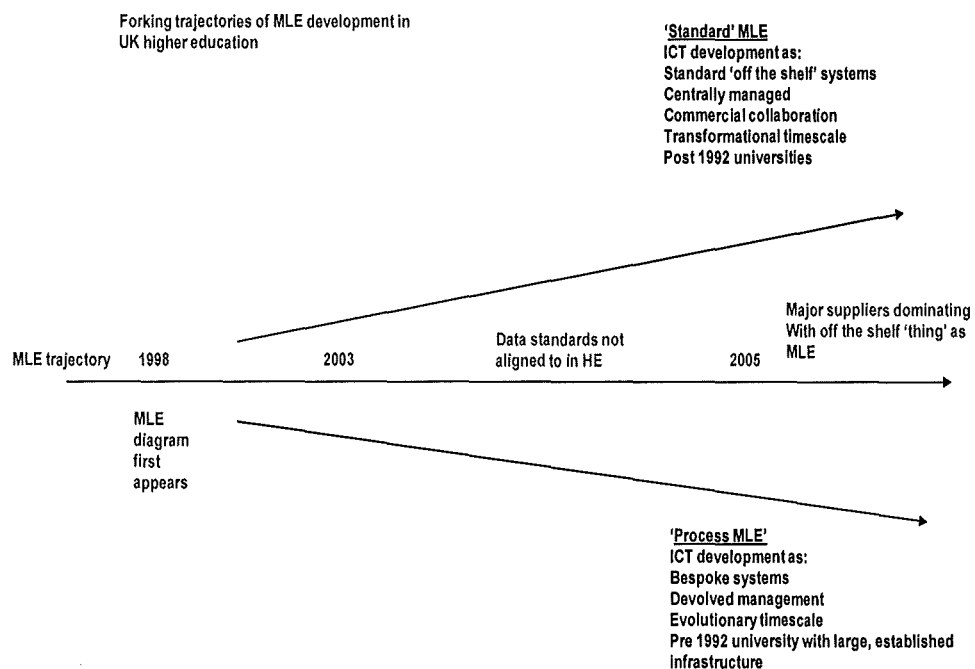


Figure 2.1 MLE Trajectories in the UK Higher Education Landscape

The first socio-technical constituency focuses on one centralised 'off the shelf' database. For the purposes of this research this is termed 'standard' MLE. The

practice of MLE development tends to involve an emphasis on technical outcomes, perhaps at the expense of social or cultural change. It is characterised by incremental configuration towards a web based portal. This approach to MLE is articulated as a transformation approach, involving persuasion of staff rather than debate as a way of overcoming barriers. It is associated with vendors, of which two American suppliers now dominate, technical staff who lead development and JISC which supplies templates to formalise implementation of standard 'off the shelf' systems.

The second socio-technical constituency is articulated as an evolutionary autonomous process: a gradual process of configuration that corresponds with organisational knowledge of innovation. For the purposes of the research this is termed the 'Process MLE'. This refers to a process of socio-technical alignment that emphasises aligning technology to people through negotiation. This socio-technical constituency counters 'standard' MLE by articulating risks associated with 'standard' MLE, such as, reliance on one institutional database and vendors. Also, the view that generic MLE is a 'thing' that is incongruent with local practice is aligned with the idea of autonomous bespoke development. The next section evaluates the Scottish context of MLE development.

## **2.5 The Scottish Context**

The 2003 MLE landscape survey data indicates differences between institutions in England, Scotland and Wales (Social Informatics Research Unit, University of Brighton, 2003). Research suggests that universities in Scotland are committed to MLE development as an initiative to increase competitiveness of the university, linking it with the competitive advantage to be gained from technology for e-learning (Social Informatics Research Unit, University of Brighton, 2003). A significantly greater proportion of respondents in Wales and Scotland, for example, consider the 'use of technology to deliver e-learning' a very important driver of MLE development. The importance of competitive advantage is a very important driver for 22% of respondents in Scotland in comparison with 12% of those in England and in Wales (Social Informatics Research Unit, University of

Brighton, 2003). Within the UK, Scottish universities had set themselves higher targets for integration of university systems than English universities (Social Informatics Research Unit, University of Brighton 2003, p20).

E-learning policy in Scotland is led by the partnership of the Scottish Funding Council for Further Education (SFEFC) together with the Scottish Funding Council for Higher Education (SHEFC) through the SFEFC/SHEFC E-Learning Group. The Scottish Further and Higher Education Funding Councils established this Joint E-Learning Working Group in 2002. The membership represented a coalition of government and education sector representatives including Scottish college and university principals, Scottish Enterprise (the national body concerned with developing the Scottish Economy) and the Scottish Executive (the executive arm of the Scottish Parliament). The Joint SFEFC/SHEFC e-Learning Group published a review of e-learning in Scotland in 2003 which aimed to be the key baseline strategy for e-learning development in Scotland (Joint SFEFC/SHEFC E-Learning Group, 2003).

This review charted Scottish national e-learning policy. In particular, it recommended that the Councils should consider the scope for 'transformational change' in the use of e-learning through major strategic investment in new forms of delivery. Subsequently, the Councils agreed to invest £6M over the period 2004-2007 to fund six major collaborative projects on various aspects of e-transformation (SFC, 2007).

The Scottish Executive (with responsibility for Higher Education in Scotland) is aligned with this report in its enthusiasm for e-learning's place in national ambitions to increase income from higher education and increase access and numbers whilst making efficiencies in the educational process. The Executive's Framework for HE in Scotland (Scottish Executive, 2003) drew attention to the work of this group in relation to the HE sector, advising that the use of ICT needs to become pervasive in Scottish higher education institutions. This policy goal resonates with attempts to structure Higher Education by western government

bodies for income generation described in see section 2.3 The Higher Education Context of Managed Learning Development.

The review of e-Learning in Scotland in 2003 (Joint SFEFC/SHEFC E-Learning Group, 2003) is based on the belief that in the future FE and HE students are going to need and demand greater flexibility in the mode of educational delivery: in the choices which are available to students and in the ways in which students interact with each other and with their teachers. This means that students should be able to begin and end courses when they choose ('just in time' education), learning is customised 'just for me' and students are able to gain access to a full range of learning programmes 'any where' i.e. irrespective of where they live.

To enable this new mode of flexible delivery the authors present a vision for the future organisation of education in which all provision in Scottish FE and HE institutions is structured within MLEs. MLE is envisaged as enabling students to remotely access the full range of universities processes. Through this they can manage their full course lifecycle, engage in learning and interact with staff and fellow students.

In the policy vision, online availability of learning materials, which are well designed in both pedagogic and technical terms, will lead to a higher quality learning experience for students, seen through increased motivation, retention, achievement and student satisfaction.

The authors advocate restructuring FE and HE such that all learning institutions in Scotland (including private providers) operate agreed standard data protocols. This would allow learners to build up and access a lifetime learning log through which they can access inter institutional educational services. This reflects the ambition of creating an institutional MLE to support the life time learner.

Also, Scottish FE colleges and HE institutions were to have agreed consortia arrangements for the production and updating of online learning materials. Such consortia may achieve significant cost savings through economies of scale in the production of learning materials and the use of a network of part-time tutors and

moderators. A ubiquitous Scottish broadband infrastructure based on JANET will be able to deliver learning anywhere.

The review observes that e-learning has the scope to transform how institutions operate and serve the needs of Scotland. This 'transformation', however, the report emphasises, needs to be user led rather than technology led. This leads to an emphasis on 'blended learning': the authors believe that, on pedagogic grounds, the issue is not a choice between conventional and e-learning delivery methods, but a choice of the most appropriate balance between the use of these different methods in different contexts.

According to the review, the effective development and deployment of e-learning across an institution needs to be a systematic and centralised approach. This is in contrast to what the report describes as the traditional 'cottage industry' approach to course development, in which individual academics, or small teams, collate and present their own materials in distinctive ways. Such a way of working does not promote efficient production, distribution and exploitation of content. The production and ongoing maintenance of high quality multimedia or interactive content production needs specialist skills which most academics do not possess. Even though there is scope for radical transformation, the authors acknowledge that this is an unlikely pathway for most institutions, with many deciding on a more evolutionary path.

The review advised that effective staff development requires a delicate balance between stimulating changes in practice, and responding to the expressed needs of staff. Changes in practice will come up against barriers. Not least of these will be the need to engage with those members of staff (particularly more experienced staff) who may feel that e-learning is 'not for them', and who may require encouragement and support to be able and willing to deploy ICT as an effective part of their repertoire of teaching skills. Further, thought should also be given to the impact of e-learning on the staff development needs of non-teaching staff (such as senior managers, librarians, network managers, guidance staff and careers advisors) and the emergence of new professional groups such as learning technologists.

In summary, the Scottish context includes additional MLE players to those in the UK wide HE sector: the SFC and Scottish Executive are enthusiastic advocates of MLE development. They align with the vision for networked higher education articulated in the MacFarlane Report. In Scottish policy there is an emphasis on the transformation of higher education through MLE development. Here the established way of working is presented as inefficient and outdated. In contrast to the JISC policy, the policy of transformation through MLE in Scotland emphasises that it is only applicable to a few universities and that the majority of universities will opt for evolutionary change. But for all universities there is an emphasis on the need for coalitions that would work on elements of MLE, such as, coalitions between the public and private sectors in developing educational markets and universities in developing content. Within institutions there is a focus on the role of educational development as key to MLE adoption and implementation.

The next section of this chapter presents an evaluation of the Scottish HE e-learning landscape that demonstrates the difficulty of creating a collaborative national approach to e-learning development through MLE that was advocated by the review of e-Learning. One strand of development has been the creation of commercial e-learning enterprises which are separate from traditional campus provision and aimed at the global online learning market. This type of activity was associated with consortia of universities, private sector organisations and the Scottish Executive and was lead by the establishment in 2002 of Interactive University (IU) by the Scottish Enterprise (the Scottish government department responsible for economic development) and Heriot Watt University, Edinburgh. The political intent behind the IU initiative was that Scotland could become a global e-learning player but that an agency such as the IU was needed to coordinate the sector to ensure quality and efficiency (SFC, 2006). The trajectory of the initiative demonstrates the difficulty in trying to create cooperation between universities in systemising e-learning.

At the launch of the IU there were significant expectations for income generation from the global e-learning market. Based on a model of partnership, it aimed to provide a strong and effective business organisation to represent all Scottish

universities in the global e-learning market. In the short term, as many as 3,000 students were expected to sign up to study programmes such as business and finance, management, IT, science and engineering at the IU (SFC, 2007). By 2007 the IU had been wound up after the majority of Scottish universities failed to get on board and a £1.5 million bid for emergency funds was turned down by Scottish Enterprise.

The degree of collaboration between universities in the IU enterprise was disappointing. The only non Heriot-Watt University degree offered by IU, the MBA from Stirling University, was inherited directly from Scottish Knowledge. The SFC offers some explanations for the failure of the IU initiative, saying that in retrospect, some of the expectations in the 1990's for the volume of global trade in e-learning were unrealistic (SFC, 2007). The principle causes of failure, the SFC Report, related to difficulties in creating or maintaining markets for overseas provision via e-learning and an inability to find a stable business model which supported collaborative provision through shared platforms. This failure involved institutional concerns over loss of autonomy and appropriate quality assurance models for overseas e-learning provision (SFC, 2007).

A second strand of e-learning development involves e-learning and transformational change of the organisation of universities, for which MLE is a fundamental framework. The Scottish Funding Council (SFC) and JISC have been the predominant national bodies in this area of activity and work together in the area of e-learning in Scotland.

The 2007 review of the SFC funded transformation projects, (SFC, 2007) reports that they have successfully achieved the main goals of the programme by demonstrating that it is possible for institutions to engage in programmes of strategic development of e-learning which lead to visible changes in everyday teaching and learning practice.

However, it has proved 'challenging' to link these developments to simple measures of productivity or efficiency gain, or to measurable improvement in learning. There is evidence that the projects have led both to observable 'culture

change' in the participating institutions, and also some quantitative metrics of increased effectiveness (reduction in staff time spent marking assessments allowing more frequent and higher quality student feedback). However, in conclusion, the report states that it is too soon to draw firm conclusions about the sustainability of these changes in culture and practice beyond the period of Council funding.

## **2.6 Summary of UK Higher Education Managed Learning Environment Landscape**

In summary, this chapter has described how the MLE framework aims for a systematic approach to the computerisation of HE in the UK. It has been primarily advocated by JISC at the UK level. A primary element of MLE is the vision of a networked higher education system that allows students remote access to a wide range of university processes. The chapter has shown how key policy documents articulate MLE first, as involving distance learning through new interactive web technology, providing the organisational efficiency associated with distance learning whilst also offering the convenience and flexibility of 'any place, any time' access to education for students. Secondly, as enabling significant university expansion without having to correspondingly invest in physical infrastructure. It also holds hopes for levelling the disproportionate level of information resources between universities.

MLE policy has aimed for standardisation of data transfer and systems across the sector to allow 'seamless' integration of HE systems. This effort has involved an aim for a high degree of coordination and cooperation between universities, vendors, HE bodies and staff groups in universities - who may be termed 'MLE constituents'. The range of these MLE constituents derived from the MLE landscape data is as follows:

<b>UK landscape:</b>	<b>Scotland</b>	<b>Universities</b>	<b>University groups</b>
Department of Education & Skills, JISC, HEFC, Professional Bodies & Associations, Vendors (In particular WebCT & Blackboard)	Scottish Executive, Scottish Enterprise, SFC, JISC,	CURL consortium IU initiative (2002 -2007)	Academic Administrative Learning Resources/Library IT Support Senior Managers Learning Technologists

Table 2.2 MLE Constituents.

The evaluation has also derived two trajectories of MLE socio-technical alignment in the UK landscape. The first is an alignment involving university technical staff and vendors. This socio-technical constituency is associated with a particular kind of MLE development approach involving short term technical ‘wins’ driven by the goal of an operational ‘portal’. Vendors are also associated with viewing MLE as a ‘thing’ rather than a complex evolutionary process. This pattern of alignment has become a ‘standard’ MLE trajectory (Boys, 2002) and is described as ‘standard’ MLE in this thesis. This pattern of alignment is particularly influential in the Scottish context.

The second type of alignment involves a trend towards ‘in house’ system development and less centralised development. It represents a trend that does not follow such a ‘standard’ MLE trajectory and values autonomous development. This alternative articulation will be termed ‘process MLE’ in this research

MLE policy has come up against resistance. Apart from the large investment in time and money resources involved, there are several points of resistance to MLE evident in this review. First, there is resistance to the representation of MLE as a generic technology led system: a ‘thing’ imposing management on universities. Second is opposition to vendors selling a system as an MLE ‘thing’. This

resistance to MLE is associated with a view of creating a technology enhanced university through an autonomous process rather than imposition of a 'thing'.

This evaluation shows that certain constituents, however, have been key in the innovation process whilst others are becoming less important and perhaps have been marginal. For example, the government and JISC remain important players, however a small number of suppliers and professional bodies and organisations are becoming more important.

In the Scottish context, national agencies emphasise the urgent need for 'transformation' of universities for MLE. There is an emphasis on consortia of universities and private sector players driving MLE development. In practice, however, there has been a low level of cooperation between universities with a growing trend to a more competitive environment between universities. The Scottish context includes Scottish Government agencies who have been strong advocates of e-learning for national income generation. However, the attempt to coordinate universities in a collective national enterprise for income generation from global markets has failed. This evaluation suggests that this is due to universities wishing to remain autonomous in their e-learning activity. Though policy has a strong current for transformation it at the same time acknowledges that few universities will choose the transformation route.

### ***3 Evaluation of Socio-technical Literature***

#### **3.1 Introduction**

This chapter evaluates socio-technical theory concerning the adoption and implementation of ICT in organisations. In particular, universities, through a number of case studies of ICT adoption and implementation in universities. A theoretical framework is developed through an evaluation of case studies of MLE computerisation projects pertinent to MLE and socio-technical theory.

The first section evaluates socio-technical research that is relevant to the study of MLE development. The first study, in the SI tradition, looks at students' experiences of distance education. In particular, their distress with university ICT practices that do not adequately support online distance learning. It highlights the dissonance between the high expectations of online education, resonant of MLE 'visions' ("the death of distance" and "any where, any time" expectations), and the realities of online learning practice. Second, case studies in the SST tradition are evaluated. This includes a study of the implementation of an ICT system in a university and an exploration of the processes involved in transferring university processes online in UK higher education sector.

The chapter then evaluates work in the SI and SST traditions concerning computerisation of organisations and, in particular, the digitalisation of organisations. It is found that organisational politics are strongly implicated in such developments and the actions of key players and coalitions are crucial in this process. Digitalisation projects are often led by a 'standard' technological frame that seriously under estimates the social complexity of adoption and implementation (Kling & Lamb, 2000). Insights are drawn from this that informs the research theoretical framework.

The chapter then moves to evaluating socio-technical theory in relation to this study. First, Technology Frames (Orlikowski & Gash, 1994) as an approach to

interpreting the way that articulations of technology interact with the adoption and implementation process in organisations is evaluated.

Moving on to the way that organisational expectations are influenced by the meso and macro environment, the evaluation considers the Computerisation Movement (CM) (Kling & Iacono, 1994; Kling, 1996; Iacono, 2001) analytical approach and develops a detailed CM interpretative framework to be used in the case study analysis. CM is then situated in the further interpretative framework that is developed around an Ecology of Games (Dutton, 1992) in which socio-technical outcome are seen as the results of players pursuing their interests through strategies. The Chapter then evaluates the combination of these two theoretical frames in a master theoretical approach to analysing the case studies.

Key points in this evaluation are, first, the important role of macro level technology framing in shaping expectations of what a technology means for an organisation. Shaping these expectations is crucial in the process of adoption and implementation. Adoption and implementation of ICT is found to be an incremental process of configuring social and technical elements of the organisation around expectations. This work involves the political strategy of key players and coalitions. In socio-technical research, the work of these actors is often characterised as learning to 'play' games around adoption and implementation. The combination of CM and an Ecology of Games situates the CM perspective with a metaphor of a broader system of action that represents the MLE landscape.

### **3.2 The Adoption and Implementation of Information Communication Technology in the Organisational Context**

Kling and Iacono (1984) focus on organisational politics in a study looking at the control of information systems developments. They describe how key actors attempt to gain control over the sequence and direction of development through campaigns to mobilise support and quiet opposition. They do not always achieve all their goals, but often succeed in structuring access to computing resources.

Such a political analysis focuses on processes of control, influence and use of power in organisational life. Key actors develop long term strategies to mobilise support for their own preferences and block conflicting preferences. In this analysis Kling and Iacono (1984) describe two key aspects of computerisation campaigns. The first is the structural dimension: the infrastructure and the way computing becomes woven into organisational life. Does any one group control infrastructural resources or is control shared more equally across contenders? Such patterns of control can vary between organisations. The second is the ideological dimension that places social life in a moral order. A 'computing worldview' describes what modes of computing are to be valued and how they fit into organisational life. Efficiency, economic rational and technical rationality are ideological dimensions of this worldview and how it fits into the organisation that are often expressed in key terms. Having others accept a worldview is the goal of this process and over time a way of organising work can become taken for granted as ideological and financial commitments are incurred.

The same authors view the computing organisation as a group of coalitions engaged in the political process. Key aspects of the work of coalitions include: commitment to one type of trajectory, competing over resources, using ideologies of computer use in mobilising support and trying to structure computing resources to their advantage. In ongoing computing developments, advocates for a particular system can dominate the computing milieu as a combination of structural control and ideology about the role of the system in efficient organisation gives them the ability to manipulate developments. This may involve back room manipulations that are generally not recognised as part of the implementation process.

In digitalisation projects, such as MLE work, key players can create high expectations and under represent the work and resource involved as a way of mobilising support. Kling and Lamb (2000) characterise this way of framing digitalisation as a 'standard model' of IT and organizational change. They relate this analysis to organisational change associated with digitalisation, making it particularly relevant for understanding the process of transferring processes online associated with MLE.

The 'standard' model underestimates the complexities and costs of computerization and overestimates the generalisability of applications from one setting or group of individuals to another. The 'standard model' of the digitisation of an organisation is resonant of the way that MLE discourse characterises 'transformation' for MLE as a simplistic and standardised approach. We illustrate this similarity by adding characteristics of the MLE framework to a Table describing the 'standard' model originally produced by Kling and Lamb (2000). This is illustrated in Table 4 overleaf.

<b>Standard Models (Tool)</b>	<b>Socio-Technical Models</b>	<b>MLE TAF</b>
IT is a tool	IT is a socio-technical network	Transformative tool
Business model is sufficient	Ecological view is needed	Based on business model of process reengineering
One shot implementation	Implementation is an ongoing social process	Urgent 'transformation' through MLE
Technological effects are direct and immediate	Technological effects are indirect and involve different time scales	Direct effect on efficiency
Incentives to change are unproblematic	Incentives may require restructuring (and may be in conflict with other organizational actions)	No incentives needed, motivation based on vision of the future Incentive for private institutions are obvious benefits
Politics are bad or irrelevant	Politics are central and even enabling	Not political, management decision regarding efficiency
IT infrastructures are fully supportive. Systems have become user-friendly, people have become "computer-literate," and these changes are accelerating with the "net-generation".	Articulation work is often needed to make IT work. Socio-technical support is critical for effective IT use.	Creating new MLE infrastructure is a simple matter of creating standards. Use of MLE systems is a matter of simply 'training'
Social relationships are easily reformed to take advantage of new conveniences, efficiencies and business value.	Relationships are complex, negotiated, multi-valent. The nature of the relationship with the customer makes a difference in what can become digital.	Social relationships are easily mediated through MLE Physical presence unimportant
Social effects of IT are big but isolated and benign	Potentially enormous social repercussions from IT	Levels the playing field of HE Allows expansion of HE
Contexts are simple (described by a few key terms or demographics)	Contexts are complex (matrices of businesses, services, people, technology history, location, etc.)	Context of each university not accounted for
Knowledge and Expertise are easily made explicit	Knowledge and Expertise are inherently tacit/implicit	'Packaging' of education is possible

Table 3.1 MLE as a 'Standard Model' of Organisational Digitalisation

As can be seen in Table 3.1, Kling and Lamb explain that underlying the 'standard' model of IT and organisational change is a conception of the internet as a "level playing field", whose architecture allows people to engage in many of the activities that they have traditionally performed off - line yet without the usual constraints of space and time. This "standard" model of the Internet is conceptualized most fundamentally as a network of computer networks connected by a standard protocol that allows unlimited sending and receiving of data. This characterization of seamless interaction through the fluid data transfer across time and location undergirds the MLE approach.

The evaluation of the MLE landscape in Chapter Two illustrates how, through its discrete approach and technologically deterministic model of the digitisation of university processes, the MLE framework is resonant of a "standard model". Particularly, the underlying value of levelling the playing field is seen in the Follet and MacFarlane Reports. Over the course of MLE development, JISC sponsored research reports, such as described in Chapter Two have described some socio-technical complexity. However, the predictive errors that result from relying upon the "standard model" are also seen in the MLE landscape data: that of overestimating the ease of "going digital" by substantially underestimating the complexity and time of the required organizational changes.

As seen in Table 3.1, one element of this under estimation of complexity which is particularly pertinent for MLE is related to the idea of inter organizational computer networks as 'seamless' MLE networks compared to the socio-technical understanding that computer networks are complex social networks. The characterisation of an MLE as a networked inter university system suggests that the most important relationships can all be wired directly, and that they can be easily established and reformed. In contrast, socio-technical studies show that inter organizational relationships are complex, dynamic, negotiated and interdependent.

Lamb, Sawyer and Kling (2000) suggest that in a socio-technical examination of IT digitalisation and organisational change, several key elements should be considered. These are incentives, politics, infrastructure support, inter organizational relationships and social repercussions. In practice, a "supporting

infrastructure" involves a wide range of "systems" and "networks" that include organizational practices, key support staff, and access to technical and social skill sets. These extensions are often referred to as 'the hidden costs of computing,' because most IT systems are built around a set of assumptions and defaults that makes deviation difficult and expensive.

The crucial features of both the social and technical outcomes of change can be regarded as the result of incremental local customization and adaptation of generic systems and models (Molina, 1999; McLaughlin, Badman & Couchman, 2000). These activities can be described as technological configurational processes carried out in the context of existing configurations of technological and social arrangements.

In contrast to the conventional political process view of technology as having generic, fixed characteristics, capabilities and requirements to make it work, the concept of technological configuration points to the loosely systemic, complex and locally constituted character of working technological systems (McLaughlin, Badman & Couchman, 2000):

*With these points in mind, we would suggest that political processes can now be understood as involving configurational activity focused on the material, technical, systemic and structural features of a socio-technical system and the interpretative schemes through which these are given meaning and understood. (McLaughlin, Badman & Couchman, 2000, p7).*

Technology adoption involves the work of socio-technical alignment as incremental gains and the local 'framing' of technology. Alignment should not be thought of as static, but a dynamic including process of misalignment and realignment which reflect situations of tension and disharmony, changes or reaccommodations (Molina, 1995, 1997). Neither should alignment be reduced to consensus. This is one form of alignment but there might also be authoritarian forms in which alignment is forced over one party by another by sheer power. Also, misalignment may be the goal of constituents who advocate a kind of computing implementation over another direction and constituency.

Molina (1997) notes three types of socio-technical alignment: suppliers shaping technology to users, people to technology (learning new skills, etc, framing etc) and technology to technology (integration for example). In practice all these elements are likely to be present in shaping a socio-technical constituency.

In a detailed description of alignment processes concerning an incoming technology to an organisation, the same author describes four inter related types of alignment are viewed as critical in the local configuration of technology. Critical alignments involve the role of incoming technology against organisations prevailing culture and perceived technical needs. Alignment with industry standards and trends may be important here. In terms of technology alignment the incoming technology may need expertise to realise its contribution. This requires strong alignment with expertise. It may be in antagonistic competition, where the incoming technology must completely replace the existing technology, or, non antagonistic competition, where incoming technology and existing technology have similar roles but are allowed to coexist.

Molina stresses the fluidity of the alignment process: being fraught with difficulty and conflict, it is not fixed and does not imply consensus. This idea is illustrated with a game metaphor to capture the fluidity and agency of this process.

Having evaluated the general political process of socio-technical alignment in this section, we now move to case studies of ICT adoption in universities.

### **3.3 Evaluating Case Studies of Information Communication Technology Adoption and Implementation in the University**

In their study of ICT adoption and implementation in a university, Hara and Kling (2000) present a qualitative case study of a web-based distance education course at a major U.S. university focussing on the experience of students. The case data reveal students' distressing experiences (such as frustration, anxiety and confusion) in a small graduate-level course due to communication breakdowns and technical difficulties.

The authors note how institutional discourse intertwines themes of educational reforms to improve accessibility with a wider cultural narrative about internet working and the “death of distance” and “any where, any time” expectations (introduction section). In practice, they observe, these expectations are found to be unrealistic because “any where, any time” education would need “any where, any time” communicative access to tutors and technical support. Existing ICT practices used in predominantly face to face education applied to online education are found to be inadequate and cause student distress. The authors find that new ICT practices for online education need to be renegotiated in particular contexts to minimise this student distress.

Because face to face communication is far richer than online communication, the authors found that the transfer of communication from face to face to online can cause problems that exacerbated ambiguities and confusions. For example, when students found ambiguous instructions on the web and in e-mail messages they reported confusion, anxiety and frustration. Consequently, they desired prompt feedback from the instructor. However, prompt unambiguous feedback is much more difficult in text-based asynchronous courses than in face-to-face conditions. This means that the focus of distress involves the course content and the instructor's practices in managing her communications with her students.

A second area of student distress focuses on technological problems. Students without access to technical support were especially frustrated. What is needed, the authors suggest, is for the students and instructors to learn how to manage their expectations about when they should be able to have reliable, fast communicative responses.

This demonstrates that online flows of data between students and the university are complex and not as ‘seamless’ as suggested in MLE discourse. To avoid issues of distress, practices have to be negotiated in their context of use, depending on, for instance, the approach of the teaching and technical support staff and the mix of face to face and online teaching. In this regard, Kling and Hara suggest that a next step in understanding ICT use in universities needs to examine *‘the socio-technical complexity of the communication and computational support for the courses’* (p578). This would involve

understanding the key processes which drive the adoption and implementation of ICT.

A critical element of this would include the political economies of the participating universities. This, they suggest, should focus on the conjunction of these conditions, social processes and practices: the various ecologies in which university actors such as university administrators, participate in internet enabled education. Kling and Hara suggest that university administrators are key in looking at the influences of political economies, as they strongly encourage the use of online teaching but rarely understand the complexity of the process or that online teaching requires highly experienced online teachers. This suggests, in addition to the framing of technology by a wide range of university players, university administrators are key in the link between political economies and localised processes of socio-technical alignment.

In an SST informed case study of ICT adoption and implementation in a university, Dutton, Cheong and Park (2004) examined the diffusion and use of a proprietary, commercially-marketed VLE (eClass) at a private US university.

This study sought to develop an empirically based perspective on the implications of e-learning through a case study, informed by SST work highlighting organizational, cultural, economic and other factors influencing the process of technological change and innovation. The emphasis of the study is on the constraints to ICT adoption and implementation in a university by asking: which are the main factors (social, cultural, psychological, economic, technical and other) that facilitate or constrain the uses to which the VLE is put?

By examining the way that existing practices and standards interact with new technology, the research highlights the way an institution '*resists, assimilates, subverts or otherwise appropriates*' (p70) what is being proposed or imposed when a technical innovations threatens the established ways of doing things. To do this, the authors suggest that the values and assumptions of all relevant institutional actors and the practical implications of VLE courseware need to be examined to reveal how conceptions and responses across a range of university actors can support or frustrate technologically-enabled change.

This should aim to include a consideration of the different 'relevant social groups' involved in interpreting a technology, including the determination of whether a technology 'works'. As well as actors in the established university structure who have influence over ICT developments, Dutton *et al.* suggest that wide spread ICT could create new gatekeepers, such as the technology administrators and technical support staff that control access to digital library resources and make decisions about technology upgrades.

The authors used a comprehensive survey questionnaire and 'embedded case studies' to undertake more in depth interviews. This provided a balance between institutional and user perspectives. Presuming the importance of instructors to any innovations in e-learning, they used their research resources to focus on this group, while using knowledge from SST research to take account of the critical role played by others in the innovation process in order to detect more general patterns and issues.

As the study progressed, the researchers discovered that the diffusion and impacts of the VLE were more limited than anticipated. This shifted the focus of the study on the social and institutional factors constraining e-learning innovation as well as the likely impacts for the most innovative adopters.

The embedded case studies revealed some individuals who worked hard to experiment with new approaches to their teaching. Taken together, however, the cases reinforced other findings that most uses of eClass were anchored in traditional teaching approaches, with eClass used primarily as a substitute for the copier or projector to support one-to-many forms of lecture-based instruction.

Dutton *et al.* highlight a number of key processes of alignment in constraining the adoption of eClass. First, some of the most critical constraints were found to be the limitations of the technology. The implementation of eClass was plagued by slow response times, trouble in updating courses from registration data and many other problems that adversely affected the teaching process.

Second, old teaching practices were retained despite the new technology. Traditional teaching paradigms are in fact designed into many e-learning

products, such as eClass. Without a new paradigm for education and e-learning, educators are likely to see ICTs as a means of carrying on doing things as before.

The third constraint involved the alignment of the new technology with institutional policy and practices. Here risk-adverse academic cultures were found to be the constraint. For example, one professor stopped distributing his lecture notes electronically when he realized that students were deciding not to come to class as they could read his notes online. Another professor's plummeting evaluations following technical problems also illustrate how technical failures can reflect poorly on the instructor, making it safer not to experiment. The culture of academic freedom in higher education is another important influence in universities. For example, the Dean of a school instructed his staff to put every class in the school on eClass. But only a few of them actually did.

As with the Kling and Hara study of student's distress with online distance learning, the researchers found it necessary to broaden the scope of the research beyond teaching staff. They suggest that, as well as the established gatekeepers of structural resources, new gatekeepers are likely to be influential, such as the technology administrators and technical support staff.

They found little change in practice as a result of eClass and so focused the research on constraints that could explain this. Social and institutional factors were found to be more important than instructors' innovation efforts. Another was 'risk averse culture', suggesting that incentives for teaching staff to adopt the new technology were insufficient compared to the potential risk of lower class scores.

The case study illustrates the complexity of 'transformation' through MLE. For example, persuading teaching staff to adopt online teaching practice and give up established ways of working is essential for MLE, but in the case study teaching staff frame their interests in relation to eClass as better served through limited adoption: losing a teaching rating is a greater disincentive than the incentives for adopting eClass.

In a study concerning transferring university processes online, Pollock and Cornford (2003) explore how universities attempt to build and use new ICT technologies change and sometimes transform established means of delivering, organizing and managing higher education' The work draws both on theories from SST and on empirical research in the UK context to examine how universities are transferring processes online.

With new suppliers of knowledge operating through the internet claiming legitimacy, widespread adoption of ICT in universities is set against the way that the internet threatens the established role of the traditional university in terms of its cultural role as 'gate keeper of knowledge' and its established physical university setting.

Together with a declined relationship with the state these pressures have undermined the intimate relationship a university has with its campus, region and nation and created a problem space that is filled by the possibility of the 'virtual campus'. The authors approach the analysis of projects as simultaneously the construction of the new model and the destruction of the old, focusing on how the 'virtual' university has to be built within the traditional university. This involved project teams in a continual movement between exploration of the possibilities of new ICT and maintaining existing practices and structures: a process that is uncertain and prone as much to failure as to success.

In choosing a methodology, Pollock and Cornford aim to make visible what is a complex process of change and innovation involving the shaping of artefacts, meanings, boundaries, processes, actors and practices. They adopt an 'intensive ethnographic' approach and base this on work from SST and in particular, the Actor Network tradition (ANT) tradition (Latour, 1988; Callon, 1986). ANT approaches prescribe the suspension of any prior belief as to the boundaries between technology and organisation, structure and agency (Callon, 1986).

The ethnographic approach involves the researcher participating in people's daily lives in a particular setting. Data collection involves collecting whatever data is available to throw light on the issues that are the focus of the study, for example,

watching, listening and asking questions. The approach aims to access the social processes that are relevant to those in the research site. Even so, the authors do enter the research with certain sensitising concepts drawn from SST that ICT's shape universities and ICTs are themselves shaped by the university.

In the process of adopting and implementing ICT, Pollock and Cornford describe key actors as 'heterogeneous engineers' who employ whatever approach (political, economic or social) or resource (legislative, financial, rhetorical) to get their work done. ANT conceptualises this work as building socio-technical networks. A key idea is that actants (human and non human actors) are drawn into a network through a process of negotiation or 'translation'. This involves getting actors involved in a problem or issue and then enrolling them in the network by aligning their goals and identities. When actors accept this alignment, they become disciplined network actors who share the same interpretation of the technology and related change. At this stage of network stabilisation, the constituent nodes of the network tend to fade from view.

As part of the 'translation' process institutional managers employ an informational discourse to redefine the university as an informational model. In this way the work of making the 'distributed university' is under girded by a representation of the university as an information institution and depends on all accepting the prognosis and diagnosis offered by the information model. For some within the project team, the informational model embodied in the system comes to represent the actual university. Acceptance of an informational discourse is reflected in system mantras that drive projects such as: 'timely, accurate and accessible information'.

However, one result of this reliance on reframing the university as an informational model was the reiteration of the importance of established university structures. For example, it was only after an attempt was made to abstract a course from the campus that the critical importance of the physical campus came to light as a symbolic and material resource. The authors also show how some of the differences and similarities between universities and standard commercial models inscribed in standard 'off the shelf' products are brought into

being and actively constructed through the implementation. The implementation of standard models is characterised by staff 'workarounds', local practices that work around unsuitable standard process prescribed by standard software. Such implementations would not be possible without such ad hoc arrangements.

Pollock and Cornford find that the shift to the virtual model, the application of new technologies aligned with pressures on funding and short term policy goals of funders have created more of a corporate form of organisation, where the ultimate aim is to establish precise structures, roles and responsibilities to implement online learning. This process attempts to align university processes with standardised processes embodied in standard 'off the shelf' systems. One crucial aspect of this is the attempt to render students as commercial customers such as customers for any other business. This is described as the work to create the 'self service' student.

Standard systems are marketed on the flexibility of their modular design as well as the ability to choose from hundreds of templates to tailor the system to an adopting organisation. However there are ambiguities regarding which parts can be customised. Customising too much can lead to a system that is too far away from supplier standards, making it difficult to later upgrade – an important original reason for the system. Evidence from Pollock and Cornford's study suggests that because of the sheer number of discrepancies that arise, complexity and time consuming nature, most adopters end up fitting the organisation to the system.

In general, the research highlights the multi layered work needed to put the university online. One emphasis is on the rhetorical nature of this work of network breaking and building. Also, configuration of standard technology involves accepting default settings that may not suite the university and consequent workarounds to make the technology work.

The work of putting the university online is complex and multilayered. Pollock and Cornford's study shows that gaining acceptance of a 'virtual university' or

informational model of the university as a computing world view is central to this work.

The role of key players ('heterogeneous engineers') who use whichever resource or structure that is available to create new networks illustrates how ICT development may cut across established university structures or follow established university practice.

For the purpose of understanding sectoral influences, they may be conceptualised as a sectoral level game. One such influence is the to and fro between suppliers and those implementing systems in which implementers want a system that matches their current needs but are increasingly aware that to end up with separate products would be counterproductive. This involves implementers making a judgement based on their involvement in a kind of sectoral supplier game. Would their customised version be supported or could they take advantage of later upgrades? The answer they feared would be no, so they started to look for commonalities across their practices. In this way an emerging ecology of games shapes the configuration of e-learning technologies.

Conceptualised as game arenas, the MLE landscape trends can be interpreted as the operation of several strategies. For example, centralisation of MLE development is a strategy associated with the 'standard' MLE socio-technical constituency. Other strategies, such as devolving initiatives to departments may indicate a different game strategy.

Within a university case study it is necessary to gain the perspectives of a wide range of actors who engage in shaping the technology in the organisational context. In particular, this means broadening the research participants beyond instructors and students. Gatekeepers such as university administrators and management are likely to be key players in the translation of political economic influences to the online imperative. Also, new gate keepers will emerge such as technologists and technical support departments.

In summary, we have evaluated MLE related change in universities as characterised by an incremental processes of socio-technical alignment in which

key actors and coalitions work to achieve alignment both in the university and in managing the conjunction between the university and the wider environment or ecology.

Building socio-technical constituencies or new networks in the university is political work. Key players and associated coalitions act as 'heterogeneous engineers' who employ whatever approach (political, economic or social) or resource (legislative, financial, rhetorical) they need to get their work done. A game metaphor is an apt way of describing this work. In an incremental configuration process games strategies can focus on short term wins in any area of socio-technical alignment. Rhetorical tools, mobilising frames and utopian visions are crucial in this work as they shape technological expectations. This evaluation is summarised in Table 3.2 which shows the processes involved in organisational MLE related developments as managing the boundary of the university and wider landscape in conjunction with structuring and ideological work in the university. This involves the structural and ideological work of shaping expectations and structuring development.

The evaluation has provided guidance for the case study methodology. First, with regard to the choice of research participants, the research will focus on key actors and coalitions in the case studies. Relevant groups have been identified as university administrators, MLE champions/ project leaders and new gatekeepers in ICT development, particularly technology administrators and technical support staff. Secondly, the research aims to access complex processes involving meanings, boundaries, processes, actors and practices.

Managing the conjunction with wider landscape	Organisational work of key individuals and coalitions	Types of activity
Managing the conjunction or boundary of the university and wider landscape	1. Structural Work/Strategies	Coalition building Steering groups  'Back room' fixer/manipulations to promote or thwart technology  Accessing/Controlling resources
Adopting an MLE world view	2. Ideological Work/	Shaping expectations of MLE for the university/Framing technology adoption and implementation

Table 3.2 Technology Adoption and Implementation Processes in Local Context

The following section of the thesis evaluates socio-technical theory to build an analytical framework that takes account of the influence of the MLE landscape together with these local processes of technology adoption described in Table 3.2.

### 3.4 Developing the Theoretical Framework

#### 3.4.1 Introduction

This section of the thesis evaluates the insights gained from the preceding chapters together with socio-technical theory to develop a theoretical framework through which the case studies are analysed. We have seen how a theme in socio-technical analysis of organisational technology adoption is that key individuals and coalitions, through their work in creating expectations for the technology in the organisation and structuring the trajectory of ICT development to their preferred path of development, appear to play a crucial role in technology adoption and implementation in an organisation. The theoretical analysis of the case studies focuses on the question of the way that individuals and groups interact with MLE in the organisational context and the broad macro context?

Each theoretical perspective reviewed in this chapter provides useful elements that are incorporated in a framework to analysis this question. The following elements of the theoretical framework are evaluated in this chapter.

The first element is, how do participants frame MLE? This involves an evaluation of Technology Framing (Orlikoski & Gash, 1994) that considers: What do participants think MLE is? What does it mean for the university? And what is the experience of MLE technology in use? Through an evaluation of frame congruence between individuals, the analysis can identifies key actors and coalitions attempting to gain control over the sequence and direction of MLE development in the case studies.

Second, the CM perspective is evaluated in order to frame MLE development in each case study through the influence of a MLE CM. This illustrates the process of socio-technical alignment of key actors and coalitions in the case studies through the boundary of the university to key constituents in the MLE landscape.

Third, the analysis then evaluates An Ecology of Games framework in order to frame the influence of a broader ecology of interests in which the MLE CM is situated. This evaluation includes an evaluation of the combination of CM analysis and An Ecology of Games analysis.

### **3.4.2 Technology Frames**

In socio-technical research focusing on organisational change through computerisation, the notion of 'technology frames' has been used to examine the underlying assumptions, expectations, and knowledge that people have about technology that is being adopted in their organisation (Orlikowski & Gash, 1994; Orlikowski, 1992; Bjørn, *et al.* 2006; Davidson, 2006). The premise underlying a technology frames analysis is that to interact with technology, people have to make sense of it and in this sensemaking process, people develop particular assumptions, expectations, and knowledge of the technology, which then serve to shape their subsequent action towards it.

Technology frames include interpretations of the general nature of a technology and contextual interpretation about its place in the organisation. This includes not only the nature and role of the technology itself (because technologies are social artefacts, their material form and function will embody their sponsors' and developers' objectives, values, interests, and knowledge regarding that technology), but the specific conditions, applications, and consequences of that technology in particular contexts of use.

Technology framing uses the notion of congruence in technological frames as referring to the alignment of frames between groups on key elements or categories. Shared technological frames emerge from an alignment process that involves the congruence of the individual technological frames on key elements and categories they use to understand technology in organizations (Orlikowski & Gash, 1994). Frame incongruence on the other hand is when there is disagreement between groups in key aspects of the technology frame. This is apparent, for example, when managers expect a technology to transform the way their organisation does business, but users believe the technology is intended to merely speed up and control their work. Therefore, where incongruent technological frames exist, organizations are likely to experience difficulties and conflicts around developing, implementing, and using technologies (Orlikowski & Gash, 1994, Bjørn *et al.* 2006). The idea of frame congruence is related to Bijker's (1997) concepts of frame stabilization and closure. Such stabilization occurs within a relevant social group when members begin to talk and think about the technology in increasingly uniform and certain terms. When the frames of relevant social groups are congruent, they may have reached closure within the organization.

Orlikowski and Gash (1994) characterise a technology frame by three categories:

- 'nature of technology', which refers to people's images of the technology and their understanding of its capabilities and functionality.

- 'technology strategy', which refers to people's views of why their organization acquired and implemented the technology (includes understanding of the vision or motivation behind adoption decision).
- 'technology-in-use', which refers to people's understanding of how the technology will be used on a day-to-day basis, including the conditions of use.

In a case study, technology frames may be used to track changes in the meanings people ascribe to information technology over time, hence providing a way of investigating the processes and outcomes of organizational change around information technology (Orlikowski & Gash, 1994).

In a comprehensive review of the use of technology frames to study technology adoption, Davidson (2006) observes that the technology frame stream of research has not reached the level of a theory because there has been no standard approach to categorising technology frames across organisational studies. The variation in content categories found in such technology framing studies is considerable.

Despite the variation in themes, across the range of technology frame research general points about technology frames and adoption can be made. The first is that frame structure in itself can be a determinant of technology adoption. For example, Davidson cites Walsh, Henderson, and Deighton (1988) as finding that narrow knowledge coverage in a technology frame and high consensus in relation to the frame in the organisation were associated with decision-making efficiency for well-defined problems. Also, research has found that cognitive diversity was important in open-ended planning stages but that integrated, focused cognition during implementation improved organizational performance (Davidson, 2006). This points to the importance of the dynamics of a technology frame, the way that the shape of the frame is associated with its mobilising potential. A narrowly defined frame, such as the MLE frame, may be associated with mobilising for consensus.

The idea that a technology frame includes local knowledge that contextualises the use of a technology is useful in the context of this organisational study of MLE adoption and implementation. However, a focus on a technology frame is prone to background the social context of technology adoption. In their study of collaborative systems adoption, Bjorn *et al.* (2006) acknowledge that a technology frame is a scheme constructed through the individuals' existence in various social contexts outside and internal to the organisation. Whilst acknowledging the broader social context of adoption, Bjorn *et al.* focus on factors that are directly related to an organisationally bounded context of technology adoption, arguing that this identifies a number of factors which are directly related to the context of technological adoption. However, any number of factors external to the organisation may trigger new interpretative processes. As the SST and SI perspectives demonstrate, the broad context of adoption can be as critical as the organisational context. Environmental triggers such as the development of a new technology, market changes, moves by competitors to employ a new information technology, regulatory change, etc may trigger interpretive shifts within an organization. Limiting categorisation of technology frames to within organisation processes would limit understanding of the adoption process.

It is questionable whether congruence or incongruence among groups' frames is a critical factor. For example, key actors' interpretations of change in the organizational environment are important triggers for interpretive shifts within the organization. Key figures such as project champions or new technology leaders can have great influence on organisational interpretative processes. Davidson (2006) suggests that investigating the circumstances that trigger such interpretive shifts could broaden technology frame research beyond an emphasis on incongruence as a key factor in technology implementation.

The possible limitations of technology framing analysis are summed up by Gal and Berente (2008):

*...we argue that since the framework is technologically centred, temporally bounded, and individually focused, its use as a theoretical lens can limit*

*researchers' ability to understand the underlying drivers and impediments to IS implementation. By solely using a technological frames framework, researchers can make themselves vulnerable to mistakenly attributing symptomatic effects, represented by the observed technological frames, with causal power. (P134)*

In summary, technology framing in a university needs to consider macro, meso and micro elements in the adoption and implementation process. The interpretation of a technology in an organisation is a collective process and part of the political process of technology configuration that shapes organisational expectations. These interpretations will be influenced by macro level framing of what a technology is and what it is good for, such as the collective framing of a CM.

The categories of technology framing of what a technology is, what it means for the organisation and what it is in use are useful ways to frame the ideological work of creating expectations for a technology and university, but have to be contextualised with wider socio-technical interactions. These conclusions are added to the framework of technology configuration processes in Table 3.3 to enrich the section concerning the ideological work in the university.

Managing the conjunction with wider landscape	Organisational work of key individuals and coalitions	Types of activity
Managing the conjunction or boundary of the university and wider landscape	1. Structural Work/Strategies	Coalition building Steering groups 'Back room' fixer/manipulations to promote or thwart technology Accessing/Controlling resources
Adopting an MLE world view	2. Ideological Work	Shaping expectations of MLE for the university. Technology framing: 1. What a technology is 2. What it means for the organisation 3. What it is in use

Table 3.3 Technological Adoption and Implementation Processes with Technology Framing

The evaluation will now turn to the evaluation of frameworks used for interpreting the influence of the MLE context: Computerisation Movements and an Ecology of Games.

### **3.4.3 Computerisation Movements**

In the MLE landscape there is regularity in framing MLE such that the MLE vision involving high expectations of internet working in the university, guides a section of MLE practice in universities. Computerisation Movements (CMs) are associated with the strong influence of a utopian technological vision process across different organisations and settings. In a CM, advocates of a particular kind of technology use a technological vision to mobilise support for computerisation projects.

The CM orientated analysis differs from most organisational analysis of computerisation by considering computerisation movements which cut across society as important sources of mobilising ideologies for computing advocates (Kling and Iacono, 1994; Kling, 1996; Iacono, 2001)

*Computerisation movements are a useful way to explain the social mobilisation for technologies where the same ideologies and debates recur across diverse social settings (Kling & Iacono, 1994, p228)*

Kling and Iacono (1994) note that the adoption, acquisition, installation and operation of computer-based systems is often much more socially charged than the adoption and operation of other equipment, like telephone systems for example. Participants who are often highly mobilized adopt and adapt to particular computing arrangements through collective activities. These collective activities take place both outside and within computerizing organizations and share important similarities with various other social, professional, intellectual, and scientific movements.

The motivating ideologies of computerisation movements promote a social order through the use of a particular family of technologies (Kling, 1991; Kling & Iacono, 1994). They usually claim that particular technologies will improve society in the future. Iacono and Kling (1994) make the point that they develop and encourage ideologies about what computing is good for and how people should manage computerisation projects. In this way computerisation is a process deeply embedded in the society beyond the boundary of a particular organisation or setting.

Iacono (2001) explains that studies in computing in organisational settings usually ignore the ways organisational members develop beliefs about what computing technologies are good for and how to organise them. It is important to better understand the process of acquiring such beliefs because it is strongly committed advocates who often drive computerisation projects. The widespread and accelerating pace of computerisation therefore, they contend, requires explanation beyond market approaches for although vendors and trade associations are powerful players, their actions alone cannot account for widespread computerisation.

Though CMs are loose collectives, the CM framework has several structural elements. We next evaluate these. Then framing process associated with CM are described, including a consideration of CM framing in the micro context of the case studies. This description of framing processes is enriched through a more detailed review of framing associated with a homogenous concept to CM, social movements. A CM framework is then developed and used to frame an MLE CM in Higher Education through which MLE advocates collectively frame MLE developments and mobilise support for MLE developments.

#### ***3.4.3.1 Structural elements of Computerisation Movements***

CMs have a number of structural elements. Distinctions can be made between reform and revolutionary movements and general and specific movements. They can be societal in scope, or “specific,” in which case they are sub movements

within a larger general movement. They can stand in two relations to the prevailing social order; “revolutionary” movements attempt to change the order and “reform” movements attempt to change a restricted domain within the order (Iacono, 2001).

CMs generally advance the interests of elite groups. This is because members of CMs often see themselves as fighting existing institutional arrangements and have to form coalitions with elite groups because of the large resource commitment involved in computerisation projects (Kling & Iacono, 1994). CMs are not likely to seek explicit public sympathy as they are trying to create change in settings where this is of little help. Consequently, they are more inclined to mobilise support through professional and organisational social networks, leaving less of a public trace.

Key advocacy for particular technologies comes from broad professional organisations which have sub groups acting as a movement organisation (CMO). Participants in movements are identified across a broad field. They include advocates involved in the implementation of computer system in organisations, meso level actors, such as, consultants and organisations, and major shapers of movement discourse. Events such as public forums, trade shows and school board meetings enhance interactions among participant groups (Kling & Iacono, 1994).

CMs have historical trajectories along which they gather momentum and then follow one of several paths. A CM can emerge, gain momentum and exert increasing pressure along one course of technological innovation or it can emerge, gain momentum then fade. The roles that CMOs play over time change as the circumstances of the movement change. There are two key functions that remain constant along a CM trajectory and must be enacted for the continuation of the CM: the need to recruit new members and the continued support of the discourse of a core ICT (Hara & Rosenbaum, 2005). These structural elements of an MLE CM that have been described are illustrated in Table 3.4. This Table compares the structural elements of a CM with MLE developments in order to begin to compose MLE developments as a CM. Elements of the MLE context

evaluated in Chapter Two are compared to the structural elements of CM discussed. This Table is referenced in the analysis of the influence of structural elements of an MLE CM on MLE developments in the case studies as part of the master CM analytic framework (Table 3.7).

<p><b>Structural elements</b> Type of CM</p> <p>Serve interests of elite groups</p> <p>Mobilise through professional and organisational social networks</p> <p>Highly motivated advocates drive computerisation projects in organisations</p> <p>Same ideologies and debates across different settings</p> <p>CMO (framing work, generate resources, structure membership expectations, educate the public, and ensure the presence of recognized leaders who can lend their prestige and inter-organizational connections)</p>	<p><b>MLE CM</b> Specific, revolutionary movement born of general internet working movement</p> <p>Working groups of principals &amp; senior managers, government agencies and IT suppliers</p> <p>Professional associations very influential</p> <p>Projects often led by MLE ‘champions’</p> <p>Regularity in MLE landscape rhetoric</p> <p>JISC Joint Scottish Funding Council Professional groups</p>
<p><b>Trajectory</b></p> <p>Momentum</p> <p>One linear path of increasing influence</p>	<p>MLE CM works to keep momentum: reflected in work of JISC: more momentum in Scotland</p> <p>MLE CM associated with a trajectory of ‘standard’ portal led development</p>

Table 3.4 Structural elements of an MLE Computerisation Movement

### 3.4.3.2 Computerisation Movement Technology Framing

The concept of technological framing as broad concept of societal framing of technology was established by Bijker and Law (1992) who used technological frames to describe the ways that social meaning is attributed to technical artefacts that tie together interested social actors. They list the major dimensions of

technological frames as goals, key problems, problem-solving strategies, requirements to be met by problem solutions, current theories, tacit knowledge, user practices and exemplary artefacts. Taken together, these dimensions constitute the meaning of a particular technology and frame it in specific ways.

In computerisation movement theory this concept of technological frame is combined with a process of collective framing to explain how meanings can be collectively negotiated, shared and acted upon in the concept of the Technological Action Frame (TAF). Iacono (2001) describes TAF as:

*...composite understandings -- constituted and circulated in language -- that legitimate high levels of investment for potential users, and form the core ideas about how a technology works and how a future based on its use should be envisioned. (p96)*

Using categories of TAF provided by Iacono (2001), Table 3.5, overleaf, evaluates MLE as a TAF. The evaluation is drawn from data concerning what the nature of MLE presented in Chapter One and data drawn from policy documents analysed in Chapter Two.

TAF elements	MLE TAF
1. Utopian vision of new order brought about by technology	'Transformation' of the university for online delivery 'Seamless' sectoral e- learning system based on e- commerce model Online learning is desired and causes no problems 'Blended learning' is desired
2. Beliefs about what a technology can do	*Provides 'Any time, any place learning' that is desirable * Systemised standardisation of higher education will produce efficiency * ICT will 'level the playing field'
3. Current theories	Systems theory
4. Practices	<ul style="list-style-type: none"> <li>• Centralisation of computer management</li> <li>• Centralised data management: centralised database, centrally managed networks to configure with new laptops, networked 'data less' workstations throughout the campus.</li> </ul>
5. Exemplary artefacts	Configuration of socio-technical processes around 'Student 'portal' offering content delivery and self service university processes  Heterogeneous systems phased out, standard systems advocated

Table 3.5 Evaluation of the Managed Learning Environment as a Technology Action Frame

This table is used as a reference in analysing the ideological work of key actors and coalitions as a process of MLE TAF framing. In this way the framing of MLE expectations in the case studies can be compared to MLE TAF elements in Table 3.5 and are incorporated in the CM master analytic framework.

In their study of the internet working CM, Kling and Iacono (1994) find that the rhetoric of time and space elimination dominates the framing of internet working. This revolves around the belief that internet working makes space and time unimportant in any context of use. The internet working CM has created several sub movements. These have formed around rhetoric's of work automation, work collaboration and distant forms of work.

The same authors also found that the computer based education CM has been strongly affected by the internet working CM. For example, advocates of computer-based education promote utopian images of information-age schools where students learn in cooperative, discovery-oriented settings and where all teachers can be supportive, enthusiastic mentors (Iacono & Kling, 1994). This Computer Based Education Movement began in the mid- 1980s and in the USA several private colleges and universities required all their incoming students to buy a specific kind of micro-computer to use at school. Other schools invested heavily in visions of a wired campus, increasing computer lab space and wiring the dorms, libraries, and study areas for network connections. There was also a major push to establish computer literacy and computer science as required topics in the nation's elementary and secondary schools. In the mid-1990s, virtual classrooms had become the focus, enabled by computer conferencing, digital libraries, distance teaming, and global networking. These new instructional vehicles are being promoted and funded national agencies concerned with technology development and education, including national government. To mobilize support and generate resources for enabling large scale visions of national development at the local level, partnerships and collaboration among business, government, school, and the community were encouraged.

Iacono (2001) finds that five beliefs are central to the internet working CM that legitimate rapid large scale adoption of internet working. They envision what internet working will create and characterise resistance as people irrationally clinging on to old ways.

These beliefs are that internet working:

- is central to a new world order,
- can further revolutionize the world order,
- pushes the conceptual limits of time, space, and the known world,
- no one loses from internetworking and
- irrational resistance is the only obstacle to success

As illustrated in the MLE TAF, the general belief system of MLE correlates with these beliefs about internet working, suggesting that MLE can be viewed as a sub movement of the general internet working movement.

### ***3.4.3.3 Social Movements***

The following section provides an evaluation of the collective framing process of social movements which we find is a useful way of enriching the TAF processes of computerisation movements described so far. There are many similarities between social movement theory and CM theory (Iacono & Kling, 1994; Iacono, 2001). This evaluation enriches the theoretical analysis of TAF processes in the case studies by adding a more detail view of collective framing processes.

Attention to the micro – macro link has fostered the study of patterns of social organisation which mediate between individual actors and macro social processes. The social movements (SMs) perspective is a theoretical approach that attempts to do this. Within the social sciences there is general agreement that SMs can be viewed as collective enterprises to establish a new order of life, which is resonant of the way a CM seeks to create a new order through computerisation. As with a CM, SMs are viewed as loose collectives in which participants engage in collective action (Diani & McAdam, 2003).

Discourse is a key alignment mechanism in the operation of social movements and the development of a group ideology is an aspect of SM perspectives (Porta & Diani, 1999). An ideology consists of a body of doctrines, beliefs and myths including a statement of the objective, purpose and premise of the movement. It provides a body of criticism and condemnation of the existing structure it is seeking to change, a body of defence doctrine justifying the movement and a body of belief about policies, tactics and personal operation within the movement. These are all underlined by the myths of the movement (Blumer, 1951). It serves to package events in a manner that maintains an ideological view of the world (Snow & Benford, 1988). Overall, the ideology must provide an answer to the distress, wishes and hopes of the people. Unless it has this popular appeal, it will have no value to the movement (White, 1992).

Framing in an SM is an active, political process for movement participants that should not be confused with shared interpretative schema. Social movement scholars conceptualize this signifying work or meaning construction by

employing the verb “framing” (Gamson *et al.* 1982; Snow, 2004; Snow & Benford, 1988). This denotes an active process involving agency in the ‘construction’ of reality. Resultant frames are referred to as Collective Action Frames (CAF). CAF also condense reality but in a way that is intended to mobilise potential adherents, garner bystander support and demobilize antagonists (Benford & Snow, 2000). CAF are ‘action orientated sets of beliefs’ that both inspire and legitimate the activities of social movement organisations. CAF are the outcomes of negotiating shared meaning. Schemas and frames interact, with CAF providing a broad base interpretation to what is going on and, crucially, what should be going on (Benford & Snow, 2000).

CAF are constructed in part as movement adherents negotiate a shared understanding of a problematic situation they define as in need of change, make judgements as to who or what is to blame, formulate and advocate an alternative course of action. Snow and Benford (1988) refer to corresponding core framing activities as ‘diagnostic framing’, ‘prognostic framing’ and ‘motivational framing’.

In diagnostic framing, ‘adversarial framing’ and ‘boundary framing’ are aspects of framing that delineate good and bad, producing accounts of who and what are good for the movement and who or what is bad. Prognostic framing tends to take place in a multi organisational field and constructs causes of action that are aligned to diagnostic framing. Motivational framing constructs a vocabulary of motives in which different but interrelated vocabularies of agency may emerge that provide compelling accounts of the advantages of participating in the movement.

In creating these aspects of framing, movement adherents deal with two interrelated problems of ‘consensus mobilisation’ (creating agreement amongst movement participants) and ‘action mobilisation’ (fostering action). Benford and Snow (2000) describe frame resonance as crucial to the mobilising power of the frame. Three factors which effect frame resonance are frame consistency (lack of contradictions), empirical credibility (claims backed up with evidence) and the credibility of frame articulators. All these will be factors in the frames resonance

with targets of mobilisation. Here such factors will indicate frame resonance in the case study universities.

The narrative form of frames can be characterised by 'frame amplification' and 'frame articulation'. In the former, punctuated or accented elements are emphasised that symbolise the larger frame, for example 'power to the people'. In MLE discourse phrases like 'any time, any place learning', 'blended learning' and 'transformation' are frame amplification. In 'frame articulation' people and events are strung together in narratives that illustrate the frame.

Frame alignment processes include the efforts of SMOs to align an interpretative frame with the interests of a potential constituent. This 'Frame bridging' links interests in an interpretative frame. 'Frame transformation' refers to changing old meanings or understandings to new ones. The repackaging of distance education in MLE discourse as 'any place, any time' e-learning is an example of frame transformation.

Within the CM perspective collective counter framing is undertaken by counter movements, which to some extent resist power elites associated with a CM (Iacono & Kling, 1996). No well-organized opposition or substantial alternative to a CM has been found however (Kling & Iacono, 1994). Such a movement would have to rest on marginal, technologically anti-utopian visions of computerization in social life which is unlikely to have the general and pervasive appeal of CM discourse. Also, counter framing is likely to be locally specific, challenging more localised changes.

In SM research, counter framing efforts can anticipate movement framing and make moves to undermine anticipated characterisation of opponents. For example, the Chinese democracy movement anticipated the state characterisation of them as counter revolutionary and drew on Chinese cultural images of community devotion and self sacrifice as a counter tactic (Zuo & Benford, 1995).

By utilising this evaluation of SM framing processes, in Table 3.6 MLE TAF processes are further developed. In the Table, each element of SM framing is

illustrated by MLE TAF processes. These are referenced in the analysis of technology framing processes in the case studies.

Framing details	MLE TAF
<p>Framing:</p> <ol style="list-style-type: none"> <li>1. 'diagnostic framing': including 'adversarial framing' and 'boundary framing'</li> <li>2. 'prognostic framing': takes place across multiple SMO's</li> <li>3. 'motivational framing': compelling accounts of the advantages of participating in the movement.</li> </ol>	<p>Need to generate income and eliminate variable cost of expansion. Traditional university is out date in internet age.</p> <p>Ability to manage the student 'life cycle' online through ICT and content delivery system. Needs systematic approach to ICT across HE sector.</p> <p>Ability to exploit global, p/t and post grad markets. Standardise 'old fashioned' university processes. Expansion at no variable cost.</p>
<p>Framing tasks: 'Consensus mobilisation', 'Action mobilisation'</p>	<p>Urgent 'Transformation' emphasised in Scottish context</p>
<p>Frame bridging</p>	<p>Attempt to recruit universities as consortia and suppliers in coalitions by aligning interests</p>
<p>Frame transformation</p>	<p>Recreating 'efficiency' of distance education</p>
<p>Frame resonance</p>	<p>Maintaining frame consistency (lack of contradictions), empirical credibility (claims backed up with evidence) and the credibility of frame articulators.</p>

Table 3.6 Managed Learning Environment Technology Action Frame Processes

#### ***3.4.3.4 The Influence of Computerisation Movements in Micro Social Contexts***

The CM and SM processes discussed have an emphasis on macro level processes. They generally describe ways that CM participants interact with the CM movement. Though this is an important element of the study, the research also aims to frame the actions of MLE CM participants in micro contexts. As Iacono (2001) notes, the CM perspective focuses on the wide-scale recruitment of constituents for broad social change, and typically fails to examine how organizations are sites for social action and change. A specific framework

concerning the way that CM participants work in organisations is now evaluated that enriches the evaluations in Tables 3.4, 3.5 and 3.6.

Several features of TAF processes in micro contexts can be drawn from the CM framework and evaluation of SM framing that can be used in the theoretical case study framework. Institutional discourse may add operational specificity to the TAF, but this is a collective process that is geared to maintaining the mobilising power of the TAF. There is likely to be disparity between a movement TAF and experience of implementation at local level as there is either a time lapse or/and process constraints on the flow of understanding from local sites of implementation to CM sites of macro framing.

Participants may modify their technology frames as they struggle to discuss the actual complexity of their practices. As a consequence, practices can generate new discourses and new discourses can build up new technological frames. However, the flow understanding of technology in local practices to influence macro level framing is uncertain because organisational actors interpret technology according to dominant macro framed interpretations (Iacono, 2001). The same author also explains that much of local technology practice is tacit, and may not be critically evaluated in local contexts. Even when new understandings become part of local discourse, they often remain local rather than being circulated across other organizations and social settings. Therefore, TAFs can remain relatively stable and misrepresent actual practice for long periods of time.

Within micro-social contexts, social groups struggle over the meaning of these new technologies as they amplify or contend with the dominant TAF to fit their own preferences and goals. As illustrated in Table 3.6, frame resonance refers to mobilising power of the frame. This is therefore a crucial process in the way a TAF mobilises support in a local context. Advocates are therefore likely to try to maintain frame resonance in the face of local experience of implementation of MLE. The resonance or mobilising potential of the TAF in the local context will be stronger if it aligns with powerful industry players within the industry ecology. CM proponents within specific organizations and professional associations engage in collective activities, such as, committees to develop and

circulate white papers and inviting knowledgeable experts to committees or professional advancement forums and seminars. These activities educate their members about what these technologies might do for them (Iacono, 2001).

This evaluation of the influence of a CM in micro context completes the CM evaluation. Taken together the evaluations of CM structure, CM Technology Framing and the influence of a CM in micro context form a master framework for the CM analysis of MLE developments in the case studies. This master CM frame work is detailed in Table 3.7 overleaf. It describes the CM processes discussed and their corresponding actions of a MLE CM in the university.

CM process	Action of MLE CM in the university
1. Technology framing	1. Ideological work: Framing expectations through MLE TAF (ref Table 3.3):
2. Creating TAF dominance	2. Colonising university with MLE TAF
3. Keeping high expectations	3. Maintaining non critical interpretation of technology
4. Collective TAF maintenance	4. New understandings and evaluation discourse not circulated
5. Recruiting CM participants	5. Collective 'educating' about CM TAF: events, invited 'experts' (ref Table 3.4)
6. Creating Frame Resonance	6. Work to maintain TAF resonance in local context (ref Table 3.6)
7. Resource mobilisation	7. Accessing movement resources by aligning to CM networks. (ref Table 3.4)
8. Controlling technology trajectory in the university	8. Structuring work to control computing projects

Table 3.7 CM Master Analytic Framework

In summary, this evaluation of CM has developed a framework which characterises the influence of an MLE CM at organisational level. This provides a template of MLE CM framing and action that can be used to frame the case studies.

The next section of the thesis evaluates an Ecology of Games as a way of enriching the analysis of the way MLE actors interpret MLE developments in their context of use.

### 3.4.4 An Ecology of Games

Though MLE has become a policy initiative in higher education, actors interpret their own interests in relation to MLE. Reference to the interests and strategies of actors in processes of inter organisational innovation are common in SST where innovation is shown to be a complex mix of cooperation and competition, with no single actor dominating or directing development. This phenomenon points to a multi layered model of how interests in the sector interact, and a careful dissection of the advantages and disadvantages to any one of them of particular strategies (Williams & Edge, 1996). In this way an Ecology of Games focuses on outcomes as a result of the strategies of local players. As Dutton (1992) explains:

*A move away from macro level structure of power analysis as a means to explain policy outcomes to a focus on the micro level, particularly the rules, goals and strategies guiding the behaviour of individuals at a micro level to explain outcomes at the macro or aggregate level. (P306)*

Dutton (1992) uses an Ecology of Games metaphor to analyse the development of telecommunications in the US. He found it to be a rich source for examples of an unfolding history that reflects many features of an Ecology of Games. Such games can be defined as *arenas of competition and cooperation structured by a set of rules and assumptions about how to act in order to achieve a particular set of objectives* (p1, Dutton 1992)<sup>1</sup>. Games give players a sense of purpose in developing strategies and roles.

In an Ecology of Games policy outcomes do not result from a system of demand and supports, the outcome of pluralist or elitist decision making or as a compromise between interest groups, but as an unfolding history of separate but independent games. In such an ecology, the behaviour of individuals and groups is organised around games. Dutton (1992) cites Crozier and Friedberg (1980) as describing how organisations can be viewed as collections of games of

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<sup>1</sup> Jorgensen and Sorensen (1999) use the metaphor of 'development arena' to describe a cognitive space that holds together the heterogeneous relations between artefacts, actors and standards; locations of related knowledge and action; and visions and 'translations' that shape stabilisations and destabilisation of relations. Rather than an emphasis on structured action the arena metaphor is used to capture the flux and change of technological development.

interrelated games. For example, a technical specialist may be working on creating a perfect technical system within a particular game that rewards such an endeavour whilst a manager may be looking for cost reduction through the technology in a managerial game. The ecology of games therefore questions how much technological innovation can be 'managed' because individuals and groups pursue their own goals within their own domains.

Ecology refers to that conception that not all players in any given territory, such as an organisation or geography are involved in the same game. The idea of ecology also relates to the fact that there is likely to be an interrelated system of actors and that players are likely to be involved in a variety of games (Dutton, 1992). Ecologies are likely to be extremely complex systems of interaction in which games are interrelated through the flow of resource or prizes, players playing in more than one game at the same time and plays in one game effect plays in another. Because players are involved in different games, when the actions of players appear irrational to an observer, it is likely that the observer does not know the games in which players are most centrally involved. It may appear irrational because the players' moves in one game might be constrained by their moves within other games.

The following section evaluates an Ecology of Games perspective with the aim of developing a theoretical framework which will work together with the CM framework. In this analysis the games metaphor is a: *sensitizing concept within a qualitative, case study mode of inquiry, which differs from a concept intended to be operationalised within a quantitative survey or represented within a formal, mathematical model* (Dutton 1992, p311).

An Ecology of Games focuses attention on the symbolic politics or the role that ideas play in policy change. Dutton (1992) describes one such key 'symbolic shift' as the idea that ICT would usher in new business and industries, the information economy. This brought in one time spectators, economic and industrial elites, into ICT related games as key players. Another symbolic shift was the growing awareness of convergence of ICT, as the technological distinctions between print, cable, broadcasting etc became blurred. Dutton (1995)

also describes how 'symbolic shifts' frame the possibilities of a technology. One such symbolic shift that affected the Ecology of Games surrounding telecommunications was the idea that communications and information technologies was an impetus to new business. For example, in Japan, Western Europe, and the United States economic and industrial elites, at one time spectators, began to enter as key players in conflicts over telecommunications policy.

Games have several main characteristics. First, a game has a set of players, defined by the fact that they interact, compete or cooperate-with another in pursuing the game's objectives. Every game has a set of goals, purposes, or objectives<sup>2</sup>. Second, a game has a set of prizes, which may vary widely from profit to authority to recognition. Third, games have rules that govern the strategies or moves open to players. Finally, plays (i.e., moves or actions) made in one game can affect the play of others.

In an ecology, games are related to each other and the outcomes of one game might affect the rules or play of another. In the context of higher education, Firestone (1989) comments that each game in an ecology requires input from the others: yet each is won or lost on its own terms. Firestone goes on to suggest that linking educational policy games are the flows between them: downward flows of resource and regulation and upward flows of demand, for example (p19). The same author describes policy games in the education sector that involve an ecology between the government administration game, district and school administration and the teaching games. Top level inputs in the policy game are political demands which are translated into educational policy and programmes of action at sectoral level. Individuals in these games are motivated by the prizes of career progression through meeting policy goals. At the level of the educational game, winning consists in seeing students through the curriculum and policy and programmes are interpreted in terms of whether they help or hinder this goal (p19).

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<sup>2</sup> The struggle to get technologies to work in local contexts can often mean the goals of actors are reshaped or redirected, therefore they should be viewed as fluid and multiple.

Defining issues is a way that central players or contestants shape games (i.e., using the politics of ideas) in order to change the scope of conflict and cooperation (i.e., by incorporating or excluding spectators) or to alter the nature of cleavages that determine how the players choose sides. Unlike the sporting analogy, the rules of games are not fixed but in themselves become objectives of competition and conflict. As Dutton (1995) notes, sometimes the rules themselves are unclear and require a mechanism, such as an umpire, to interpret rules and their application.

Dutton (1992) describes the development of telecommunications policy in the USA as an example of a 'giant game' made up of many sub games. For example, the one sub game, 'public utility game', was organized around the provision of efficient telephone services to residential, business, and government customers in a universal and equitable fashion in return for monopoly revenues to the private telephone companies. Telephone companies, groups representing business and residential users, the Federal Communications Commission (FCC), and state public utility commissions were some of the key players negotiating over regulatory policies, such as rate-of-return pricing. The rules of this game were established by the Communications Act and by state legislation as interpreted by their respective regulatory agencies. The play of this public utility game was importantly influenced by a boundary drawing game, which pitted the telephone companies against new telecommunications equipment and service providers, with the FCC serving as umpire. The MLE landscape can be interpreted in a similar fashion using an Ecology of Game analysis

This evaluation of an Ecology of Games is summarised in Table 3.8. This shows dimensions of a game, dimensions of an Ecology of Games and effects of Ecologies of Games. The study will use these categories to present an interpretation of the MLE landscape as an Ecology of Games in the analysis of the case studies.

<b>Dimensions of games</b>	<ul style="list-style-type: none"> <li>• Defining issues is a way that central players or contestants shape games</li> <li>• Games strongly influenced by ‘symbolic shifts’ in framing of ICT</li> <li>• Arenas of competition and cooperation structured by rules and assumptions about how to act in order to achieve a particular set of objectives.</li> <li>• Set of players (interact, compete or cooperate-with another in pursuing the game’s objectives)</li> <li>• Set of goals, purposes, or objectives</li> <li>• Rules that govern the strategies or moves open to players.</li> <li>• Players strive for prizes</li> <li>• Player makes plays or moves</li> </ul>
<b>Dimensions of ecology</b>	<ul style="list-style-type: none"> <li>• Games are interrelated through the flow of resource, prizes and issues. Players playing in more than one game at the same time and plays in one game effect plays in another</li> <li>• In HE context, downward flows of resource and regulation and upward flows of demand</li> <li>• Umpire role sometimes established</li> <li>• Explains outcomes at aggregate level</li> </ul>
<b>Effects of ecology of games</b>	<ul style="list-style-type: none"> <li>• Games give players a sense of purpose in developing strategies and roles.</li> <li>• Organisations can be viewed as a collections of games of interrelated games</li> <li>• Players’ moves in one game might be constrained by their moves within other games.</li> <li>• Actions of players playing interrelated games appear irrational to an observer unaware of ecology</li> </ul>

Table 3.8 Dimensions of an Ecology of Games.

The next section of the thesis evaluates that way that the CM framework can be situated within an Ecology of Games. It considers the similarities between the two frameworks that allow them to be combined.

### **3.4.5 Combining an Ecology of Games and Computerisation Movements**

Dutton (2005) first made the case that it might be useful to embed the conceptions of social movements, technical invention and public policy within a framework of action that sees technological shaping as an unfolding interaction of various actors pursuing a diverse array of goals and objectives.

An Ecology of Games provides the basis for an integrative framework in which to analyse the co evolution of economic, cultural, organizational, legal and other intertwined dimensions of social transformations such as the social transformations envisaged by CM. Dutton (2005) illustrates the value of the Ecology of Games in illuminating the dynamics and uncertainties of CMs within larger systems of action. These dynamics are associated with the alignment of MLE players in separate but interrelated games across Higher Education.

From the perspective of an Ecology of Games, no one governs MLE development in the rational-comprehensive sense, as the MLE ecology is ever evolving, bringing in new players, interpretations and challenges. Instead, most actors try to win more focused prizes. However, MLE development is part of a policy process. Firestone (1989) makes the point that the education sector, educational policy games are linked by the downward flow of resources and regulation and the upward flow of demands.

This research situates a MLE CM within a larger game ecology of UK higher education. This combination of theoretical frameworks is envisaged as follows. First, in their work, members of the CM (MLE players) are concerned with changing or reconfiguring established games within the UK higher education ecology of games. Secondly, MLE players are guided by the MLE TAF which acts as an ideological resource in their context and a mechanism of alignment between MLE players. In this way the MLE TAF is both a mobilising resource and a set of rules guiding the actions of team players in separate but related games. Players can access resource flows in MLE CM networks in return for playing to the MLE CM rules. Third, by aligning with a CM players can achieve prizes in their local context through accessing collective mobilising resources

and expertise that help them achieve career goals in their own spheres of operation. Fourth, through a process of alignment, elite players in the MLE landscape can achieve a level of coordination across the ecology that suites their interests. The alignment of CM and an Ecology of Games is illustrated in Table 3.9 overleaf. This describes the similarities between the two frameworks concerning the way a technology is interpreted and expectations generated. The main point is that both share a focus on the flow of resources (ideological, material and symbolic) across macro, meso and micro levels<sup>3</sup>. An Ecology of Games broadens the analysis of socio-technical alignment by situating the MLE CM in a broader system of action.

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<sup>3</sup> These levels are not intended as fixed and completely separate levels and are conceived as relative to the actors discussed and interpenetrating.

Aspect of Socio-technical Action	Ecology of games	CM	Description	Role
Interpretation of technology	Symbolic shift in technological understanding (Dutton 1992)  Issues around technology games	Vision of new order in TAF (Table 3.5)	States problem to be solved  Describes new socio-technical order as a diagnostic  Assigns blame by targeting players in established games	Mobilises support and resources  Opens new games by attracting new players  Guides players to align to interests of key players
Guide to action in games	Rules, Objectives, Tactics Strategies (Table 3.8)	TAF guide to action: Current practices, theories (Table 3.5)	Provides rules for games of reconfiguration	Guides MLE players  Aligns players to interests of elite players  Mobilises support by simplifying socio-technical alignment in the university

Table 3.9 Illustration of the Alignment of Computerisation Movements and Ecology of Games perspectives

Table 3.9 forms the basis of the analysis of MLE development as a MLE CM situated in an Ecology of Games. This theoretically links the case studies to the broad context of MLE development that has been evaluated in Chapters One and Two and forms the basis of the analysis in Chapter Eight.

## ***4 Research Methodology***

### **4.1 Introduction**

This chapter of the thesis evaluates and describes the research approach used in the study. It locates the research approach within the domain of socio-technical research in information systems. The theoretical approach is evaluated and described together with the fieldwork, data gathering and data analysis techniques. The second section of the chapter describes how the research was undertaken including establishing the research sites and the process of data collection and analysis.

### **4.2 Research Approach**

The formulation of the research questions and aims is informed by the Social Informatics (SI) and Social Shaping of Technology (SST) perspectives that technology both cannot be viewed in separation from the context of its development and use and in turn shapes the context of its use. Thus, the research seeks to avoid approaches that treat the IS artefact as a 'discrete entity' (Kling, 2000) with limited consideration of the context of adoption and implementation. The limited appreciation of context is exemplified in the view of the 'user', which Lamb & Kling (2002) describe as a limited appreciation of the nature of socio-technical interaction. They propose that the concept of the user needs to be reformulated as 'social actor', a richer conception of the user of technology as an active shaper of technology, rather than a passive user.

The research approach seeks to understand the complexity associated with the socio-technical milieu in MLE development. Interpretative research can yield a deep understanding of the complex organisational change associated with IS (Silverman, 1998). This research is interpretative and is concerned with the social construction of meaning associated with IT in an organisation (Walsham,

1995). Following Wagner, Scott and Galliers (2006) the epistemological position of the research is aligned with constructivist studies:

*...because multiple interpretations, when combined together, highlight a web of socio-technical agency – an ensemble of interests – that is created and maintained over time (p257)*

As noted by Silverman (2001), interpretive researchers are attempting to access others interpretations, filter them through a conceptual apparatus and then feed a version of events back to others. The epistemology of the study is therefore categorised as non- positivist - data collection and analysis is not 'objective' in the positivist sense. As an aid to explaining the research approach, elements of the approach are compared along a continuum between positivistic research and interpretative research. Silverman (1998) cites Wood Harper (1992) as offering a comparison of various aspects of positivism and the interpretive approach, with the most interpretative approach represented as action research. The research approach of this thesis is located between these two poles as detailed in Table 4.1:

	<b>Positivism</b>	<b>Research Approach</b>	<b>Action research</b>
Scope dynamic	Context free	Context influenced	Context based
Methods	Cause effect relationships	Patterns within and across case studies	Insights which may not be quantifiable
Role of researcher	Detached observer	Interview	Actively involved
Goals	Set by researcher and selected participants	Set by researcher	Negotiated with client group
Outcome	Laws/generalisation	Patterns of behaviour associated with context	Context dependent

Table 4.1 Research Approach (adapted from Silverman, 1998, p5)

The research analyses the views of participants regarding MLE development at a particular time and in particular places and relates these views to a broad social context. As Kling (2000) notes the context of ICT and organisations is a complex matrix of, for example, people, history and type of business. The context considered in this study is multilevel: ranging across micro, meso and macro levels. For example, it may be that a participant's view of MLE may be associated with their personal experience of using an MLE system. It may be that MLE is evaluated in relation to their professional group, such as the way MLE influences the role of the educational technologist. Or it may be that their university has become aligned with a particular type of MLE development for historic reasons and this is influential. All of these perspectives will play a part in interpreting the technology. An important contextual element of the research approach is the historical construction of the trajectory of MLE development at each institution through interview and documentary data.

The research uses a number of theoretical lenses to explain patterns of behaviour that vary with different combinations of context. The theoretic lens of Computerisation Movements (CM) (Iacono & Kling, 1994) and An Ecology of Games (Dutton, 1992) are chosen through the literature review and iteration with the data analysis phase as a way of explaining the shaping of the MLE landscape. Within the CM theory strongly committed advocates drive computerisation projects. Within CM's, technology frames are developed that connect the technology to a preferred social order. It is theorised that MLE movement advocates will import such an MLE frame to local settings to underpin MLE projects. The research constructs a process of MLE CM technology action framing (TAF) and uses this to illustrate patterns of the way that participants interpret MLE. This is done through analysing participants views of MLE and comparing this to the movement TAF process. Alternative MLE frames are also identified within the views of participants that represent MLE counter frames. Technology Frames are related to aspects of CM social organisation drawn from the CM literature to construct a view of behavioural patterns associated with framing of MLE.

A further theoretical lens, the Ecology of Games (Dutton, 1992), was adopted during the analysis stage of the research as a way of enriching the analysis. The Ecology of Games perspective is utilised to enrich the research interpretation by considering what Flyvbjerg (2001) describes actions as the third element of a context dependent situation:

*Context dependence appears to entail an open ended, dependent relation between contexts and actions and interpretations that cannot be brought under rule based closure. (p48).*

The Ecology of Games analysis is a metaphor which interprets MLE related behaviour through game elements such as strategies, moves and rules. This element of the analysis aims to explore the way that individuals and groups interpret their local actions in relation to MLE development. This analysis offers an additional perspective to the macro level organising influence of CM's in a way that seeks to create a richer description. With these combinations of context

and theoretical perspectives the research looks for patterns of interrelationship between the categories of context, MLE related meanings and actions.

Case studies of three universities are presented. Several authors offer advice on how to conduct an interpretative case study (Walsham, 1995; Klein & Myers, 1999; Eisenhardt, 1989). Eisenhardt notes that case study research can be used in three different ways: to describe, to test theory and to generate theory. This research aims to describe through theory. Case study research is defined following Darke, Shanks and Broadbent (1998), as research that investigates predefined phenomena but does not involve explicit control or manipulation of the variables, with the focus being on in depth understanding of a phenomenon and its context.

Klein & Myers' (1999) heuristic check list regarding the case study process also informs the research as an aid to research design, though not a guide, since the methodology differs from this research. For example, the importance of contextualisation informs the development of a detailed historical context for each case study. Also, their advice regarding abstraction and generalization, relating the idiographic details revealed by the data interpretation to theoretical, general concepts that describe the nature of human understanding and social action, is followed through employing several theoretical perspectives. In addition data analysis involved frequent iteration between theory and empirical evidence.

The research uses three comparative case studies to offer analysis of patterns of MLE development in different local contexts. Multiple case studies allow cross case analysis and comparison that aids the analysis of a phenomena across diverse settings (Darke *et al.* 1998). The same authors note that multiple case studies can provide contrasting results. Case study variation is sought that illustrates MLE development in a socio-technical context. The advantage of multiple cases is that they strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the theory. Yin (1994) points out that generalization of results, from either single or multiple designs, is made to theory and not to populations.

In multiple design case studies must follow a replication rather than sampling logic. Selecting cases must be done so as to maximize what can be learned in the period of time available for the study and in doing this the research aims to study institutions with varying characteristics such as age, size and orientation. It is noted that the strategic choice of the case may greatly add to the generalisability of the case study: a good choice may become a 'critical case study', a kind of exemplar of a particular pattern (Flyvbjerg, 2001).

Though the case study method is recognised as a useful way to study the interaction of information systems and organisations, there are several disadvantages. The main disadvantage is the influence of the researcher's background and characteristics on the research process. The research relies on the researcher's interpretation of events, documents and interviews. Researcher bias occurs in two ways: unduly influencing the interviews on site and the researcher's own beliefs, values and prior assumption unduly influencing the analysis of data. The first issue is considered in the section evaluating interview technique (see section 4.3). The second issue would result in the inadequate consideration of possible contradictory data and explanations (Darke *et al.* 1998). One way researcher bias was countered was when the iterative process of data analysis was discussed with supervisors and colleagues. These helped the researcher to maintain a critical stance to the analysis. Work in progress was presented at conferences and workshops and this process of peer review aimed to reduce the influence of researcher bias. These events and subsequent conversations also helped to the researcher evaluate the data analysis process.

Bias in data collection and analysis can be counteracted by the triangulation of data. This involves collecting data from several different sources such as documentation from minutes of meetings, strategy and policy documents etc. Given this, interviews are generally the primary source of data in a qualitative case study. Johnson (1997) notes that a qualitative researcher can use investigator triangulation by considering the ideas and explanations generated by additional researchers and in this sense the research is triangulated with research already undertaken of the MLE landscape and evaluated in Chapter Two. For example, technology framing constructs that were developed during the analysis stage of

'process' MLE and 'standard' MLE, are found to be resonant of the two articulations of MLE found by previous researchers (see section 2.6).

The idea that matching of observed data patterns and theoretical patterns of constructs is associated with construct validity is an element of the validity of qualitative research (Trochim, 1989). The same author considered pattern-matching as one of the most desirable strategies for analysis. This technique compares an empirically based pattern with a predicted one. If the patterns match, then the internal validity of the study is enhanced. The actual comparison between the predicted and actual pattern might not have any quantitative criteria and is an element of the discretion of the researcher. Data analysis builds and matches corresponding data patterns. In this way key constructs, such as the MLE TAF, were constructed from the MLE landscape data. These were subsequently used to identify corresponding data patterns in the case study data which in turn further developed the detail of these original constructs. The research actions that relate to the validity and reliability of the case study methodology are summarised overleaf in Table 4.2.

Internal Validity	Pattern Matching	Theoretical expectations matched with data patterns
Construct Validity	Using multiple sources of evidence  Establishing a chain of evidence  Triangulation	Multiple interviews with broad range of MLE actors. Multiple data sources Analytical phases detailed  Peer assessment, Comparison with MLE research
Reliability/dependability	Creating a case record  Establishing a case study protocol	Transcripts, documents  Evolving interview protocol for each case
External Validity/ credibility	Multiple case studies  Case sampling  Contrasting theory	Same propositions tested in each case  Cases chosen according to standard variable  Theoretical analysis aims for counter expectation data

Table 4.2 Case Study Methodology

### 4.3 Undertaking the Research

The following section describes how the research was undertaken. This includes, first, how the case studies and research participants were chosen and brought into the research process. Second, it offers a description of the fieldwork. Third, it describes how the data was coded and analysed.

#### **4.3.1 The Case Studies**

Cases were chosen on the basis of diversity and practicability. A diverse range of three cases were sought within a convenient distance to the research setting. The universities vary in primarily in terms of age, fitting a standard classification within the higher education domain of ancient, modern and new (Allen *et al.* 2002). Some literature makes the point that MLE is being more rapidly adopted with the new university setting than the ancient (Chapter Two, section 2.6). As such it was decided that age was a good variable on which to base the choice of case study leading to the possibility of contrasting patterns of adoptions across the case studies.

Three universities were identified and potential participants were sought initially through a website search and recommendations of research colleagues. Once participation was accepted from a number of participants in a particular setting, their university was considered a case study university and a focus of the study.

#### **4.3.2 Research Participants**

Chapter Two (Section 3.3) identified that studies ICT adoption in universities should aim to include a consideration of the different 'relevant social groups' involved in interpreting a technology, shaping technological expectations and the determination of whether a technology 'works'. For example, as well as actors in the established university structure who have influence over ICT developments, Dutton, Cheong and Park (2004) suggest that wide spread ICT could create new gatekeepers, such as the technology administrators and technical support staff. The literature review identified key players and coalitions as particularly important in MLE related change in universities. The targeting of participants focussed on key players in MLE related processes that were identified in the literature review (see Table 2.2 MLE Constituents).

These were:

- Educational technologists
- Administrators
- Technical staff
- MLE champions
- IT Support
- Senior managers
- Learning resources/library

Sections such as Educational Development, IT Support and Management Information sections were thus identified as basic starting points<sup>4</sup>. Second, an MLE and e-learning related web search of each institution showed specific actors in each institution who have been involved in MLE action. These participants may be part of a wider range of work sections and are or have been involved in related working groups, strategic initiatives or networks of MLE related work. Third, contacts were drawn from knowledgeable people from the research setting who have knowledge of the MLE scene in Scotland. Lists of potential participants were compiled for each institution. Where there were areas lacking, potential participants were researched and invited to take part in the research. Appendix 1 shows the list of participants.

A request letter was produced and emailed to potential participants (see Appendix 2 Participant Request Letter). At an early stage in this process a standard letter of request was used. However, the researcher found that a number of potential participants had not replied to the email because they did not understand how they relate to a study of MLE. Therefore, as the process progressed the letter was personalised in a way that attempted to make clear how the potential participant would be able to contribute to the research project through their particular experience.

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<sup>4</sup> As evaluated in Chapter Three, this research seeks to identify key actors in the work of MLE adoption and development who are beyond the academic users of MLE.

Where there was no reply from initial emails a second email was sent. If this produced no response, the researcher attempted to contact them, or their secretarial staff, by phone. Some persistence was needed here as participants are busy and may not see participation in the research as important. Here some persuasion was needed to convince them of their potential contribution. On the other hand some participants showed enthusiasm to participate from the initial contact.

Research was undertaken prior to interviews to learn about the research site as well as to identify potential participants. As the interviews progressed the research employed the idea of 'snowballing' in which contacts were gained through asking participants who they thought it would be useful to interview. A large proportion of contacts were generated in this way. This element of the snowballing process was used as one indication of who were key players in later analysis. It was also a particularly useful way to approach new participants as the researcher was able to say that they had been recommended (unless a participant stated that they did not want to be mentioned to the contact) to participate in the study from someone with their own institution.

It was the researcher's intention to maintain interviewees as live contacts. Accordingly, it was practice that interviewees were asked if it would be alright to contact them in the future to arrange a follow up interview. This was usually politely accepted, but the general impression was gained that after a lengthy interview the interviewee would not be keen to repeat the interview exercise as it was in general quite time consuming.

In the appropriation and use of technology, groups are likely to vary in their power over the trajectory of ICT development in organisations (Sorenson & Williams 2002, p70). Control over important aspects of development is likely to involve, for example, crucial influence over the choice of technology, access to ideological and structural resources. Vice Principals, Managers and Heads of Service have more control over resources than other participants. For example, Heads of IT/IS have structural influence over MLE trajectories. Other types of key influences such as ideological resources and key roles in transferring

processes online were found to be associated with Heads of Registry and MLE and VLE managers. This consideration led to the recognition that some participants may be regarded as more authoritative than others due to their control of aspects of adoption and implementation.

The research included detailed web searches of each institution's web site for documents related to MLE activity. A range of documents was collected for each institution including for example, MLE newsletters, minutes of meetings, reports and strategies. Interviewees were asked to direct the researcher to relevant documentation such as internal reports or JISC publications. Documentary evidence was useful when used as a triangulation device to aid to the analysis. It was found that minutes of key meetings, for example, when available, could help construct a history of a group of MLE aligned actors that combines with interview data to create a case study theme.

#### **4.3.3 Interviews**

Interviews took place at the participants' place of work. Interviews lasted between 45 minutes and one and a quarter hours. Interviews were taped and notes were taken concerning the context of the interview and during and after the interviews. The researcher used a mixture of traditional mini tape Dictaphone and digital Dictaphone to tape the interviews. Also, a logbook was used in which notes were taken during the interview.

A research ethics prompt sheet was produced and used to brief participants about the research process and ethical, legal and professional considerations (see Appendix 3 Research Ethics Prompt Sheet). For example, participants were informed that their interview was confidential and that an interview record could be available should they want to view it. Also, participants were asked if they objected to their interview being taped.

In generating interview technique there is a need to be informed about the domain and to structure the interview in a way that covers areas which will be

relevant to theory generated in the literature review (McCracken, 1988). The same author advises that this must not reach the point of dictating the interview and introducing theoretical (second order constructs) constructs to the respondents through researcher questions. Here the researcher endeavoured not to bias the participants' interpretations by introducing research generated constructs in questions. This was achieved by following an interview protocol.

Also, general areas of interest were brought to the interview in the development of the interview protocol. These included personal involvement with MLE and interpretation of what MLE is, the history of the participants interaction with MLE, organisational transformation through technology, MLE related pedagogical issues, the rhetoric associated with ERP adoption and the influence of national organisations. Although areas were introduced, the interviewer, following Eisenhardt (1989) endeavoured to remain unbiased as to the association of concepts during the interviews.

Where it might have been the case that categories from the literature review or areas of developing interest do not emerge prepared prompts had been prepared which might stimulate the interviewee to talk around that area. For example, the opening question, How do you view MLE? is accompanied by a floating prompt asking its relation to the VLE for example?, thus giving the respondent something to consider. Another form of prompt is called the auto prompt in which interview material is prepared that might be presented as a stimulus.

In this way a timeline of MLE development at each university was prepared together with a time line of national developments as part of the interview suite. (see Appendix 4 Interview Protocol).

The researcher found that the iteration between theory and data produced hunches about possible new areas of interest of areas which could be explored. One example concerned the emerging role of an educational development officer in an MLE related project in case study N. To explore the relation between national MLE framing and the framing work of local projects, a prompt was added concerning the adoption of national policy discourse concerning the phrase

‘transforming the institution through e-learning’ which had appeared in the project literature.

Such hunches were included in the interview protocol development (see Appendix 5 Example of Protocol Development). As part of the interview suite trajectories of MLE development at national level and for each institution were produced as an aid to the researcher (see Appendix 6 MLE Trajectories)

Auto prompts in which interview material is prepared that might be presented as a stimulus were prepared showing a timeline of MLE development at each university together with a time line of national developments as part of the interview suite. This was referred in the interviews several times.

The first four interviews were transcribed verbatim by the researcher. However, transcription was a time consuming process and it was found that each interview taking up to 12 to 15 hours. The researcher decided that this was too time consuming and that a quicker alternative had to be found. From then on interviews were transcribed using a method of discrimination. This involved listening to the interviews and taking notes of passages that represented the protocol categories and research categories. Other passages of interest were noted, for example important players. These passages were transcribed as content without the indications of talk associated with verbatim transcription. Only the most prominent incidences of style were noted, such as a prominent tone or forceful passage. This process resulted in a reference transcription which could be referenced in the analysis phase<sup>5</sup>. Where appropriate the transcription would be used in analysis directly or could indicate where the interview could be listened to again for a particular category.

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<sup>5</sup> Potentially this could impede analysis by missing important data. However the possibility of such effects was minimised by frequent analytical iteration between untranscribed material, transcriptions and coding categorisation.

#### **4.3.4 Data analysis**

Content analysis is employed as a data analysis tool. Content analysis is a research methodology that utilises a set of procedures to make valid inferences from text in which the many words of text are reduced down and classified into fewer content categories to create a manageable platform from which to analyse the data (Weber, 1990).

A content analysis interpretation is valid to the extent it measures the construct the researcher intends it to measure but validity problems grow out of the ambiguity of word meanings and category definitions (Weber, 1990). Krippendorff (1980) makes the point that content analysis is not objective. Objectivity implies that content is 'contained' in the message, waiting to be separated from its form and described, whereas text are open to multiple interpretation. Single researcher coding was undertaken, with the researcher interpreting how text would be categorised.

A variation of different size text elements were used to denote constructs, ranging from single words to larger blocks of text. These single word elements were carried out using the software as a word searching tool.

Coding method has to be flexible since participants may express their interpretation of MLE or other phenomena in various degrees of complexity and ambiguity. For example one participant may describe it as simply an 'information environment' whereas another may take 100 words to build a construct of what MLE means.

The researcher created an audit trail of coding developments to give the analytic route to the research interpretation. For example, coding categories emerged in relation to the protocol of the interviews. The researcher developed this pattern into a coding scheme from which further theoretical constructs were developed. The aim is that theoretical concepts can be easily traced to text categories within the interview text.

The researcher used QSR N6 software, a qualitative software application as a coding instrument. The software is designed to aid users in handling Non-numerical and Unstructured Data in qualitative analysis, by supporting processes of coding data in an index system, searching text or searching patterns of coding and theorising about the data. The programme is a tool for storage, coding, indexing, structuring retrieval and analysis of text.

The software was an aid to analysis by enabling central storage and coding of data. The coding tool enabled an initial coding tree to be developed that included a large amount of elements that would be extremely difficult to keep track off in a manual coding method. Codes can easily be refined into further branches and this can be used to record instances within constructs, for example, growth as a driver of MLE adoption. Across data comparison of constructs is possible with the software and was used as an aid to developing the coding scheme.

Later in the analysis process the researcher went on to code in other ways in conjunction with the software. Initially, text documents were introduced to the coding software and coded as whole documents against categories of text type, case study university and interviewee details so that the software could be used as a central data store. The initial coding strategy involved coding inferred constructs derived from the literature. The initial constructs from the literature can be seen in Appendix 7 Initial Coding Categories.

In addition, data was coded without reference to the inferred categories, as they emerged according to the data. Three interviews were coded as a pilot exercise. The coding process began to look within the general categories and considered ways of recoding within each category. At this point particular emphasis was on the trajectory category which seemed at the time most relevant. As the coding progresses, more coding ideas were generated which refined the general categories with more branches for example, type of MLE driver such as 'senior management'. The development of this coding tree can be seen in Appendix 8 Development of Early Coding Tree.

At this point the researcher became more aware of the need to adopt a theoretical approach to coding because although the initial coding tree was useful for constructing a wide range of aspects of the phenomena, it could not explain the association of categories. The analysis moves on to developing more theoretically focused coding.

At this stage the researcher became aware of consistent differences between the managerial/administrative side of the participants compared to those from the learning technology sections. Data was coded broadly around the learning and managerial worlds using coding which would cover aspects of these 'worlds' concerning practice and structure as well as alignment with a MLE computerisation movement. (see Appendix 9 Worlds and Computerisation Movement codes).

According to Weber (1990) an essential step in theorising is the sharpening of constructs. This involves the iteration between constructs and data to sharpen and focus constructs. At this point in the coding process, the researcher became aware of the need to operationalise this point. Accordingly, it was decided to focus on the notion of technology framing, a focal point of computerisation movement theory.

The aim of the coding procedure was to construct the framing process across individual, group and macro levels. This included hypothesising the influence of macro level TAF computerisation movement frames at institutional framing, group framing and individual framing levels. The researcher was concerned not to impose MLE constructs on the data, so the procedure was to create first order constructs on which macro level could or could not be inferred. This would also capture local technology framing processes. First order constructs derived from the data were participants idea of what MLE is, their critique or contrast to this, what MLE should be at their institution and influential experiences shaping their interpretation of MLE.

In addition, to using the software it was found that using word tables coding with columns headed the various aspects of the frame was a useful technique. Tables

allowed the researcher to view and compare participant data in addition to the software view. Also, the manipulation of text samples by moving from one table to another aids the experimental process of construct construction.

The process of using word tables was as follows. Participants were analysed one by one and grouped according to their institution. In the first tables text data that exemplified participants interpretations of 'what MLE is', 'what it is not/its critique' and 'what it should mean for their institution' was pasted into the first three columns of the word table. Then the possible influence context ('where from' column) was filled with a general researcher observation, inferred. Next possible influencing TAF (master frame column) were associated with each participant.

The resulting table allowed the researcher to compare data for each participant to look for further patterns. Analysing the first three columns together as a construct led to a further categorising of participants into 'process framers' and 'standard system framers': those who talk of MLE as a process of innovation and those who talk of a process of implementing standard business class systems (see Appendix 10 Summary of 'Standard' and 'Process' frame). A further construct was developed, as the result of the analysis of what guides MLE development (or resistance) at each institution, that of the 'institutional technology action frame'. This process led to a table summarising all these above mentioned elements that could be used as a master table of analysis (see Appendix 11 Master Table of Analysis).

It is noted that this process involved generating category patterns as constructs. This involved a good deal of experimentation and checking against the data. This procedure resulted in word tables that could be used for theoretical analysis through the CM and Ecology of Games perspectives. Also, the software was used in this process through developing corresponding categories.

A further analysis of the flow of MLE resources was carried at this stage so that the constructs generated so far could be compared against networks of resource flow that are associated with the influence of macro level actors on institutions.

Having established technology frame congruence between coalitions in the universities the analysis turned to other elements of CM action in universities that are detailed in Tables 3.3, 3.4, 3.5 and 3.6. The case study write up proceeded according to these tables. This involved using the Participant Analysis Mater Table and returning to interview transcripts and documentation data via the software when necessary. To construct a trajectory of technology use in each institution, documentation was analysed and correlated with participant accounts of technology in use.

Coding and analysis through the metaphor of an Ecology of Games was carried out using a similar method to that of the CM analysis, using word Tables in combination with the data analysis software. First, constructs were identified from the literature concerning an Ecology of Games (Table 3.8).

The research identified two possible methods for constructing a game analysis. The first involves identifying key actors who have a stake and can influence outcomes and asking which issues are important to them. The second involves identifying interest groups and analysing issues in which they become involved. Initially, the analysis utilised the first method.

Key players were identified for each institution by way of their position of influence in the university. A word table was created with rows labelled as goals, key players, juncture, sub issues, move/actions and prizes. Then interview data was analysed for each element and data entered into the appropriate cell. This data was then compared and edited until a game took shape. This process was rather like putting together a jigsaw puzzle (see Appendix 12 IT Manager University N Game Table).

Through these key players a number of games were constructed for each institution. The analysis then looked at how participants' data from a particular interest group might be analysed according to the games constructed through the key player analysis. For example, at university N an online 'totaliser game', concerned with moving all systems online, is described through the initial analysis of the IT Manager (see Appendix 12 IT Manager University N Game

Table), then the role of the Head of Registry in this game is analysed, looking sub issues which the Head of Registry may be involved in whilst pursuing the goals of the game e.g. putting the matriculation online (see Appendix 13 Sub Player Game Table for Head of Registry University N).

Returning to the Participant Master Analysis Table the researcher made a judgement based on framing characteristics as to which game participants may be thought to be involved in. This game was then added next to the participant in a new column. In this way the analysis produced a master table including framing and Ecology of Games analysis from which the researcher could compare and reference in a fairly convenient manner in the case study write up and cross case study analysis sections of the research.

Firestone (1989) comments that each game in an ecology requires input from the others: just as the lion gets food from the zebra, the news game gets copy from the government game, yet each is won or lost on its own terms. Firestone goes on to suggest that linking educational policy games are the *flows* between them: downward flows of resource and regulation and upward flows of demand, for example.

As well as institutional factors that create commonalities between players, such as working the same section, at university N team and individual goals are both internally and externally orientated to ecologically linked games through the flow of resource. In this sense the flow of MLE resource indicates a coalition of interests between players in connected but different game arenas.

An Ecology of Games was defined by certain resource flows (or attempting to stop a resource flow) and shared issues (see Section 3.5.4). Combining an Ecology of Games and CM involved analysing the flow of resource and issues between players in universities and in the wider ecology who are aligned to a common TAF (the MLE TAF or the counter MLE TAF). This analysis is detailed in Appendix 14. Analysis of Resource flows and issues. Resource flows also identified players in the broader system of action than the MLE CM who had not been recognised as sharing an MLE TAF, for example, major suppliers. What

emerged was a web of players who are aligned through resource flow, the MLE TAF or both. This analysis provided the basis for the illustration of the 'MLE game' through which the dynamics of MLE socio-technical alignment are interpreted.

The next three chapters of the thesis present three case studies of MLE adoption and development in three Scottish Universities.

## ***5 Case Study N: The New University***

### **5.1 Introduction**

University N is a 'new university', having acquired degree awarding status in 1992. This case study covers the period from 1998 to 2006. The trajectory of technological development at the university is characterised by the push for e-learning. The first phase of the trajectory describes a strategic initiative to initiate a stand alone e- learning faculty that would provide e-learning services to the whole university. This initiative was to be based on a technological model being used at the Open University of Catalonia, Spain. The story of the initiative is constructed through interpretations from several of the longer serving participants who were present at the university at this time and some impressions from others who were not present at the time. The case study continues with the story of growing MLE 'colonisation' of university N.

MLE is now at the heart of the university's aim to be a leading 'modern' university that offers a new degree of flexible access to a changing student population (university N 10 Year Strategy). Technology development has come to be dominated by the MLE TAF as the university pushes to achieve the transfer of processes online. These socio-technical alignments and the strategies and issues encountered are illustrated through the CM and An Ecology of Games analysis.

The university is not part of the CURL consortium of universities (see Section 2.4.2), suggesting that it is not a university with strong data resources and would therefore benefit from a 'levelling of the playing field' of data provision in the HE landscape.

The university is part of the trend for post 1992 universities to make greater progress in transferring processes online compared to pre 1992 universities; Chapter Two illustrates how post-92 universities show the highest increase in

personalised online access to all e-learning and support resources (6% in 2003 to 24% by September 2005).

University N is committed to MLE as the core of its ten year strategic plan aiming to be the 'most modern' university in Scotland reflecting a high commitment to aligning with the practices and visions of MLE. This suggests that the MLE TAF has strong influence in university strategy making and technologically led programmes of change. University discourse has traditionally been aligned with the ideas of student centeredness and flexible delivery. This commitment to flexible delivery has seen teaching and learning delivery initiatives aimed at open access which has been guided by an underlying philosophy to be provide learning opportunities at a time, place and pace which suits the learner's needs and circumstances (Head of Educational Development, library newsletter, 2002).

The university's ten year Strategic Plan (2006) aligns the institution with several dynamics of the higher education landscape. It aligns with commercialisation in: *thriving, more financially independent university with a strong culture of customer service recognised both internally and externally.* (P4, Strategic Plan). Part of this drive, the plan states, is the continued exploitation of growing and emerging markets in higher and further education in the UK and internationally. The university continues to align itself with the discourse of wider access by aiming to be: *'highly regarded for the accessibility and flexibility of our provision to the widest possible range of learners and for our responsiveness to their needs.'* (P4, university strategic plan). This general commitment links to a commitment to the idea of equality of opportunity.

Web based learning is the core enabler of this strategy at the university as it aims to *'develop excellence in e-pedagogy'*. In doing so the Strategy aims to *transform* the university's approaches to learning, teaching and assessment and learner support. The 10 year strategy also puts the virtual learning environment at the centre of on campus provision and states that each student will have a portal through which they can access the full range of university services:

*'Our on-campus delivery will integrate WebCT tools and other digital tools to underpin programme delivery and learner support.'* (P14, strategic plan)

MLE strategies at the university are underpinned by a the informational model of the university described by Cornford and Pollock (2003) as evaluated in Chapter Three. For example the 2006 Information Strategy aligns with this view of the university promoted by JISC:

*'Information is the lifeblood of higher education institutions. It is a resource and needs managing as such: this puts it on a par with finance and human resources.'* (Joint Information Systems Committee (JISC): Guidelines on Developing an Information Strategy.)

This is particularly true of University N as it moves to become to the best modern university in Scotland (University N Information Strategy).

The strategy underlines this model by stating that:

*'Almost everything that the university (N) does is in some way connected to the use of information'*

The case study participants were as follows:

- N1 – Head of Communication and IT
- N2 – Assistant Head of Communications and IT
- N3 – MLE Manager
- N4 – Educational Development Officer
- N5 – Educational Development Officer
- N6 – Head of Registry

## **5.2 Trajectory of Educational Technology Development**

In the early 1980s, University N's main involvement in flexible and open learning was the Learning-by-Appointment (LBA), a community learning facility

for the general public. Course materials were text-based, or a combination of programmed learning texts with tape, video and computer-assisted learning programmes (Head of Educational Development, library newsletter, 2002).

Over the 1980s and early 1990s, the LBA Centre evolved into the Opening Learning Centre (OLC). While still having a community-based focus, the OLC increasingly served the institutions students with the provision of remedial, study-skills and extension materials. Increasingly, student-centred flexible materials produced within University N were lodged in the OLC. During the 1990s, the centre closed as a separate entity with its resources being incorporated into the Library.

The 1990s saw an increase in flexible programme development activity. The Postgraduate Certificate in Learning and Teaching in Higher Education was first validated in 1992 and has run successfully as a flexible learning programme from the Educational Development Unit. Other flexible programmes, supported by paper-based materials, included flexible learning versions of the MBA, various postgraduate programmes in Law and some developments in Construction and Engineering.

N1 describes how MLE first came to be high on the university agenda in 1998 when a senior manager (SM) joined the university who was *very keen* on distance learning. This led to an exploratory trip to the University of Catalonia to look at an Oracle based system they had developed to support their distance learning provision. However after much discussion this initiative *fizzled out* (N1):

*"Part of the reason it fizzled was the licensing situation they had with Oracle was dubious to say the least. I think it was probably true to say they were working illegally at the time we went over there."* (N1 61 – 65)

Following this, the SM set up a new distance learning project (E) which N1 describes as aiming to be a stand alone distance learning faculty which would brand and coordinate all the university's distance learning output. N1's opinion

is that this was the right thing to do but it too fizzled out. N1's interprets several types of phenomena as possibly influencing its disappearance. The first was resistance, which probably came from the *established academic structure* (N1 83) associated with watering the concept down until more and more of the origin project was left with the faculties. Also, the SM was involved in starting up a number of other initiatives and was therefore perhaps too diverted.

The Head of Educational Development describes how E was an attempt to co-ordinate and focus flexible learning developments more centrally because at that time they were occurring within '*hotspots*' in the university, largely opportunistic and not strategically driven or co-ordinated. The initiative is described as short-lived and failing to make an impact at a strategic level.

N1 remembers a senior manager's (SM) initiative as being the last big push for e-learning before MLE. But the push did not '*carry through*'. The guiding frame for the E initiative, that of the project sponsor, SM, was incongruent with key groups in the university and with wider networks of influence. This is despite the fact that, according to N1, the SM was a nationally recognised expert on e-learning.

N1 describes how the SM was a nationally recognised educational thinker who advised government ministers but had views about learning provision that were unusual. He was: "*very keen on distance learning, who had some slightly, well not odd views, but specific views on it that didn't match everybody else's.*" (N1 44 -45)

Specifically, the SM, although an advocate of e-learning, was not an advocate of totalising online provision, as N1 describes:

*"He also had views that he didn't want to distribute material online, he just wanted the bits of it...he wanted a funny mix of online and mmm paper based. So this time round...."* (N1 438 – 441)

'Everybody else' may refer to constituents external to the university as well as internal. Indeed if one is to treat the university as an open system rather than a closed one (Lamb & Kling, 2002) this would be a valid interpretation and suggests that the SM was out of tune with an influential wider MLE arena. It was this world that was more influential than the nationally recognised educationalist, the SM. N1 hints that the present push for e-learning is informed by a different e-learning frame not based on the mix of online and paper based provision that was advocated by the SM.

This indicates an emerging alignment between wider networks of influence and IT management around a technology frame that advocates the idea of disseminating documents online and transformational organisational change.

Technology choice for the E project reflects the SM's e-learning frame concerning the dissemination of documents and communication. N3 describes how project E was an initiative headed up by the Educational Development Unit using the First Class system in combination with flexible writing skills for developing flexible learning materials. The First Class system was chosen following a technical review of products. Two products emerged from the review, WebCT and First Class. N1 says that First Class was chosen on the recommendation of the Educational Development Unit, though N1 would have preferred WebCT, adding that perhaps it was too early for WebCT at this point. At this point Educational Development was aligned with the wishes of the project sponsor, SM. This is reflected in the alignment of Educational Development's technology choice and the e-learning framing of SM.

There is a fit between the capabilities of the technology and the aims of the E project in that N3 says that the system was generally good for communicating but not at disseminating documents. This fits with the SM's ideas about not disseminating documents online. And indeed N3 confirms that the system was generally used as a communication tool in conjunction with paper based distance learning. So the First Class system and the publishing operation at Educational Development were mutually supportive.

However, for N3 the First Class system compares unfavourably with WebCT, its successor, because it lacks the same 'impact'. As N3 describes:

*"I think Ed Dev acted as a small publishing house taking work from lecturers and creating booklets. Along those kind of lines. Why it didn't take off I don't know but First Class wasn't the kind of software that suited the institution. It doesn't make the same impact that WebCT makes, just because of the narrower range of tools it has."* (N3 130 – 134)

Orlikowski and Gash (1994) include the notion of impact (one of seven) as a core dimension of technology framing across managers, technologists and users in an organisation undergoing technology adoption. Impact concerns expectations or experiences about the impact of a specific technology on the strategy, structure, culture and practice of an organisation. With its greater impact WebCT is therefore more congruent with strategic level planning than First Class. Accordingly, WebCT better mirrors the goals of MLE framing, i.e. realignment for e-learning that distributes documents online across the university and enterprise level transformation based on one central database.

The university ran the First Class system and it had islands of usage but take up was poor (N3). At the same time there were bespoke systems within some schools. In 2002 First Class was replaced by WebCT. N3 interprets First Class in comparison with WebCT:

*"First Class was only for communication, private mail, discussion boards etc. students had to get a CD and install the system on the machine they were going to use. There was no tie in with the student record system, whereas in WebCT we are integrating directly with the student records system. So students gain access to admin. With the move to Vista that is even closer."* (N3 69 – 75)

Here is a more specific interpretation of First Class's lack of 'impact'. This lack of impact revolves around the lack of web based capabilities. From the student point of view it needs individual installation rather than network access. In comparison WebCT can be accessed securely from any Internet connected PC,

and is therefore equally suitable for the delivery of both on and off campus learning. Administratively, with First Class there is no integration with other systems, such as the student records system.

This assessment of First Class is associated with the integration imperative rather than a pedagogical frame, further suggesting that an MLE administrative frame has come to dominate e-learning developments at N. This movement to framing educational technology from an administrative or managerial perspective is illustrated by N3's interpretation of the technological trajectory of educational technology:

*"There was no tie in with the student record system (referring to First Class), whereas in WebCT we are integrating directly with the student records system. So students gain access to admin. With the move to Vista that is even closer".*  
(N3 71 – 73)

The idea of integration had been important within the management information systems community at the university since the late 1990's. A 1998 report from the Management Information Steering Group shows that the idea of integrating all systems was gathering momentum at the time but could not find practical expression in affordable technical systems.

It observed that:

*'Integration is properly identified as a key factor contributing both to the consistency of the information delivered by an organisation's management information systems and to the eradication of unnecessary manual processes'*  
(Management Information Steering Group, 1998)

In the report, integration is associated with an '*ideal environment*' in which each data item would be entered once and only held one once in a single, corporate database. However, this option was considered unachievable at this time since there were no fully integrated systems available on the market at that time. Insofar as low-level integration was thought to be technically achievable in

relation to some aspects of the business, it was not at that time an affordable option.

In 2001 the university moved towards this vision when it introduced a new student administration system, the CITS e-vision product, that encapsulated this frame for integration. The CITS system is an information system that utilises distributed database architecture to facilitate the integration of all the universities data and is a standard, 'off the shelf' piece of software. It replaced a bespoke system that did not encapsulate the 'enter once, store once' (N9) ethos nor could be easily integrated with other university systems.

Following the new student records system, the 2002 Annual Plan details further plans for a suite of new systems, including a new timetabling system and a new finance system, which have since become operational.

Although WebCT Campus did provide a level of integration, the implementation at N was actually far larger than had been attempted before and there were doubts as to whether it was robust enough for an enterprise scale, 'heavy duty university wide' (N1) implementation:

*"The problem, I suppose the main, well from a technical point of view, the main problem with the Campus edition (WebCT) was that it is flat file, whereas vista is an oracle database. It's a more solid underpinning really..."* (N1 154 – 157)

Also, the Oracle database in Vista integrates much more easily with the Oracle based student records system and other systems.

*"I suppose the other side which is part of the MLE is the student portal which is just about to go out on pilot this semester coming"* (N1 180 – 181)

The Student Portal project was initiated in 2005. The portal chosen was a Microsoft product that integrates with Oracle software, the kind of database in the WebCT update, Vista. N1 envisages the portal as integrating with all university systems so that the portal is the universal interface for all student

systems. The idea is that students can then interact directly with systems such as student records, exams, timetabling, etc. The student portal is promoted in the university's MLE newsletter as demonstrating how modern the university has become. In this sense the portal has become symbolic of the MLE led technological transformation of the university.

In summary, the trajectory of MLE development is characterised by changing alignments between key players and technology. The E project was associated with a socio-technical alignment of the SM, Educational Development and the First Class system. These players were aligned with an e-learning framing that advocated a mix of paper based processes and online delivery with an emphasis on systems that focused on online communication rather than content delivery. This was seen as the basis for a 'stand alone' e-learning faculty. However, academic units, IT management and wider networks of influence did not align with this technology frame. As this project fizzled out, the MLE frame becomes influential at the university through an alignment of IT management and wider networks of influence. WebCT is the technology of choice for this alignment.

The end of the E project marks a socio-technical realignment for the university which coincides with the first emergence of the JISC MLE frame in the late 1990s. At this time e-learning developments are aligned with the administrative frame of integration around one data base. This is demonstrated by the realignment of the Educational Development Unit with the IT management frame, having previously aligned with the SM who advocated the stand alone e-learning faculty. In this realignment, the administrative ideal had been elevated to a greater level of importance than the teaching process at N. As N6, from the Educational Development Unit, comments:

*"Its not just about how we deliver our teaching, its how we manage our administrative processes "(N6 196)*

### 5.3 Technology Framing

There is a commonality between the way the majority of participants frame MLE. This commonality is resonant of the 'standard MLE' trajectory involving the key ideas of integrating university systems around a student portal. In this way the university will be able to manage the student's journey electronically from the point they come into university to the point they graduate. Key players align to the idea of transforming the campus by equating on and off campus learning as far as possible. The VLE system, WebCT Vista is advocated as a system that exemplifies MLE because it can be integrated with a student portal and central database.

For university N, MLE is associated with a 'push' for e-learning: a transformational technology that will underpin university expansion. As a student management system it will ensure data quality and quantity through creating a 'master' data set that is authoritative and accessible.

This way of framing MLE is resonant of the 'standard' MLE trajectory (see Figure 2.1) that involves MLE development led by the student portal and is associated with alignment between dominant vendors and IT management.

Educational development officers are concerned with developing the view that MLE is about supporting teaching. This demonstrates a common concern, though not as strong as criticism, amongst 'standard' framers that MLE development can be seen as imposition. This is especially the case with academic staff who, it is interpreted, may be suspicious of MLE development and feel threatened that it undermines their role in the university. There is also a concern about losing face to face contact with students.

One participant views MLE differently to this 'standard' frame. This participant emphasises that MLE should be about supporting a learning community through connecting students to student and staff to students. The way that the university is developing MLE is criticised for not being student centred: educational practices have not changed with the adoption of MLE, reflecting the

misalignment of existing educational practice and new ICT practices that are needed for online learning. This correlates with the misalignment between existing practice and in coming technology found in case studies by Hara and Kling (2000) and Dutton *et al.* (2004) evaluated in Section 3.3.

#### **5.4 Managed Learning Environment Computerisation Movement Technology Framing**

The next section of the case study frames MLE development through the MLE CM Theoretical framework developed in Chapter Three, with reference to Table 3.7: Influence of Managed Learning Environment Computerisation Movement in the University. The analysis follows the order of the elements of Table 3.7 which involves MLE framing through the MLE TAF process, counter framing and the structural influence of the MLE CM.

The dominant technology framing amongst the participants is congruent with the MLE TAF. This dominance is reflected, for example, in the MLE newsletters produced within the university. These emphasise the role of MLE in creating flexible access, facilitating growth and accessing new markets, as well as creating new efficiencies in university processes.

MLE advocates do not diagnose what is wrong with current practices, but rather shape the expectations for MLE. There is an emphasis on beliefs about what MLE can do (Table 3.5, point 2) in creating flexible delivery and underpinning expansion.

MLE is seen as the platform that can deliver growth in the post graduate and distance learning areas (N3 225). This is the strategy that will facilitate the growth goal. However, the concept of growth is broad and although N3, for example, specifies growth in 'off campus' provision, growth simply means the expansion distance learning practice i.e. off campus provision, into all areas of the university, on and off campus. As described by N1 in another way, MLE involves equating on and off campus provision by moving off campus provision on campus.

The idea of colonising on campus provision with off campus distance learning would be contentious amongst sections of the university and not surprisingly this hybrid is articulated (Table 3.7, point 5) as 'blended learning' rather than the growth of online learning. As a way that MLE articulation neutralises controversy, N1 describes blended learning as a '*red herring*', because the blend or mix of face to face and online learning is never specified. This problem of the appropriate mix of online and face to face provision is a phenomena across the game arena, as N6 comments:

*"It's exactly the same argument as the teaching side of the MLE, do you go for a blended learning approach or do you go for the full delivery of a module online? And no class contact?"* (N6 121 - 124)

The player who is most concerned with negotiating appropriateness is the Educational Development Unit. Representing the appropriate mix of online and face to face practice maintains frame resonance (Table 3.7) by avoiding any contradiction between new online teaching practice and established practice.

In non critical interpretation of MLE, Participants within the Educational Development Unit expressed concern about appearing to question MLE and showing dissent (Table 3.7, points 2 & 3). This desire not to appear critical, for example, was expressed by N4 can be seen as a need to discipline one's self to be diplomatic and the hope that nothing controversial.

The work of the educational development unit has indeed been interpreted as disciplining, as N4 comments:

*"Also I think that people have a fear that departments like this are like the e-learning police and they are going to come and that we will come and put all their courses into some pre specified format or box".* (N4, 51 – 54)

N5 is the only participant to be critical of MLE at the university, but questions the extent to which an alternative framing of technology is appropriate at university N, asking: *How honest can I be here?*

The trajectory of MLE development illustrates how the MLE trajectory at the university has become dominated by MLE TAF user practices (Table 3.5, point 4). Standard ‘off the shelf’ systems have come to dominate the drive for integration. Centralisation is the organisational practice that has come to underpin MLE development at N.

In counter framing MLE, N5 illustrates counter MLE framing, questioning the resonance of the MLE TAF for the university (Table 3.7, point 6). Three factors which effect frame resonance are frame consistency (lack of contradictions), empirical credibility (claims backed up with evidence) and the credibility of frame articulators.

N5 was the exception to the congruence around the MLE TAF, generally describing the approach to e-learning at N as poor and ill informed. N5 describes how MLE at N is not guided by the experience of practice in the US, where N5 previously worked. In this previous experience at a dedicated e-learning university, N5 describes how e-learning has to be developed as a specific system with its own monitoring, evaluation and cultural facets. It is not an introduced as an efficiency measure and indeed can take as much if not more staff time than traditional lectures. The dangers inherent in not properly resourcing e-learning accordingly, N5 comments, are that of high drop out rates as students become demotivated, frustrated and isolated. N5 comments that MLE at N is being driven by management who do not understand this kind of good e-learning practice:

*“There is nobody up in management or administration who is what I would call an e-learning champion, somebody who recognizes the benefits of technology for what they are ...mm... and drives that forward, its grass route effort” .(N5 138 – 141)*

For N5, there is a feeling that lecturers do not embrace an e-learning culture at N and that the tools offer an opportunity to distance themselves from students. Without proper monitoring of e-learning practice and possible sanctions for bad practice, N5 feels that the situation will not improve at N. N5 refers to the danger inherent in online learning, particularly with regards to retention.

*"I read the Times Educational Supplement.. Does anybody read that? I do, an Australian study showed that 80% of the average working adult will drop out of an online course if it does not have a social element"* (N5 224 - 227 )

### **5.5 Managed Learning Environment Computerisation Movement Structural Influence**

With reference to Table 3.7, (point 1), the trajectory of MLE developments has been characterised by the growing influence of the MLE TAF as key players such as the Educational Development Unit realign to the MLE socio-technical constituency. One aspect of development that illustrates this is the pressure to create MLE resonance in the university (Table 3.7, point 5). This is illustrated by the careful choice of language that MLE advocates employ in a pan university MLE project at the university, funded by the Scottish Higher Education Funding Council. This centred on the use of the word 'transformation' in the project's literature. 'Transformation' is an element of the MLE TAF in the Scottish context, as illustrated in Chapter Two section 2.5. There is pressure to mirror this idea in the project. N4 explains the problem with using the word:

*"I think the issue for us wasn't with the issue of transformation it was how to articulate it. How do you get it to make sense to the practitioners? How do you get it into a way that makes sense and is appealing to their colleagues?"* (N4 145 – 149)

N4 goes on to further explain the issue with using the word transformation:

*“Transformation is a word that carries a lot of connotations, it hints at major change. You have to be careful how you use these words. Because it hints at major change and then begs the question: Why? What is wrong with how it is?”*  
(N4 149 - 152)

N4 describes the role of JISC as having an educative role (Table 3.7 point 4) at the university by providing for, good practice exemplars and standard guides on evaluation and course design. It offers a good network for people to join who are enthusiastic about MLE with funding opportunities and access to key figures in the field of educational technology. For N4, however, dominance has drawbacks –JISC advocates just one way of using technology. N4 suggests that there would be a ‘richer’ dialogue if more agencies were involved in this area.

In summary, there MLE development at university N can be framed as strongly influenced by the MLE CM because:

- The MLE TAF has become dominant with key players,
- There is a culture of non critical interpretation of MLE
- JISC acts as a CMO in the university
- Innovation is guided by the MLE TAF

## **5.6 Managed Learning Environment Development as an Ecology of Games**

In describing the Ecology of Games at university N, Table 3.8 is used. The analysis starts with the description of the institution wide game arena that aims to totalise online working at N. From this broad game, an ecology of smaller game arenas is identified in which MLE advocates play to change established rules. This institutional level game is drawn from the analysis of the Head of IT & Communications, N1, as a key MLE player.

Key resource flows between the university and the wider MLE landscape demonstrate how the MLE game at N is ecologically connected to larger, more

powerful games which offer prizes to these local MLE arenas and individual players who align themselves with larger arenas.

### 5.6.1 The 'Online Totaliser' Game

The adoption of WebCT marks the a stage in the university's MLE trajectory that establishes a game arena at N in which a network of players work to establish the 'standard' MLE frame at the university. Within the group of research participants there are four prominent team players, the Head and Assistant Head of IT management, the MLE manager and the head of registry. Each is engaged in unique areas MLE related action, for example implementing online matriculation, guiding the practice of e-learning or negotiating software licensing for off campus learning and anticipating infrastructure demands.

The aims that underpin the game correspond with the aims of the 2006 Information Strategy at the university; that of responding to the context of changing student markets, the need to develop funding streams from cross-sector developments, and the need for efficiency in the light of reducing resource per student.

Within the arena of MLE action at the university prominent advocates are pushing 'standard' MLE forward towards a fully functional self service portal. Here, the goal of MLE is expressed as a drive to totalise online provision. This drive to totalise online provision has become a major goal of the MLE at university N.<sup>6</sup> As N1 expresses:

*"But the idea of what we are trying to do I think is basically, deliver as much as possible to students - what we do electronically - deliver as much as possible of what we do via the web". (N1 281 – 284)*

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<sup>6</sup> This game is one of several possible MLE games at the university, in the case studies 'totalisation' refers to the goal of transferring the management of the whole student lifecycle online rather than one overarching game.

The Educational Development Officer, N3, expresses a similar idea, linking integration with totalising online provision in which MLE is about:

*"...integrating online learning applications together with institutional applications so you can essentially manage the student's journey electronically from the point they come into university to the point they graduate."* (N3 8 – 11)

N1 goes on to express an important idea behind the totalising drive, the equating of on and off campus learning provision through a portal:

*"And the then, just have a single entry point, you know, University N.ac.uk/student which brings you into a single screen, log in and you get everything you want. The idea is that will equate on and off campus learning as far as possible. So everyone will just get effectively the same".* (N1 283 – 288)

Integration at N is driven by a game that aims for totalising online provision of learning and administration. One of the main prizes of the game is institutional growth without having to increase infrastructure in physical buildings and staff. As N3 notes:

*"There is a limit to how many we can bring on campus. I mean we are at the limit of the face to face we can do just through our physical buildings. So the growth is seen as off campus provision. Which I think is common throughout the sector."* (N3 228 – 230)

Within the overall goal of totalising online provision and equating on and off campus university service, MLE advocates each have their own role to play, with their own problems to negotiate.

The Head of IT, N1, is concerned with negotiating a number of potential obstacles and the interview data shows the student licensing, creating self service online student administration, demand for technical infrastructure on campus, and the integration of systems to be up most of these. These issues reflect an ecology of related games.

### 5.6.2 An Ecology of Related Games

The following section describes an ecology of related MLE related games that key players engage in during their MLE development work.

#### The 'Licensing Game'

Perhaps the most serious of these concerns is student software licensing. Even though the idea is to deliver everything to students through one point of access there are at present commercial software licensing problems reasons why this may be a problem. It is difficult to equate the software the university mounts on lab pc's with web based software because most of the 'heavy duty' applications are not web based. Also, the university acquires large discounts on commercial prices for lab based software and so suppliers expect the university to stick to lab based use.

*"And sort of just putting it so you can get access from anywhere in the world is something they are not happy!" (N1 311 – 312)*

The best solution up till now has been for students to acquire their own student copy at a discount price. With internationally based distance learners this becomes problematic because suppliers are often UK based and software can be very expensive. So a student from, for example Thailand, cannot be expected to overcome these obstacles and the university will not buy it for them. Up until now people have 'frittered' around these problems and as N1 observes there is no universal solution.

*"And I think its best to say that people have managed to fritter around it to date, ...mmm...Quite frankly I don't think there is a universal solution. But we do certainly do have issues with academic staff getting upset because we can't give licenses". (N1 331 – 334)*

The issue of software licensing illustrates the intersection of a related game involving software providers protecting their interests.

Since there is no universal solution, establishing MLE in this institution is context dependent. This is a clear example where the universal technological determinism of the standard system MLE frame is inconsistent with the MLE related social action required to determine the adoption of MLE at a local level.

### **The 'Major Supplier Game'**

There is a flow of MLE resource between major suppliers, funder's and MLE advocate arenas. Amongst the MLE advocates at the university one big win has been the portal development in which the university is seen to be the first to get integration between standard systems, WebCT and portal software to create the student portal. This win helps feed an ecology between the university and a number of larger arenas through which resources flow to the university such as supplier networks, government and funding agencies. The MLE Manager notes, for example, that "*Microsoft have been looking to get into the educational market*" with their portal technology and it is with a note of pride that the MLE Manager talks of the university's partnership with Microsoft in this mutual goal.

The 'totalisation game' at N is driven by game prizes offered by dominant players. Through achieving the prize of being the first university to get functioning portal, the university has become a leading MLE player. Analysis suggests that the kudos of getting the first integration of global software products has been a strong motivator for MLE players at the university. That this achievement is important to global players is evidenced as it is praised as a strong exemplar of a technologically advanced university by a global supplier in their international website. Playing for this prize has attracted the attention of global suppliers and sends out a strong symbolic message of commitment to the MLE game to all players. In turn this leads to securing funding and all the benefits to MLE players of being seen to be on the winning team.

It may be that the supplier relationship is enhanced by the university being the first to achieve integration between Vista and the Microsoft Sharepoint Portal, with the university in turn procuring preferential attention from the supplier and the accolade of being 'ahead of the game': the most modern university.

### **The ‘Political Game’**

The university seeks to play a ‘political game’ by aligning with the goals of the Scottish Executive, as set out by the university’s Wider Access Unit Strategy 2004 – 2008:

*‘...to contribute to the wider development of widening participation and lifelong learning in Scottish higher education as set out in the Scottish Executive’s Framework for Higher Education. Lifelong learning, widening access’*

The overriding objective of this game is increasing numbers whilst keep down cost per student. By increasing access to education from traditionally under represented sections of society at lower cost per student the university can contribute to the government aim of increasing the number of graduates as a proportion of the workforce.

### **5.6.3 An Ecology of Games within the ‘Online Totalisation’ Game**

The following section describes an Ecology of Games with the game of ‘online totalisation’.

### **The ‘Administration Game’**

The Head of Registry (N6) is a key player in this game. One important move has established the primacy of the VLE by giving students access to modules after registration rather than the previous practice of only allowing students a module presence after matriculation, when they had paid their fees. The pendulum has swung to removing students from the VLE if they do not matriculate rather than adding them if they do.

This means that the university can deliver MLE functions to students in week one rather than when all matriculation has been sorted out but it has had a knock on effect as registry have to spend twice as long chasing students to matriculate because they have got all their services but haven't yet matriculated.

Another example of Registry's work to establish MLE primacy has been the blocking of modules into half day blocks. This aims to make it easier for students to choose modules that suite their own commitments because the all the module events will happen in a half day rather say a lecture on a Tuesday and a tutorial on a Friday. The new timetable can be offered online, enabling the student to choose a course timetable that suites them. Also, further information about modules such as learning outcomes and assessment techniques is supplied online to aid their choice.

This move to online self service for students has been questioned, with some wondering if such a loss of face to face contact will have an adverse effect on the institution's relationship with the students. For example, getting an idea of how students really feel can only be done face to face. However, N6 presents this aspect of the game as being won:

*"With online matriculation last year there was a real concern that we would loose face to face contact. That if we weren't seeing new students face to face then we would loose some of our contact. But in fact we have proved to ourselves that the quality issues, and students being in control are beneficial."* (N6 114 – 117)

Although the Head of Registry reports that there are no downsides with moving services online, with the push for 100% conversion to online service, at some point there comes an issue of balance between face to face contact and online self service:

*"So I really don't think there are any downsides. I think there comes a point where there is a balance where we push sort of 100 percent compliance"* (N6 119 – 120)

An example of this need for balance is where older people and people with disabilities might have problems with online self matriculation, so for the first year of online matriculation online matriculation was held on campus and monitored by staff, who would be available to help students who struggled. Also,

human agency should provide academic guidance within the self administered module choice arena.

Here the Head of Registry equates this issue of balance with the issue of balance in the teaching and MLE arena, where with 'blended learning' there is still debate about the right balance between face to face and online provision. So the issue of balance between face to face and online provision, or in terms of an Ecology of Games, when it may become necessary to rein in the totalising game is the same for the administration of the university as for the teaching and learning process. This indicates how the totalising game is spread across the whole university.

The student records database supplier, have developed a network of practice concerned with innovation in online working in universities through their software development. Registry is an active member of the network and the Head of Registry explains that's only by being an active member can the university attract supplier resources that may keep online innovation ahead of the competition. Thus, proving a commitment to the network and totalising online provision ensures the continued attention of the supplier through offering upgrades and supportive work.

One aspect of the administrative game is that 'online totalisation' creates greater demand for on campus student pc's. This element seeks to align student computer use with the aims of the university. The aim of this game is to encourage students to work at home more, as stated in the university's 2006 Information Strategy:

*'Evidence from the USA suggests they will not routinely bring them (laptops) on campus. This 100% home availability can also be assumed in the provision of distance learning. On campus students will use their powerful handheld devices to their limits but when they require a PC (or Mac) they will continue to use University equipment unless we proactively incentives them not to do so. The key will be to encourage them to carry out more of their work from their residences.'*

It is assumed that campus will have wireless networks but that: *'fixed equipment will continue to be heavily used in business and education and at least over this period this will continue to largely use wired networks'* (2006 Information Strategy).

Other assumptions are that more and more software will move to using the web as its primary user interface. This is important to the University, allowing it to deliver a more equal learning experience for all on and off campus users. Also that server infrastructure will continue to become more powerful and also increasingly available/reliable. This is key to delivering high availability 24 by 7 services (2006 Information Strategy). Giving students 24 by 7 services feeds into the aim of reducing drop out by helping students engage in part-time employment whilst in full-time education.

### **The 'Academic Game'**

The Educational Development Unit has the controversial role in that it is responsible for negotiating the adoption of MLE amongst the group which is seen as having the most to lose from MLE: academic staff. Playing the game of MLE and an academic game concerned with student contact and student retention is particularly difficult. As the Educational Development Officer, N4, explains when referring to academics and the adoption of MLE:

*"Also I think they felt that if they moved to putting their courses online they wouldn't be needed or their role would be reduced."* (N4 48 - 49)

The Unit has a very prominent role in educating the university staff by offering courses on the best use of distance learning technology. Throughout this programme the unit adopts a promotional stance towards WebCT, encouraging lecturers to use more functions through promotional short courses.

In such a position the Educational Development Unit plays a complicated dual role of establishing the primacy of MLE whilst trying not to be seen to be technologically deterministic. As N4 explains:

*"From our point of view in this department we understand that apprehension (academic fears concerning MLE). We want to support staff in using technology. It's not about putting all their course online or making them use tools which don't fit with their teaching style or subject." (N4 53 – 55)*

On the other hand the unit is a player within an arena that aims for transformation through the institutional adoption of MLE systems. Again, N4 sees this MLE game goal as incongruent with the academic game:

*"However, that said when WebCT was introduced properly to the university as a whole it was a goal, an aim, I'm not sure if you can call it a strategy, but a message from sort of high up that within the first year each module must have an online presence and I think that didn't necessarily help the apprehensions that people had. I think that if you tell a group of people that you have to do this then it raises suspicion and fears." (N4 56 - 62)*

The concept of the 'appropriate' mix of online learning and face to face takes on significance as the MLE ideal comes to be translated into teaching practice. What is appropriate is viewed as relative to the course context by the educational development MLE players, and a continual task for educational development to navigate. The university's ten year strategy calls for all courses to be modularised on WebCT within a certain time.

The Educational Development Unit operates within an Ecology of Games within the university and embraces what seem to be contradictory rules: on the one hand deterministic rules of adoption and on the other the right of academics to find their own appropriate use of the technology. A national funding agency has funded the MLE manager and four educational development officers. Proving that MLE works and is worthy of funding and a prize for both parties. This imposes constraints on the evaluation of MLE within the educational development unit and may go some way to explaining the way the unit displays such close alignment with the MLE frame and associated advocates within higher education policy, such as JISC, and major suppliers.

For Educational Development Officer, N4, JISC offers a resource of expertise in course design and evaluation and good practice on how to embed technology into every day practice. They also produce tools, such as plagiarism detection tool which the university has adopted. Examples of good practice which are produced by JISC are particularly helpful as they are much more '*real*' (N4 145) than just reading articles. Here the totalising game does not sit easily with the educational development officer's ideas about technology adoption. With the goal of totalising online provision it is not surprising that the appropriate mix is unspecified: such a strategy would be seen as overly deterministic. For educational development officer N4 the appropriate mix is an ideal that should be aimed for and which some people will get closer to than others.

The university is a player in a JISC funded e-learning practice project that is working to improve the quality of e-learning practice in a number of universities through a shared network of practice. The project helps develop experts within the university who will lead e-pedagogy in their own academic arenas. The projects are guided by the aim of creating MLE champions from which widespread adoption will cascade. Through their involvement in the project individuals so have the opportunity to advance their careers both in the university and within wider arenas of MLE development through becoming champions and change agents.

The issue of articulating MLE demonstrates how the Unit is careful in considering how to play two games. With a project to set up a community of practice in the use of e-learning, N3 describes how consideration of the project funder's (JISC) aims and academics led to a difficult decision concerning project discourse. N4 goes on to further explain the issue with using the word 'transformation'.

### **Representing MLE in the game of MLE 'online totalisation'**

The MLE manager has a role within the 'totalising game' as a representative of MLE. This role is particularly interesting since the MLE manager has an overarching role, presiding in multiple arenas to pursue the interests of MLE in

many areas of the institution. Although one might imagine that the job of the MLE manager is largely technical in nature, in fact, N3 is substantially involved in establishing a system of belief in the primacy of MLE. The role exemplifies the difficulties in aligning socio-technical elements of the university in the ongoing 'game of totalisation'. N3 gives voice to the voiceless MLE, acting as spokesperson for the system (Callon, 1986) and represents the MLE system as always legitimate. For example, all the surveys that N3 has carried out fully legitimate the system. As N3 describes, the MLE Manager acts as a promoter of MLE (*I have a narrow focus on trying to promote this*) and the MLE promoter requires belief in MLE whilst being able to play the academic arena:

*"Of course I am going to say it will have a positive effect, I do believe that. But I only believe that if WebCT is used appropriately to compliment the module". (N3 263 – 265)*

There is a sense in which N3 must believe in the system even though the game is always undermined by the ever present issues of appropriateness and balance. The responsibility for resolving 'appropriate' use lies not with the system but the lecturer: *"it depends very much on the lecturer (N3 101), it depends on what the lecturer is doing in the classroom (103) and it depend on how MLE is integrated within a particular module or programme" (258).*

As representative of MLE, the MLE Manager articulates its needs. This involves anticipating dissonance between WebCT inscribed processes and university practice For example:

*"I think that we can anticipate the obvious problems but the smaller ones don't arise until you start using it. For example, WebCT doesn't cope well with two semester modules and communicating with offices that they have to know about this..." (N3 307 - 309)*

This communicative role also involves brokering communication and negotiation between service units as a way of ensuring the best outcome for MLE. N3 explains:

*"So it requires constructive dialogue between all the service units..... and that's part of my job." (N3 328 - 329)*

The MLE Manager is involved in managing the positive representation of MLE in the academic arena. The way that N3 describes MLE tends to portray it as a malign response to environmental stimuli, naturally demanded by students and 'pushed for' by senior management because it has become a natural part of the higher education scene in the UK:

*"So we have a drive from the top and we also have students saying we want more of this, so we have pressure from two angles." (N3 90 – 91)*

N3 does however describe how some may (lecturing staff) view MLE as less than malign. For example, lecturers are worried that supplying materials online will result in less face to face contact: again the issue of 'balance'.

*"But lecturers are worried that if we put up the notes then they are not going to come to the lectures so we are trying to strike a balance between supplying materials and not drawing students away from vital class contact." (N3 97 – 100)*

Striking a balance is a reassuring concept that mitigates against the possible imposition of online learning from which lecturer fears stem.

There is no mention of the possible drawbacks of MLE framed online provision. In particular, N3 notes that university N has a problem with student retention, yet there has been no evaluation of the effect of MLE framed e-learning and university provision on retention. This is despite the recognised concern that MLE may reduce vital class contact. As the MLE manager notes, evaluation of the effects of MLE growth has not been evaluated yet because:

*"The MLE does provide flexibility but there is concern that it will drive students away from vital contact time. It depends on the way MLE is integrated within a particular course or module. So its hard to quantify because we haven't done any*

*studies of a module before it went to web support and after. It is difficult to compare the marks of cohorts of students.” (N3 258 - 262)*

Evaluation is something with which participants have little engagement (with the exception of one dissenter). There is little to no internal evaluation of MLE. A large scale evaluation of MLE at N has been carried out by an outside consultant which underlines the legitimacy of MLE and does not evaluate the effects, rather the barriers to further growth.

## **5.7 Summary**

Games of ‘online totalisation’ are characterised by short term technical wins, a characteristic described in the MLE landscape as typical of MLE initiatives. The overriding goal of totalising online processes resonates with the mode of progress evaluation employed in JISC surveys of MLE progress: the migration of processes online (see Chapter Two 2. section 4.4.2). Game trajectories that are controlled by MLE coalitions and tends to move forward incrementally in a technologically deterministic manner resonant of the ‘technological wins’ described in MLE research and evaluated in Chapter Two, section 2.4.3.2 UK Universities Experience of the Managed Learning Environment Framework

The MLE trajectory at university N illustrates how MLE games move through incremental configuration that is punctuated by the acquisition of MLE artefacts. Over the last 10 years there has also been a movement towards importing the MLE TAF as the influence of the commercialisation game has grown. A detailed illustration of the ‘online totalisation’ game at university N is provided in the following game description in figure 5.1.

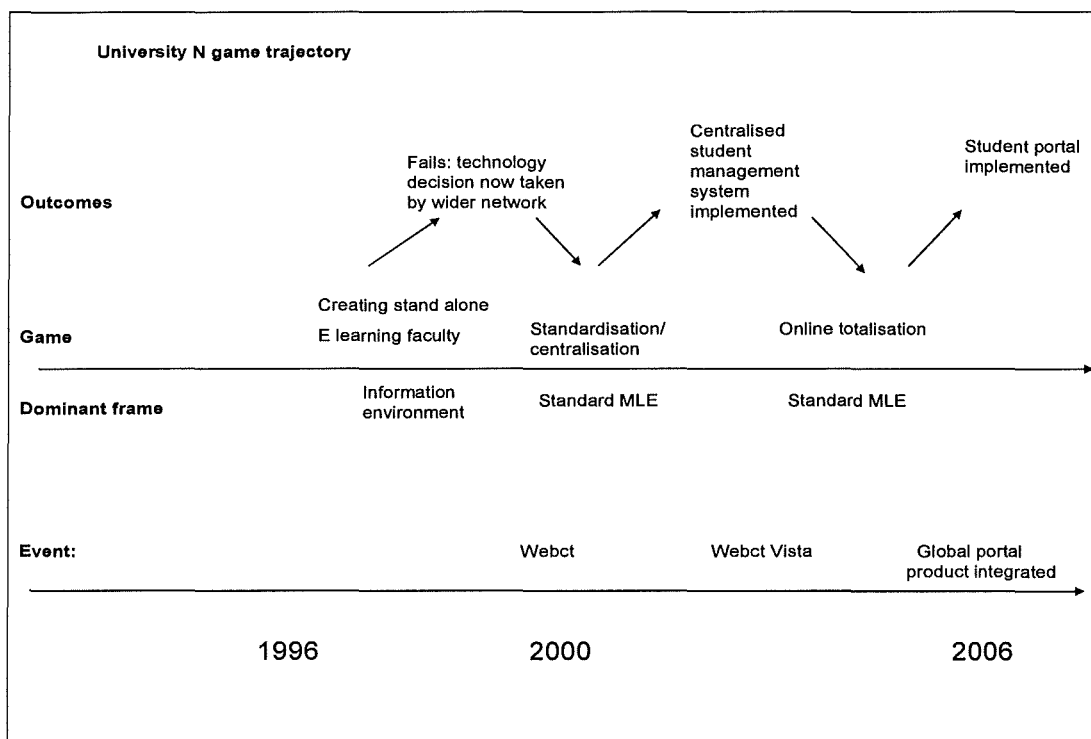


Figure 5.1 MLE Game Trajectory at University N

Frame alignment moves at the university coincide with JISC MLE framing events. This point is illustrated by the university's re alignment with the first JISC framing of MLE in 1998. Prior to this, data suggests that the educational development unit was aligned with the senior manager who sponsored the stand alone e-learning faculty project detailed in case study N. This project is associated with 'non content led frame' that advocated using VLE mainly communication and not for distributing packaged learning material online. The subsequent failure or 'fizzling out' of this project is associated with the sponsor's frame being incongruent with a wider network of influence. This happens at the time when JISC first frames the MLE TAF, indicating that this type of content led frame was circulating in a network of influence to which university N players aligned.

In the university N game ecology an important win is to get the whole student life cycle online, from initial application to student updating their records to issuing an e-ticket to graduation. This win is defined in the game of commercialisation as a whole. It refers to government sectoral plans for a fully integrated student portal. Also, a major software supplier refers to the goal of a

personalised portal (capable of facilitating the transfer of the student life cycle online) for each student as the 'holy grail' of system integration for universities.

The university is aligned with Scottish Funding Council's 'e-transformation' initiatives. This suggests that the university has become one of the few universities that take the opportunity to 'transform' through MLE. The aim is reinforced by the influence of private sector players such as major software suppliers and vendors who also push the university along the 'standard MLE' trajectory. This dominant coalition aligned with 'standard' MLE socio-technical constituency illustrates the 'standard' socio-technical constituency illustrated in Chapter Two, Section 2.6. Summary of UK Higher Education Managed Learning Environment Landscape.

Framing the technological development at the university has demonstrated how frame congruence amongst a group of technological key players is related to a wider network or socio-technical constituency. The focus of advocates is on networks out with the university as well as within and MLE CM networks are utilised to help mobilise support for the MLE trajectory.

Framing the MLE development at the university as an MLE CM explains the nature of the ideological work undertaken by the coalition. Local difficulties are smoothed over and MLE is articulated as benign in a way that is resonant of the 'standard model' of digitisation as described in Chapter Three (Kling & Lamb, 2000). In particular the unresolved issue of the appropriate mix of face to face and online interaction is smoothed over through the rhetorical device of 'blended learning'. This ideological work of maintaining the resonance of the MLE TAF and colonising it throughout the university is part of the collective framing process of the MLE CM which has become dominant in the university. In this was the trajectory of development has become a relatively uncritical acceptance of exemplary standard artefacts that are associated with the MLE TAF. Key players in the MLE coalition are focused on ideological work at this point in development, having established a high degree of structural control.

The Ecology of Games analysis enriches the description of how advocates work to establish MLE in the university both within the university and at the conjunction of the university and the wider landscape. Advocates seek to gain leverage in wider games associated with e-learning and educational technology. Coalitions with major suppliers are viewed as wins in gaining leverage and accessing MLE resources. MLE has drawn in big players such as Microsoft and WebCT who are now exerting strong influence on the trajectory of development at university N and in particular adding momentum to MLE through incentives and resources.

Within the university ecology advocates seek to change existing games such as the academic game and administrative games. This is done through a range of tactics and incentives. It is at the intersection of the academic game and the MLE game that pressure is greatest. This pressure is evident in the work of the Educational Development Unit. Such was anticipated in the Scottish e-learning review (Chapter Two, Section 2.5), when a programme of re-skilling educational development was advocated as part of the MLE agenda.

Membership of movement networks enables university to achieve MLE at an advanced pace yet may also constrain further innovation through the influence of standard systems creating a standard system trajectory of development.

## ***6 Case Study M: The Modern University***

### **6.1 Introduction**

University M was awarded degree awarding status in the 1960's. It is a strong engineering and science based university but also has strengths in languages and management. M is also rated highly as a research university. It has more off campus students than on campus students, of whom about a quarter are from overseas and has several campuses in the UK and over seas. The university was not a member of CURL and is therefore not considered to be rich in data resource.

The university senior management have agreed that the university is strategically committed to developing modes of delivery beyond the traditional lectures based approach. As noted in the minutes of the planning and management executive, 2004. The Executive:

*'Agreed that the development and delivery of flexible, open and - where appropriate - "distance learning" materials was fundamental to the University's ability to deliver on its mission and strategy, and must therefore be considered core activities.'* (Planning and Management Executive: Summary notes of the meeting of 18 March 2004)

This is a broad statement of strategic commitment and does not specify the type of organisation of systems or mix of teaching process involved. It serves an indicator that the highest levels of management at M are aligned to developing modes of distance learning.

The university has been associated with the strand of development in the Scottish context that involved the creation of commercial e-learning enterprises which are separate from traditional campus provision.

The history of events presented describe a major shift in attitudes regarding IT/IS at M, for example, belief in the autonomy of schools regarding their own systems

has declined with a strengthening in the belief in the centralisation of systems. Implementation strategy has moved from an evolutionary, step by step approach to standard 'off the shelf' system one off implementation. This change is linked to greater strategic emphasis on IT/IS to support or fulfil a wider range of objectives than previously.

In general, this is associated with IT/IS systems becoming increasingly politicised at M: they are now part of a strategy of system integration that aims to support the strategic drive for income generation and growth at M, making each sub system integral to strategic objectives. MLE at M has now become predominantly associated with the twin imperatives of totalising online delivery mechanisms and commercialisation. Together with the new IT/IS paradigm this means an aim for enterprise level web based systems and emphasis on organisational change management.

A coalition of key players aligned with the MLE TAF has gained dominant influence over the trajectory of ICT development at the university during the time frame of the case study. There has been resistance to this and the case study suggests the trajectory MLE has involved an array of organisational politics that have realigned control of the technological trajectory at the university to this coalition. The case study shows how this group of MLE advocates promote organisational alignment with JISC and suppliers. MLE at M has become a site of struggle involving struggles to control large scale institutional change both pedagogically and structurally. The recent VLE tendering process is shown as a particular site of struggle, in which MLE advocates and counter framers struggle to influence the trajectory of MLE at M.

#### **List of Participants:**

M1: Head of Educational Development Unit

M2: School based learning technologist

M3: Academic Registrar and Director of student services

M4: Director of finance and IS/IT

M5: VLE coordinator

## 6.2 Trajectory of Managed Learning Environment Developments

In 1996 the university embarked on an implementation of a university wide intranet. This project was underpinned by an information strategy that identified four types of institutional information management needs: Administrative Information, Corporate Information, Learning Resources, and Promotional Information.

This strategy does not aim to standardise information practice. Indeed, the underlying logic takes account of the *effectiveness* of local departmental and school administration. This aim is expressed as an attempt to bridge the historical *'tension between the efficiency and consistency of centralised provision and the effectiveness and specificity of local systems.'* (*M Information Strategy*, 25 – 26) In general the intranet project is seen as providing the essential bridge between the operations of the departments and the administration.

The implementation is not to be seen as a project with a specific finish date, but a corporate wide change in the attitude to information management. As noted in the strategy:

*'It should be stressed, however, that the Information Strategy itself should not be seen as a "project", with a defined completion date' ..... 'it requires a change of attitude on the part of users, technologists and administrators to appreciate the importance that accurate and consistent information has in achieving the objectives of the University.'* (*Information Strategy*)

An evolutionary, project by project development approach was adopted because it was believed to create favourable outcomes such as allowing user confidence to be developed, the approach to be refined and information access to be synchronised with local applications development.

The data offers interpretations of some aspects of the intranet project from two members of the IS/IT steering group. M3, is a long standing member of the IS/IT policy group. M3's views on the student records system have changed since the UNITY project. The first aspect of this change in attitude concerns the relationship between schools and the centre. M3 explains how this attitude has changed:

*"I want to get away from the divide between centre and schools. When I started it was agreed that schools would do more because they are at the coal face. Until then there had been a fair number of criticisms of central services for the way that records were kept." (M3, 65 -68)*

It may have been that such a change of attitude over this period was partly a consequence of the intranet project:

*"...suddenly staff in the schools realised just what a difficult system we were trying to operate. So there was a much better level of understanding about the system and as a result of that much more support for getting a new (centralised) system." (M3, 68 -71)*

However, M3 expresses concern that systems should be implemented from a user perspective. This is contrasted not with a top down approach but with the influence of the technical team:

*"If I have a battle its doing things on the basis of what the user wants rather than on the basis of that the technical team tell us it's the best way to do it." (M3, 91 – 92)*

M4, chair of the IS/IT policy group, comments on the system resulting from the 1996 project, that the present system is now 7 or 8 years old and was 'home grown'. Over time there have been 'drip feed' changes to the system and the resulting system is not viewed as 'scalable'.

At the time of the study the university was embarking on a project to replace the student administration system resulting from the UNITY project.

This new student administration system project is guided by the aim of integrating all university systems. The integration of all university systems is a huge undertaking and is a far bigger project, of a scale beyond the experience of the university so far.

M3 describes how they have produced a spec for the new system they would like, whilst acknowledging though that no system will provide everything. M3 has presented the business case for the new system to the planning and management group and thereafter obtained university funding. SAS, HESA and the Funding Council have also supplied funding for the new student administration system project. What the project coordinating group, the IS/IT Group, is aiming for is an Oracle based system that can integrate all aspects of university business process into one system:

*“One of things that worries me a lot is that student alumni have got their system, accommodation team will think about have the system they use, finance have got their system, what we have to do is go for an Oracle, what we are trying to do is go for an Oracle based suite that will allow us to encompass for all these various things.” (M3, 27 – 31)*

They are looking for a ‘business class’ standard system that has been tried and tested in the UK market as an indicator that:

*“... it will meet our needs now and make further developments for the future because HESA and the funding councils returns change continually.” (M3, 58)*

The new student administration system should embody one standard system approach that does not allow shadow systems and conforms to the system dictum of putting information in once that can be pulled out many times. In this system all information should be assessable from the centre with a high degree of confidence in its quality.

The system is therefore very different to the earlier intranet project. It will be a centrally implemented, standard 'off the shelf' system, as possible rather than a bespoke system. The status of schools as stakeholders in the development of the new system has diminished considerably since the intranet project.

A major shift in thinking since the UNITY project is that the administration system should support the VLE system, as the integration of the two is now part of an MLE trajectory:

*"And this is seen as one stage of the MLE (referring to the new VLE) we are also going for a new whole student administration system for which we have just gone out to tender. The idea is that that will support things like the VLE". (M3, 23 - 26)*

The importance of the student administration system is now much wider than just information access and quality, the focus of the intranet project. As one vital stage in the development of MLE, it becomes an engine of commercialisation at M: as *"a computerised system to support all aspects of the business"*. But it is more than just a system, for M3 it is also a state of mind, it is about trying to think of all areas of the business that can be delivered online. It is about joined up business processes and how that can increase business for the university.

In summary, this section of the case study has demonstrated how technological development has come to be underpinned by an efficiency frame rather than the effectiveness of localised innovation. Integration has become the focus of development, with configuration of systems for the purpose of income generation underpinning development. Systems are now configured to a standard 'off the shelf' administration system.

### **6.3 Technological Framing**

There are two types of congruence in the framing of MLE. The first technological frame is focused on standard 'off the shelf' student management

systems and VLE's. It is congruence between the Director of finance & IT/IS, the Academic Registrar & Director of Student Services, Deputy Principal (Learning & Teaching) and the VLE Coordinator. This technical configuration aims for a student portal, one data base and VLE, resonant of 'standard' MLE. There is an emphasis on the business function of MLE in creating new opportunities for income generation and efficiency. MLE is viewed as an approach that separates content and teacher so that content can be packaged and delivered online. This MLE frame aims to transform traditional campus delivery.

The second technology frame involves an evolutionary process of learning to apply technology to improve education process. This frame runs counter to the focus on MLE as a configuration of standard systems in the 'standard' MLE frame and will be fully described in the section of this case study analysing MLE counter framing. This frame is congruence between an educational technologist and the Head of Educational Development, who identify the 'standard' MLE frame as incongruent with on campus delivery because it originates as a business orientated distance learning approach.

#### **6.4 Managed Learning Environment Computerisation Movement Technology Framing**

The Director of Finance and IT/IS is a key player in MLE activity at M in a similar vein to a 'heterogeneous engineer' (see Chapter Two, section 3.3). Also, because the finance system itself has become an essential player in supporting distance learning policy by being the most important element of the integration process. As noted by the Planning and Management Executive:

*'Noted an opportunity to take advantage of a proposal presented by Oracle for RMF et al fulfilment on favourable terms of additional elements of planned new integrated IS/IT systems, of which the new finance system formed core initial investment. Associated work by the University would represent a considerable commitment in the short-term, both in financial terms and in*

*reconfiguration/systems re- engineering work.' (Planning and Management executive: Summary minutes of the meeting of 1 April 2004)*

The new Director of Finance and IT/IS (M4) arrived at M in 2003 and is chair of the IS/IT steering group as well as a member of the high level planning and management executive. This new actor brought a marked shift in attitude towards IS/IT that is resonant of the transformational and revolutionary aims of a CM participants (Table 3.7, point 1). According to M4, IT/IS is now all about one system student administration system and VLE, and should create organisational transformation to achieve delivery of education through online structured reusable media.

For M4, MLE at university M involves a belief in technological and social 'transformation' that aims to facilitate the supply of modularised, packaged courses to local and international markets (Table 3.7, point 1). This will enable M to compete with international e-learning and distance education providers in the e-learning market. In the diagnostic aspect of MLE framing (Table 3.6), M4 views the traditional university as out of date and that there needs to be a transformation in academic practices that separates the lecturer from content. This would allow packaging of educational content for online distribution. Here the constraint on MLE progress is expressed as the academic community's fear of this change. M4 does not frame MLE as involving a belief in levelling the playing field of higher education or creating a sectoral MLE system.

MLE development involves the introduction of business systems thinking, an MLE theory, at the university (Table 3.7, point 3). Standard system implementation offers central administration the opportunity to review all business processes and assess which add value and which do not, i.e. those practices that do not conform with the standard system ethos as described. This standardisation of data aims to capture data once in one central system avoiding duplication and allowing management direct access to and confidence in the data. Underlining this process of centralisation, M4 seeks to define the relationship between central services and schools within a commercial ethos, as one of

customer and service provider so that the system would create a customer service environment for support services to the schools

For M4, MLE practice (Table 3.5, point 4) is based on centralisation and standardisation. Organisational change is always sketched out at a high level before being implemented in a top down fashion because: *"The change is top down not from detail up"*. Because change is top down it is essential that people buy into the *"idea of what the future will look like"*. Unless this happens they will not be able to embrace it properly or absorb the change because they will see it frequently as a threat. Although people may or may not be able to embrace change for M4 they have no right to be exempt from change as it is *"natural"* that people's jobs change with time in response to initiatives and pressures. Even so, it is the change management process that is the biggest challenge, not simply the system implementation project.

*"The student administration system is really the smallest part of the project. The biggest part of the project is the change management project which says: what are we trying to achieve here? How are we going to make this happen? How are we going to convince people to adapt the change, to embrace that, to make sure it slips in easily- that's going to be the really tough bit."*(M4 83 – 85)

For M4, there is no doubt that the university should align to standard business systems as in the MLE TAF (Table 3.5, point 5). IT/IS policy should:

*"go for as close to plain vanilla as we can. So you take the wrapper off, put it in and make it work and if that means we have to change our processes to access the power of a system that has a generic audience in mind, then we should do that"* (M4 73 – 76)

It is not realistic to maintain separate systems within this view. This applies to departments and schools and M4 aims to have all administrative work undertaken by the central system with schools and departments having no justification for maintaining shadow systems. Standard business class system are, for M4, the only efficient systems.

In 2006, a new VLE Coordinator (M5) was appointed to oversee the implementation of the new VLE system. M5 has come from working as an educational technologist at a very new university (1995 awarded degree status) and was previously employed by a major VLE supplier. For M5, MLE is a term, not a system. It is somewhere on a trajectory between a VLE and a “*full blown portal*”. M5 considers that, although it might take some time, M is on course for a portal. M is now at the stage of an institution wide VLE and this is favourably compared to the previous position:

*“I think we should be thankful that we are now at the stage where we are going to have an institution wide VLE. Where as before there were two different VLE's in use by two different schools and some schools didn't even use a VLE or using web pages or what ever. So we are now moving towards one centralised place of provision.”* (M5 21 – 23)

One of the first things M5 did when coming into the post was to run a naming competition for the new VLE, offering a prize for the best suggestion. Creating an institution name for the VLE system is seen as important ideological work (Table 3.7, point 2). M5 has been surprised by the culture of decentralisation at M, which in comparison to post 1992 universities is far less centralised. This appears as an unrealistic level of autonomy:

*“And I did get the impression some how that people tend to forget that in the end their pay check comes from M and not the school of x”.* (M5 50 – 52)

This level of localised technology use has created too much system duplication with schools running their own email and pc systems, necessitating some kind of central coordination. M5 has a qualified hope that the best of innovative technology use at M can be captured in the new system:

*“So if we can pull this all together in one VLE we will hopefully be able to do something, use the expertise and spread the word, but we will see.”* (M5 58 – 59)

In summary, M4 frames MLE in way that is very resonant of the MLE TAF. Local MLE frame resonance is not achieved through modifying and softening the MLE TAF, but in emphasising the revolutionary aspects of MLE and in particular the blaming of academic practice as a constraint on transformation through MLE. The point of difference with the MLE TAF is the emphasis on competition rather than MLE cooperation within the sector. New standard system expertise (M5) has been brought into the MLE coalition. M5 is a strong believer in centralisation and frames local autonomous innovation as a problem.

In counter framing of MLE, M2 and M1 frame MLE counter to MLE advocates at the university. The emphasis of counter framing differs for each. For M2, an educational technologist, the MLE TAF is criticised from the perspective of autonomous technological innovation. 'Standard' MLE constrains innovation by advocating standard system use and revolutionary time scales of implementation.

M1, Head of the Educational Development Unit, counters the MLE TAF from the perspective of educational values. MLE is associated with off campus education as a business enterprise, which, given the history of separating online teaching for business from on campus provision at the university, is counter resonant of local context.

Counter framing tends to focus on the undesirable effects of CM structural elements that are beginning to dominate technological developments at the university. For example, M1 frames the MLE as exhibiting a unstoppable momentum. This corresponds with the structural element of CM as involving growing momentum (Table 3.4, point 6).

With regard to momentum, M1 views MLE in the university and other universities through a metaphor of momentum which gathers pace, not through ration institutional decision making, but as a process that is not transparently through established university structures:

*"But I see it as being at the top of the ski slope really. You know once you start that decent or what ever you want to call it then there is an inevitable process*

*that comes into play. I don't think the university is fully aware of that yet but I think this is going to get legs, it has done elsewhere. Even though we haven't put it in the strategy.”(M1 162 – 166)*

The metaphor of getting ‘legs’ suggests that MLE is carried forward as a process like that of advocates mobilising support for MLE, rather than a process of decision making through university structures.

M2 criticises the constrained linear trajectory that is associated with the MLE CM, but aligns with the original MLE vision for sectoral data standards. For M2, MLE should be a process of learning to apply technology to improve education process that is iterative and incremental: MLE should be a process of learning to apply technology to improve the education process and by its nature is slow, evolutionary and cannot be forced.

*“I personally don't think it's sensible to talk about a piece of software called an MLE and a piece of software called a VLE. It should be a process.” (M2 66 -68)*

M2 talks of a process of technological innovation that involves the iteration between initial implementation for efficiency and subsequent learning to use the technology effectively. This is illustrated through an evolutionary metaphor:

*“It's evolution rather than revolution in education, it's moving along a continuum.” (M1 177)*

Indeed, M2 is heavily critical of practice that does not use this process orientation and pressures academics to use a particular tool:

*“I must, I must use discussion boards, how can I use discussion boards in my module” rather than what does my module need to have to support students getting from this point to this point.”(M2 212 – 215)*

For M2 technology adoption should be a bottom up process:

*"What you can't legislate for is people using it more creatively. So it will percolate out in a more bottom up kind of way. So it will be up to people whether they use it or not." (M2 220 -225)*

MLE practice should be focused on creating data standards. the management and establishment of standards and specifications is a key consideration in creating an MLE.

M2 observes that standards and specifications need to be improved, demanded, more widely understood and be complied with. Otherwise, people are very wary about making changes for something that they do not feel confident they will be able to move with in the future. Changing business processes for one 'off the shelf' proprietary system does not further the goal of commonly accepted standards and specifications.

M2 believes that the application of technology in education is still uncertain, commenting that University M is at the stage in an innovation cycle of implementing for efficiency. M2 looks forward to a time when innovation will move towards effectiveness. Though this may be an aspiration, the danger is that adopting a standard 'off the shelf' system and standardising university processes to align with it will constrain the university's ability to innovate.

For M2 the idea of technology is that it enables things to be done differently to the way they have been done in the past. Buying into one particular technical configuration means is seen as restrictive to innovation:

*"..... if somebody said to me is: "all you can have is this machine, with this particular piece of software, with this particular set up" I would never have changed the way that I did things. But because I have some freedom to use things in the way that I want to, to explore new technologies, I find new useful ways of doing things and so anything that is too restrictive I think is a bad idea." (M2 163 – 168)*

Accordingly, for, M2, any measure of success for e-learning that relies on the number of modules that are using a piece of technology or piece of software is an anathema to innovation:

*"Cos I just think...we don't go round and say: how many people are using seminars or tutorials? And that is the measure of success of what! But we do it with e-learning and I think it is the most ludicrous measure of success." (M2 185 – 188)*

M2 recognises the increasing pressure to adopt e-learning practice at M and thinks this is wrong, believing that education and learning are ends in themselves and should not be technologically determined:

*"Well I don't think there should be an institutional push for e-learning. My personal opinion is that we should push learning, we should push education. That the best way to do that is sometimes through technology and sometimes not." (M2 182 – 185)*

Head of Educational Development, M1, has little or no affinity with e-learning. M1 evaluates blended learning as of very limited use for someone who was "interested in education": it having efficiency uses and administrative value but that students have to be forced to use it. Pedagogically, M1 is not a supporter e-learning:

*"I think that people learn socially and by rubbing ideas of other people rather than by learning off the web". (M1 116)*

However, recently M1 has been obliged to use blended learning for delivering educational training to other campuses and so as a user has started to see some benefits.

M1 aligns MLE with off campus distance learning for business, describing it as:

*"Tying in all the systems relating to teaching and managing the learning process. Very much to do with distance learning for business, an off campus delivery system."* (M1 31 – 33)

This area of university business is something M1 or the Educational Development Unit is not aligned with:

*"That's less of a concern for me personally because I am less concerned with the business side of things because distance learning students tend to be more of a business concern in some ways rather than the learners we see on campus."* (M1 38 – 41)

In summary, this section has illustrated an alternative framing of what MLE should be a process rather than the implementation of standard 'off the shelf' products. This process should focus on standardisation of data transfer and creation of data specifications across the university to allow an integrated approach rather than the implementation of standard systems. This alternative technological frame introduces the idea that MLE practices of evaluation are technologically deterministic and incongruent with the notion of teaching practice leading technological practice. Counter framing reflects the history of technological commitments at the university as the Head of Educational Development resists changes to the established boundary of on campus and off campus educational process. MLE is counter framed as colonising the university campus as a MLE CM: through advocates mobilising momentum for one linear path of constrained technological development.

## **6.5 Managed Learning Environment Computerisation Movement Structural Influence**

In terms of structural influence, M4 and members of the MLE coalition have been key in accessing MLE resources through participation in CM networks and this has helped to educate players within the university (Table 3.7, point 5). For example, guiding ideas about MLE are taken from JISC that direct MLE development.

M4 uses expertise from JISC and was very pleased with this 'free' resource provided by JISC, explaining that they had been invited in to talk about project management methodology and subsequently acted in a consultant role, offering ongoing advice on project methodology. M4 felt that the relationship was a reciprocal one - a "virtuous circle" - with university M providing an exemplar of how the JISC MLE approach can 'work':

*"They were quite interested in what we were doing because we were taking ideas that they had, making them our own and implementing them. So they were very keen to understand how that had worked. This meant there was another case study institution that they could cite as evidence that the thing was working."*(M4 152 – 156)

M4 was responsible for bringing new funding for MLE projects from other MLE CMOs. M4 mentions two significant sources of funding for the new student administration project coming from the Scottish Funding Council's Learning and Teaching Infrastructure Fund and the Strategic Infrastructure Research Fund. Funding is granted on a formula basis on the basis that projects fits the objectives of improving the infrastructure of learning, teaching and research. M4 talks of the collaborative work undertaken with the Scottish Funding Councils and an important aspect of CM structure, professional networks (Finance Managers), of which M4 is an established member of this network of practice.

The MLE coalition has been key in mobilising resources for MLE from within the university, particularly in the process of getting funding for the new student administration system, in which M3 was directly involved:

*"It's been quite a difficult task to the university to provide the funding for the VLE. The business case for the new student management system has now been accepted, I gave a presentation to the planning and management group. We are aware that the university doesn't have limitless funds. So it is quite a tall order to drive a new system and be aware that there financial limitations."* (M3 72 – 77)

Though these activities have added momentum to the adoption of MLE, M1 has tried to hold back MLE by influencing technology choice. As s chair of the VLE Steering Group in 2003, set up to look at how M1 could get a new institutional VLE, M1 describes how the group recognised that the new VLE could be a vehicle for an institutional MLE and took a decision to eliminate the MLE option whilst setting up a community of practice through which people from schools would be trained and share ideas concerning VLE.

M1 says that the group...

*"....quickly decided that we weren't going to go for an MLE because we decided we weren't at that stage of development. That if we went into something that was a big bang approach like that it was less likely to be successful."*(M1 52 – 55)

Also, M1 describes how the group *"eliminated"* the MLE option because it was not considered an urgent need and that the resources were not there for it. In fact, it seemed a very expensive option.

M1 also mentions that simultaneous with the VLE project, the ongoing consideration of the new student records system was becoming the more important project and beginning to lead the decision making process concerning VLE. This concurs with M4's view that the records system implementation is a much bigger project than the VLE. The student records system project may therefore have been, to a large extent, dictating the MLE approach.

A second pressure was coming from the tendering process itself. Here M1 describes how during the tendering process *"MLE is kind of coming in the back door"* as suppliers try to scale up what they will supply by *"dangling"* the more expensive options in front of the group. M1 describes how even though the group had asked for a demonstration of the VLE, the suppliers had demonstrated the full academic suite instead of just the learning part. M1 was clear that they had specifically asked not to see the integration functions which the group associated with MLE. So one major supplier had for example, showed them the things that they asked them to show them but M1 considered that a lot of what they showed

them was within the latest version of the product which is more focused on integration than the earlier product which was the edition they were interested in. M1 concedes that there might be a time in the future that they might be interested in the full academic suite but at that time they were not.

As background to this story of resistance it is interesting to note the role played by the MLE coalition (Head of Registry, Head of Student Services and the new Director of Finance) in the IS/IT Policy Group. The IS/IT Policy Group is the forum for discussion and decision of strategic IS/IT issues, and the prioritisation and resourcing of IT/IS projects. It is integral to the senior management structure of the Planning & Management Executive, with whom it works very closely through its Chair, the Director of Finance and IS/IT.

From 2002 to 2006 the Policy Group consistently worked on two major projects, a new student records system, the Oracle Student Records System and the VLE project (IS/IT Policy Group minutes). M3 mentions MLE in the record of the meetings, in October 2003, reminding the group the strategy of the university was for MLE and not just a VLE:

*“(M3) reminded the Group that the IS/IT strategy for the University includes development of an MLE which would link information systems across the University and negate the need for shadow systems currently operating (or proposed). It was agreed that this must be pursued as an extension to the VLE Working Group discussions.”*

The next meeting is chaired by the new Director of Finance and IT/IS when there appears to be a marked change in style, with more emphasis on ‘methodology’ and far sparser reporting of discussion. As the new Chair comments:

*“project began before the Project Management Methodology started and has been a challenge to reverse engineer the documents. If the VLE project was to begin now – process would have been far simpler”.*

In 2006, a new VLE coordinator (M5) is appointed to oversee the educational development unit's support for the new VLE. The VLE manager is identified as part of the MLE coalition through frame congruence with the MLE TAF. Even so, there is evidence that suggests that the unit resists alignment with MLE and tends to apply a separation of e-learning functions from on campus activities. For example, the unit's web page may be a reflection of how the new VLE role is incorporated into the work of the unit. Although hardly mentioned in the main priorities of the Educational Development Unit, a third of the webpage menu is now given to the flexible learning and VLE work of the unit. This may give the impression that this area of work is a recent addition to the unit's responsibilities. Perhaps it is note worthy that although this area of work is substantial; it is not included in the list of major responsibilities of the unit. Given that the new university wide VLE is such a major project, one may wonder why the list of the unit's major responsibilities has not been updated to reflect this.

Several documentary sources suggest the nature of the relationship between the Unit and the new VLE coordinator. The coordinator seems to occupy a place in the unit but is not part of the unit.

Firstly, the March 2006 newsletter has an introduction by the unit manager which seems to reflect the underplaying of the VLE project. At the beginning of the introduction the training programme for PhD students and research staff, the institutional review and professional career development programmes are flagged up. The new VLE is only mentioned as a part of a list of initiatives at the end of the piece as part of the work that is supported by the Unit:

*'We are also supporting a number of initiatives such as Plagiarism education and detection; on-line survey tools; VLE implementation; and a blended learning version of the PG CAP course.'* (VLE Newsletter)

The section of the site covering e-learning called *Flexible Learning Opportunities* deals with the new VLE coordinator who is responsible for the implementation and continuous enhancement of the new VLE system. The VLE coordinator is described as *'operating from within'* the Educational Development

Unit, not as being part of the unit. This may suggest a desire to separate the e-learning section as a separate unit within the overall Educational Development Unit.

M5's interpretation of the VLE steering group offers an insight into the VLE decision process that echoes the controversies previously described regarding the choice of VLE. M5 talks of how the full academic version brought by the university was shown to the project steering group very late in the tendering process. As M5 explains:

*"As I say I was on a project board where we haven't decided what to buy, four months later on the same day, on the Friday, we showed the project board the singing and dancing VLE function with integrated data and goodness know what! So obviously we cannot roll out all the features, there is no way, so we are working on devolving administration into the schools....."* (M5 69 – 74)

In summary, the MLE coalition has worked to structure decision making in favour of their MLE trajectory. This trajectory is far faster than the displaced coalition would have liked.

## **6.6 Managed Learning Environment Development as an Ecology of Games**

In reference to Table 3.8, the following section evaluates MLE development at the university through An Ecology of Games. The MLE game at the university has the aim of 'online totalisation'. It has a focus on organisational change to achieve delivery of education through online structured reusable media. This will involve a significant symbolic shift in the framing of technology at the university to understand technology development as geared towards income generation. As the Head of Student Services explains:

*"It's about joined up business processes and also about thinking about how that can increase your business, for example, packaging an online course so that it*

*can be delivered in different countries. This makes your business more flexible. It doesn't have to be overseas ofcourse, it can be part time or evening for example.”*  
(M3, 3 -7)

The game of ‘online totalisation’ is played by the MLE coalition, with support from senior management (M6), in competition with counter framers of MLE.

### **6.6.1 The Game of ‘Online Totalisation’**

The major goal of the game of ‘online totalisation’ is to spread the practice of already successful university M online throughout the university. In this game, the MLE coalition has attempted to create dominant rules and assumptions associated with their framing of MLE through the MLE TAF. This involves structuring the ‘standard’ MLE trajectory towards a self service portal by replacing all shadow systems with one MLE system.

The overall tactical approach of MLE players has been the structural and ideological work described. Once structural control is achieved there will be a shift to ideological work, as M4 explains, a major tactic will be to keep MLE at the forefront of university discourse through Newsletter, questionnaires etc.

Although there are available tactics, there is a significant tactical uncertainty in how to avoid conflict whilst configuring MLE. As M4 asks: *“How are we going to convince people to adapt the change, to embrace that, to make sure it slips in easily?”*

M4 recognises that work has not yet created a major symbolic shift in how technology is viewed at the university: *“many people not grasping the huge changes MLE involves.”* Therefore, work needs to be done and tactics developed to engage more players in the MLE game.

### 6.6.2 Ecology of Related Games

The game of 'online totalisation' is related to a broader game ecology. Three related games are identified in the case study. The first is the game of 'online educational delivery' in the international market. This is the market for the delivery of education in a structured form over electronic reusable media. In the UK, the leading player in this market is seen as the Open University. In the international market the leading players are seen as the University of Maryland and the University of Phoenix. In this game the campus can be used as a resource to develop online courses on campus before offering to global market. As M2 explains:

*"In electronic media one of the markets we are pursuing where it's generic is undergraduate and post graduate students on campus. And many universities have moved to this as an easier way to transfer knowledge to students because they are recognising that students learn quite often by not turning up at lectures, by staying at home, do where ever they do it, at whatever time of the night and day they do it. And electronic self service is a perfect way to do that." (M4 54 – 61)*

A second related game is the political game which seeks to make universities more financially independent. As M2 observes, the UK Government, which in the past has substantially funded universities, has said that it wants universities to become financially sustainable, by which they mean they should make enough cash to cover reasonable costs and reinvestment in its own infrastructure. In University M, As M2 explains, about a third of income comes from government; the rest comes from research, overseas students, or catering and residencies. In this game the university sector as a whole is required to become more businesslike. Funding councils and JISC have supplied MLE resources with the broad aim of modernising the university to generate income. Within this game MLE players court funding and engage in network activities. One aspect of this game that drives MLE is the ever increasing demand for university data from governance bodies.

A third game is the 'major supplier' game. Here the MLE coalition works with major suppliers to have the university adopt and implement their 'off the shelf' systems. This has involved the structuring work of the MLE coalition in controlling important technology alignments for the university. The transfer of standard 'off the shelf' systems expertise from a major supplier to the university has helped align the university to incoming technology. The manipulation of the VLE tendering process has also been an important move in this game.

### **6.6.3 An Ecology of Games within the 'Online Totalisation' Game**

The following section describes an ecology of games with the game of 'online totalisation'.

#### ***The 'Academic Game'***

Aligning academics with MLE is seen as a significant problem by the MLE coalition. This is not surprising considering that an assumption of the totalising game at M is that lectures are not always necessary for student learning. There is emphasis on creating a rule in the academic game that separates the lecturer from educational content, so that educational content is authored and packaged as a reusable electronic format. M4 recognises that academic autonomy is a strong rule in the academic game and that MLE will have to change this: *"it's a new concept: doing what you are told and academic in the same sentence!"*

Rather than defining the campus as less significant, the campus is redefined as an MLE resource. First, the campus can be used as a testing ground for packaged learning in which the effectiveness of packages can be readily assessed. Then packages can be developed which are ready for online delivery to the international market. Second, with the assumption that lack of face to face contact is overcome through group learning, the campus is a place where students can gather and form groups.

### ***The 'Administration Game'***

MLE players are concerned with breaking down local ownership of administrative processes. These can lead to shadow systems through which academics manage their own students. In return for giving up their own systems, it is hoped that offering 'business class' standard 'off the shelf' systems will offer higher bandwidth, reliability and security. This tactic is underpinned by M4, stating that: "... *you can't support your own system in this day and age.*"

Every part of the student administration will be carried out through the new administration system: "*The new system will effect everything that we do. We have an Oracle financial ERP system as our base, so what ever goes in has to interface with that*" (M4, 80 -82)

The game employs technological determinism as a strategy. Standard system implementation is seen as a catalyst of organisational change for MLE.

### **6.7 Summary**

The VLE tendering process was a juncture in the game as a point in which the technology choice process determines the continuation of the game. Here MLE players succeeded in creating the outcome they wanted: the full academic suite. An illustration of the MLE trajectory at university M is provided in figure 6.1.

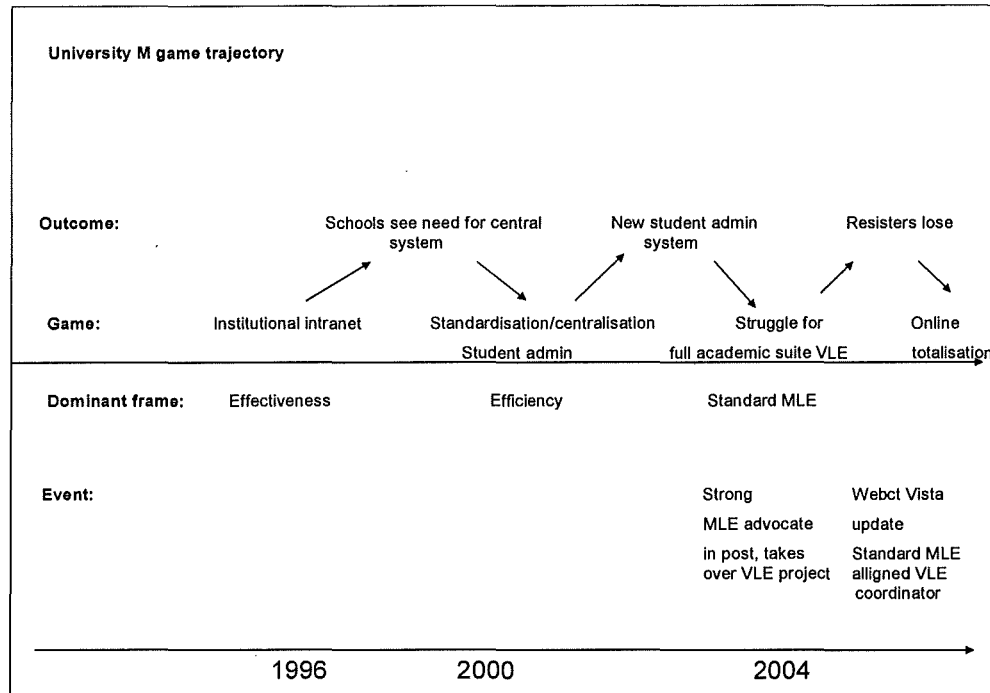


Figure 6.1 MLE Game Trajectory at University M

The research suggests that the trajectory of MLE is shaped by the growing influence of a group of ‘standard MLE’ aligned players. The 1996 intranet project strategy detailed in the case study, refers to a guiding vision of bridging what it calls the ‘historical tension’ between the efficiency and consistency of centralised provision and the effectiveness and specificity of local systems. However, following this project the dominant IT systems frame moved on to incorporating the single centralised database associated with the MLE TAF, becoming associated with efficiency.

The game of ‘online totalisation’ at the university aims to be revolutionary but as with university N, the implementation of MLE technology comes first and the revolutionary image refers to the social alignment that could be attempted once the technology is in place. At this point in the game, centralisation of administrative functions and the dedicated use of MLE systems is hypothetical: part of the game plan. In reference to the trajectory of MLE at university N, the first stage in this process would be to align educational development with ‘standard MLE’. To this end a new VLE manager from a global supplier of an MLE system, has been appointed who is aligned with ‘standard MLE’.

In comparison with university N, the MLE project at M is at a relatively early stage, with the VLE system in an early stage of roll out and the new student administration system not yet implemented.

The MLE coalition has undertaken structuring and 'back room' work (see Table 3.2) to realign ICT development to MLE networks beyond the boundary of the university. The focus on aligning to major players in the MLE landscape is felt as a lack of negotiation by participants who advocate the established alignments of technology to the academic game and the division of off campus online education and on campus education.

With reference to the An Ecology of Games, the educational technologist is in a situation of still playing the academic game, whilst experiencing pressure to move to the MLE game. The educational technologist in the academic game has more intrinsic creative reward than in the MLE game where the rule is to impose technology on colleagues rather than experiment.

The 'online totalisation' game offers professional prizes for the initial MLE players who connect with CM networks and mobilise support for MLE work. This is more so as a player in the administrative game where quicker wins are possible more than the academic game, which is perhaps more strongly defended.

## **7 Case Study A: The Ancient University**

### **7.1 Introduction**

University A is a large, ancient university and highly rated for teaching and research quality. The university's 2006 e-learning strategy claims that the university is at the forefront of using e-learning and over the last few years there has been a rapid expansion of demand for software, systems and e-learning support across all Schools. Strategically, the e-learning strategy emphasises that the focus of e-learning activity is to enhance the educational experience of campus-based students, whilst seeking opportunities to expand access to (and income generation from) provision at postgraduate and continuing professional development levels through 'judicious choice' of market-led developments of e distance courses which are aligned to the University's research strengths.

The university has been a member of the university consortia that have maintained and developed the CURL bibliographic database, as described in Chapter Two. As such the university is regarded as having a strong position in the Scottish context with regard to data resources. As a pre 1992 university, it is associated with a trend in the UK HE landscape for 'in house' bespoke VLE development, as identified in Chapter Two, Section 2.6 Summary of UK Higher Education Managed Learning Environment Landscape.

#### **Participants:**

- A1 - Librarian involved in e- learning community
- A2 - Assistant Principal (e-learning & e-health), Director of Learning Technology Section
- A3 - Learning Technologist, College of Medicine and Veterinary Medicine
- A4 - Senior Lecturer, Teaching and Assessment
- A5 - Manager of Communication and Training Services within Information Services
- A6 - MLE Manager
- A7 - Senior Librarian

## 7.2 Technology Framing

There is congruence between all the participants around a counter MLE technology frame that is termed by this research as the 'process frame' (see Appendix 10, Master Participant Analysis Table).

## 7.3 Trajectory of Managed Learning Environment Development

A very senior manager set up an e-learning strategy group to promote e-learning developments in the Colleges, especially larger and more ambitious projects. Out of this initiative came a centrally administered e-learning fund in 1992 through which practitioners can apply for funding for their projects. This approach of developing practice through bottom up innovation is encouraged by the showcasing of projects at the university annual e-learning conference, which several participants now think of as an important aspect of the e-learning community at the university (E-learning at University A, 2004).

As the number of students who wanted to use technology such as conferencing tools rose significantly in the 1990's, A4 explains that the university saw the need for an institution wide policy on technology use. So one of the things the university did in the early nineties was to try to develop an 'email for all' policy. The experience of negotiating this policy is remembered by A4 as particularly difficult:

*"Blood on the walls when it came to discussing what sort of system. There were powerful lobbies from law and divinity who were already using a modern type e mail. Because they were both geographically separated they had developed their own systems. So there were centres of resistance there. But there had to be an institution wide decision to use it. So to me it's the same for the VLE."*(A4 147 – 152)

A6, the MLE Manager, also comments that at this time there were many universities using VLEs and ICT but very few universities who had made an institution wide decision to adopt a particular technology at an enterprise level:

*"..... I started in this area in 1998, but there were institutions, very few who had made an institution wide decision, but many who were making some use of these kinds of products." (A6 23 – 25)*

Even so, A6, recalls that an enterprise vision of systems linking up had been around at this stage:

*"Even then everybody had the vision of everything linking up and it being an enterprise wide piece of software. But nobody really knew what shape it would take, if it were possible." (A6 27 – 30)*

Though the vision of what an enterprise system would look like was not clear amongst the group A6 refers to, at the same time there had been a 'school of thought' in information management fields that wanted to implement one big generic enterprise level database that would do everything. As A6 explains:

*"I have been working in this field or related information management fields for a very long time indeed and there has always been a school of thought that want to go for 'the big database' that will handle everything or the big....and they never work, no matter what the enterprise is, whether its education or banking, what ever it is." (A6 116 – 120)*

This leading learning technologist in university A does not align with the standard one database approach advocated by the information system field, seeing it as an illusion and particularly inappropriate for the university.

In 1999, a medical technology section was established at a time when, an A2 report, the university was just starting to think about VLEs. This desire to increase use of a VLE was in response to the fact that the university had recently redesigned, and in 1998 relaunched, it's undergraduate medical curriculum. This

was done in response to both the General Medical Council's 'Tomorrow's Doctors' guidelines to UK medical schools and to the dynamic changes in the forms and processes of higher education in general including the deduction in funding per student and rising accountancy and audit burdens, as reported by A2.

The medical school at that time were trailing two 'off the shelf' systems, WebCT and a free system from Singapore University. However, the school found that these systems did not suit its needs. In particular, the fact that the systems were based on a modular system of educational delivery made them incompatible with the way the medical curriculum was delivered. For example, courses straddle four years and are taught in lots of different ways that do not fit the generic 'off the shelf' VLE (WebCT, blackboard etc) modular model. The curriculum is based on a constructivist approach where students build on knowledge until they become experts. This, A2 comments, is not possible where a course is built of discrete modular units because there is no programme wide over view.

A2 talks of how the option of buying a standard 'off the shelf' system was ruled out because even though suppliers try to sell a standard 'off the shelf' system that will do everything, this is never realistic. A2 indicates that the university has been led by a standard system or propriety system frame in the past but has found it inappropriate:

*"I think we all brought into propriety packages in the past and they have done their job in this black box fashion, but then when we find that we have to transfer data out between another we have to make a physical join between the two, they don't interoperate with each other..." (A2 49 – 54)*

In contrast to the 'off the shelf' system, the medical school wanted a bespoke system, designed for the particular context of the medical school. These concerns led the school to develop its own VLE system through the in house expertise of the new medical technology section. The system build was initiated in an experimental spirit ("so we started off and said well lets suck it and see", A2, 74), by first putting study guides online and seeing where to go from there. From here the school has built three 'very sophisticated' (A2) VLEs, each on the same

platform but with variations. These variations have evolved to fulfil the needs of the different courses and course communities. The VLE is regarded as an information environment and not a distance learning system. As A3 comments:

*"We have created this exoskeleton of resources around the MBCHA, people still see patients, talk face to face, its not an e distance course in medicine by any stretch of the imagination. But we have supported all the processes."* (A3 130 – 133)

Some selected post graduate courses are fully online but the undergraduate course is carefully blended, being thought of as supporting the process learning rather than providing content. The system now supports up to 3000 students across the school.

This approach to developing systems through incremental local socio-technical alignment has been central to the strategic approach to ICT at university, as a bounded approach to ICT innovation. There is an absence of the rhetoric of 'standard off the shelf' system efficiency in university ICT discourse that signals that key groups guiding MLE strategy have not aligned with major suppliers.

The 2003 Knowledge Management Plan indicates the kinds of approaches to managing technology were being adopted at the university in 2003. The plan maps out a heterogeneous approach to systems: recognising the need for diversity and accepting projected resulting inefficiencies. Indeed, the strategy, for example, aims to support local systems to link with central data systems rather than enforce standard use of a centrally proscribed technology at all levels of the university.

Though this locality is preserved, institution wide initiatives have continued to be developed that direct users through central systems. By this time single sign-on architecture had been built and the task of switching all systems that could use it over to its use is reported to be well under way. According to the report, it had been agreed that a centrally developed portal should become the University's primary portal and it was expected that new services would be delivered using

this portal. User communities for the portal had been expanded, and once students were using the portal, the portal project will have achieved the objective of providing a unified service to all the significant stakeholders.

A review of the range, types and quality of service of e-learning tools across the university was carried out as part of the report. In general, the major e-learning tools currently in use at the time were seen as providing a high degree of robustness and resilience. Localised e-learning systems are accepted by the strategy as legitimate and there is no call for standardisation of e-learning tools.

To support local systems to link with central service data systems, a project was included in the Corporate IT plan for 2005-06 to provide a service whereby local VLE owners would be able to write programs which link their VLE to corporate data. The use of web services for this project would make this linking possible on all supported computer systems in the university.

The Knowledge Management Strategic Plan stated a balanced position with regard to the issue of centralisation and decentralisation of control. A plan and set of principles that underpin the shared responsibilities of colleges and central administration had been agreed that suggested a mixed model. It recognised that there are genuine reasons for diversity in the university, with the proviso that this does not create significant extra cost to the university. In addition, it was stated that so long as the central administration was unable to provide a viable alternative to local systems, some inefficiency and confusion is inevitable. Therefore, at this point there had been no institution wide decision on enterprise level technology use and adoption. Indeed a degree of non managed, non standardised innovation is accepted in the strategy.

In the review of E-learning 2004 – 2007 at University A, the Vice-Principal for Knowledge Management, who has key responsibility for e-learning, maps out the respective roles for central services and the three colleges of the university. In essence, the colleges retain responsibility for aligning student processes and educational technology. Central services are tasked with providing a high quality e-learning infrastructure to support the e-learning developments of colleges.

At the start of the 2003-2004 academic year, WebCT was adopted as the standard centrally-supported VLE at the university. Was this implementation part of an institution wide decision regarding technology adoption? A4 answers this question in the affirmative, yet with a twist:

*"Was it an institutional decision? Yes it was, all be it made my relatively few people in consultation with relatively few who they thought might have an opinion." (A4 138 - 139)*

The problem with consulting staff about the implementation was that it was thought, as interpreted by A4, that too few staff actually had an opinion. Those who may have had an opinion, the technically and pedagogically 'savvy' (A4 113), would object to having such a 'clunky' (A4 114) (low quality) system as WebCT being foisted upon them. A4 equates these people with distinct socio-technical constituencies:

*"I think there are a few groupies whose opinion is based largely on religious prejudice, so there is the Open Source community, there's the build it yourself community, there's the 'off the shelf' community and you can argue all of those cases." (A4 118 – 121)*

A1 reports that there has been an opinion that WebCT should not be adopted at the university because it represents a distance learning technology, in fact, reactions may have been quite extreme to being told to use the system instead of pursuing an autonomous innovation pattern:

*"Other people have been horrified by the fact that they have been told to use WebCT. They say: I don't want to use WebCT, I want to do something myself. And the truth is you can do pretty much what you want round here as long as you can find the funds for it." (A1 110 - 114)*

Shortly after the Knowledge Management Strategy the university produced an e-learning strategy. This strategy also reflects the acceptance of diversity of adoption in e-learning systems seen in the knowledge management strategy: it

does not include a standardising managed approach to innovation in e-learning technology. The strategy states that over the last few years there had been a rapid expansion of demand for software, systems and e-learning support across all Schools. This increased demand; it stated, had largely arisen independently of any central initiatives or strategies to expand use of e-learning and had been led by enthusiastic teachers. Rather than the centre dictating technology strategy, the e-learning strategy emphasised the importance of partnership between the colleges and the central services in providing e-learning infrastructure and support to staff and to students.

Strategically, the focus of e-learning activities was seen to be to enhance the educational experience of campus-based students, whilst seeking opportunities to expand access to (and income generation from) provision at postgraduate and CPD levels. This includes a 'judicious' choice of market-led developments of e distance courses which are aligned to the University's research strengths. So there were no plans to introduce off campus e-learning practices to undergraduate on campus courses.

In terms of managing innovation, the e-learning strategy review emphasised the need for interoperability (standards and specifications compliance), resilience, high quality, and re-usability to ensure maximum value for money for the investments being made now and into the future.

The report cites a range of achievements in centralised technology adoption and integration with existing systems, such as the student management system and WebCT. The central information services section was seen to have made good progress in supporting these early stage e-learning developments through acquiring several campus-wide e-learning software licences, e.g. the virtual learning environment WebCT. A university-wide learning object repository, enabling digital learning materials to be shared within the university and with repositories, had also been developed.

Interoperation had been achieved for major systems of the e-learning infrastructure. Students can access WebCT via the student portal. Also, there is a

degree of integration between WebCT and library systems: within course websites in WebCT, relevant readings in the Library's digital holdings could be accessed directly.

At the time of the study the university was in the process of updating their existing WebCT system to the latest version, WebCT vista. The MLE manager alludes to the reasons for the update as being concerned with constraints, both of time and resource. The choice to update the same software is not considered by the MLE manager as the best possible choice but one born of necessity:

*"We have moved from Campus Edition to Vista in part because we really had to move on. Campus Edition 4 was no longer adequate for our needs but within the timescales and resources we had it would have been extremely difficult to make any decision other than going for Vista."* (A4 30 -34)

Though the upgrade to Vista has been decided, the university has engaged in a review process that aims to inform future technology adoption decisions that would suit the entire institution. As A4 explains:

*"Even the most neutral of observers would say that next time we would want to take the time to be sure we have made this decision because it's the best possible one for the entire institution. Because, we really didn't have much choice. We just didn't do the study that would say this is the best possible thing that we could have. What we could say is that it was the best possible choice we could have made at this time in this situation we were in - not quite the same thing."* (A4 37 - 43)

The goal of the review is to arm the university with various contextually appropriate options that will enable it to make future decisions based on rational, autonomous decision processes rather than through pressures: *"calmly and in the fullness of time rather than because we didn't have much choice."* (A4 4 – 5).

So there has been an institution wide review group set up to really do a requirements study all over again for MLE and VLE, with the MLE manager as project leader.

Following the decision to implement the WebCT Vista system, a pressing concern has been to integrate the library system with Vista to enable a single sign on to both systems via the student portal. Students will log on to the portal using an authentication tool developed in the university. This has become increasingly important because as the library offer more and more digital material student authentication, a condition of publisher licensing, becomes more of an issue.

#### **7.4 Managed Learning Environment Computerisation Movement Technology Framing**

Amongst participants at the university there is a tendency to frame MLE in a way that is critical and counter to the 'standard MLE'. They counter frame MLE as a 'mindset' concerning the innovation process rather than a 'thing'. The research defines this as a process led frame: a process of socio-technical alignment guided by a mindset rather than an imported deterministic entity: the 'thing'. As an illustration, A2 uses the concept of process in talking about MLE:

*"Mind set about inter/extra institutional systems joining up rather than a thing. Should be an 'information environment'..." (A2 46 – 47))*

This process led frame is critical of the supplier created 'thing' and instead talks of an information environment that is led by pedagogy. Standard products such as WebCT are described by A2 as being content rather than process driven. As A2 says, MLE should not be seen as a content delivery system:

*"These are areas where you need a process orientated approach to education rather than a content orientated approach. Bear in mind that WebCT and all these other things are still obsessed with content." (A2 134 – 137)*

The framing of MLE at the university does not utilise the discourse of e-learning: there is little talk of blended learning, equating off and on campus provision, student centred learning, flexibility or the active learner, as would be associated with the e-learning frame associated with JISC MLE. The contrasting frame to the process led frame, the MLE 'thing', is associated with mechanised learning and, as A1 explains, a 'cynical' way of interpreting MLE could mean that:

*"...some people think that managed learning environments is kind of like spoon feeding, you know, treating people like tins of beans, you know, go away and let them get on with it. But I don't actually see that way or that it is a cost effective way of delivering learning to a lot of people and I am not convinced about that either."* (A1 8 – 12)

This participant would prefer a frame that involves 'extending learning beyond talk and chalk' for:

*"...a community of learning for a particular subject or group which is available to that group. A closed environment in a way. The idea is to present the thing as a unity, partly to stop people having a lot of steps and the learner basically has all the stuff next to them."* (A1 2 – 6)

This highlights a common idea amongst the participants that MLE at the university should be about supporting on campus students rather a distance learning system, something that there is a perception MLE can come to mean in universities. Indeed, this is an important element of university A framing: that MLE should not be confused with distance learning.

In the alternative 'process frame' MLE is an enterprise level computer system, but the standard enterprise 'off the shelf' system is rejected. The idea that one big 'off the shelf system' can do everything, both business and education process, is seen as being sold by suppliers with a rhetoric of universality that is considered outdated and unrealistic.

MLE and e-learning in general is not seen as an efficiency process by the participants but there is the idea that it may be seen that way in the top management of the university. As A5 comments:

*"I think many people have suspected for a long time that in the upper echelons of university they are always looking to make efficiencies. So it is not beyond the bounds of possibility that some people thought it would. But that is not the reason why it is being encouraged. Anybody with a grain of sense now can see that it does not make money at all."* (A5 115 - 120)

Whilst acknowledging that it is difficult to know if you are not in the upper management, A4 imagines that there might be a perception in the upper levels of management regarding efficiency and MLE, as well as quality and control:

*"...there must be a feeling that there are economies of scale to be had, a quality enhancement dimension, a control dimension. I just don't think like that, and many of these aspirations will be disappointed. You know Tom Lander's book, the trouble with computers? I think that is an extremely strong argument."* (A4 180 - 184)

The MLE Manager talks of how the one big database idea of MLE is driven by the notion of efficiency through business systems analysis approaches. But the standardisation inherent in this approach, whilst it may appear to be used in the business context such as banking, is not *effective* in the educational context:

*"Because the mmm...in teaching and learning efficient is not necessarily the same as effective."* (A6 124 – 125)

Here the JISC vision of MLE is seen as inappropriate for the medical VLE:

*"They have a very simplistic view of what an educational establishment is, how it is put together and what are its constituent parts."* (A6 34 - 35)

This is because the educational context is more complex than the standard business model, and its core, the interface with the student, has to be as flexible as possible. As the MLE Manager explains:

*“In education, that interface is absolutely the core business. You've (>)got to get that right, otherwise the rest of it is a waste of time. Doesn't matter what's guddling about underneath, you've got to get the user interface right. That's been as issue all along. But it just makes the thing much more complex to analyse because it's not a straightforward business process” (A6 131 – 136)*

Thus, effective education is not just about moving information, from x to y to z, and transforming it in a certain way as one might see in a business process analysis. A6 acknowledges that some areas of the university can be treated as a business but that business systems analysis should not guide interface development, the interface should lead the process:

*“As soon as you get to an academic member of staff putting together course materials, and even more so, course interactions you have something that is (>) highly individualised...and should be.” (A6 138 – 141)*

With a diverse university, such as A, one standard system cannot serve all the various and complex needs of every discipline. Tasking one system to produce an interface that is flexible enough to deliver all courses is extremely complex compared to locally course interaction which: *“until now it's not been a straightforward thing to produce.” (A6 141)*

## **7.5 The Framing of Managed Learning Development at University A**

The previous framing section details largely what participants think of the JISC advocated MLE frame: an extremely negative evaluation. This section looks at how participants view what MLE should be at the university.

There is evidence that the framing of what MLE should be at the university is associated with an ongoing and lively dialogue concerning how the university should approach MLE. The framing of MLE is taking place through university discourse considering issues relating to how virtual provision throws the idea of University A uniqueness into question. Important issues debated within the university are: What is the uniqueness of the university A experience? What is the meaning of the university's physical presence and what is lost through virtual provision? Is the ancient reputation of the university under threat?

As A7 explains:

*"One argument I have heard in this university is that, yeh lets do e-learning at university A, the high quality university A brand in the electronic context, but do people feel robbed of the physical experience of coming to this ancient seat of learning."* (A7 63- 66)

There is an *"interesting debate in this community"*(A7 67) going on concerning MLE framing. A7 asks:

*"How do you give them the university A experience?"* (A7 73)

A7 talks about how such types of debate have been associated with the introduction of WebCT:

*"Well the university, after a ridiculously amount of lively and extended debate, decided to use WebCT."* (A7 125 – 126)

Even so the decision to use WebCT is still open to question and the adoption decision does not represent any kind of closure: As A7 explains:

*"But there are people out there who will get away with not using WebCT. You know, 'what the hell is a university of this calibre doing using that sort of thing anyway'. That's what the Open University is for. If we are going to routinise this what is the University A experience going to be?"* (A7 126 – 130)

There is broad agreement that MLE at the university should be an information environment led by pedagogical concerns. The need for flexibility at the student interface is exemplified by the librarian A1's story of the medical school MLE through involvement in its development. The medical school MLE is described as a place where students can get all kinds of information about courses and contact students and staff. But also the medical curriculum changes have meant a greater need for immediate feedback on computer based training. This had been built into system with in house expertise in response to the changing needs of the medical curriculum: an example of the flexibility of the system. Another example is the virtual patient that the students get to know and relate their study. So as they go through the curriculum, each year they look at how the topics of study relate to the virtual patient.

The medical school VLE is highly regarded in the university, as reported by a number of participants, and as such is regarded as a technological exemplar. This technological exemplar helps to define the framing of a non standard system MLE at the university. A7 talks of this notion:

*"The school of medicine has long been pioneering in e-learning, but they programme their own stuff. They have built their system not off the shelf. And that to some degree has motivated other people to think "oh I wish we could do that". (A7 106 - 109)*

In the area of system integration, joining systems up is thought of as important. There is agreement amongst participants that MLE should be about linking systems as seamlessly as possible towards a single log in for students, however, this is usually not described as integration, as is common in the standard system framing. This differs from JISC advocated MLE in that it does not mean integration around a standard system configuration such as WebCT and the Oracle student database, rather this should be a mindset or process that is not determined by a single thing. As A2 describes, past experience has shown that buying 'black box' solutions and trying to integrate them has been problematical.

*"I don't know of an example of a university in the UK that has a fully integrated information environment, I think we all brought into propriety packages in the past and they have done that in this black box fashion, but then when we find that we have to transfer data out between one another we have to make a physical join between the two, they don't interoperate with each other,,,,," ( A2 48 – 51)*

This notion of seamless linking or joining up is an important aspect of the medical school VLE framing, a powerful local exemplar of practice:

*"Our systems are quite MLE like if you look at the JISC definition of an MLE in terms of a broader range of services wrapped around a core learning activity in that a lot of what we do is administrative support and work flow and those kinds of things." (A2 16 -20)*

## **7.6 Managed Learning Environment Computerisation Movement Structural Influence**

JISC is involved in work to mobilising coalitions in universities, by giving talks, workshops and funding projects. However, university A is not generally interested in the JISC funding as it is considered too small. However, the JISC Funding does sustain a community of JISC workers who are employed on short term contracts:

*"It does, but they are not huge amounts of money actually. If you are sitting on this end of the fence and look at the amount of money available, there is quite a lot of work that goes into putting together a bid. And then when you get it, you have to employ some staff to do it. And that's why there is a kind of community who are used to doing that. And there are some staff around who are used to being on fairly short term JISC contracts and they tend to...there is a JISC community in this university, there are a handful of people, a dozen people." (A2 351 – 356)*

JISC educates elite groups in the university, (Table 6, point 2):

*“...well I suppose the higher level you are the more likely you are to take part in JISC activities. So probably: our new vice principle, information services, sits on a JISC committee. She was invited to. Because she is in the position that she is in. So necessarily she finds out what is going on and that probably educates her”*  
(A2 311 – 316)

## **7.7 Managed Learning Environment Development as an Ecology of Games**

The ecology of games at the university is described with reference to Table 3.8. This research identifies two interlinked games at the university. The first is the ‘MLE game’ to create a ‘standard’ MLE configuration of systems. This game is driven from the centre, with central computing services playing a leading role.

The second game is concerned with autonomous technological development: making the right technological decision for the whole of the university. It is concerned with framing MLE for the university rather than following the ‘standard’ MLE frame. It is rooted in the trajectory of technological development at the university: the attempt to align players with a institution wide technology decision. Players counter frame MLE as an attempt to implement distance learning rather than pedagogically led e-learning.

Both games are represent contrasting approaches to the symbolic opportunities that stem from the higher level e-learning game in which e-learning is seen as an opportunity to pursue economic and sectoral goals. In this higher level game e-learning is seen as a way to create efficiency by overcoming the pressure on physical infrastructure through student numbers and an opportunity for income generation. Also, it can capture student ICT desire through which the university can improve administration processes. Each game at the university offers a set of rules, strategies and prizes that represent different sets of players in the e-learning game.

The e-learning game is a competitive arena in which universities define their strategies and through careful choice of e-learning projects playing to research

strengths, the university chooses to define itself as a high quality e-learning provider.

### **7.7.1 Game 1: Creating a 'Standard' Managed Learning Environment**

This MLE game is concerned with directing work and processes through a centrally controlled university portal. The leading players in this are central computing services and major suppliers. The game is lead by the 'standard' MLE TAF.

One feature of the game is the scale of the legacy systems involved: large sophisticated systems that cannot be changed or integrated easily and it is a rule of the game that existing systems do not change for adopted standard systems:

*"Whilst there was no question that our financial services for instance change what they are using and doing, that's a whole huge sophisticated and complex financial system and the student records similarly, which has just been through a business process analysis, specifying a new system which will much more sophisticated and we hope flexible." (A6 69 – 73)*

The portal system integrates with WebCT Vista and has various degrees of integration with the heterogeneous decentralised systems throughout the university. As A6 describes the architecture of integration is heterogeneous at the university:

*"There are lots of web applications. And they are variously joined up to ourselves or to other central systems. Some aren't at all." (A6 62 – 63)*

An aim is to implement WebCT as an institutional system with widespread use. However this aim is constrained due because it is difficult to impose a central decision on schools: if schools have the resources, they tend to be able to do as they wish with regard to e-learning. Also, there is a misalignment between academics and WebCT: there is a perception that WebCT is for distance learning

whereas most academics believe in fervently in face to face tuition. The sheer amount of resources needed to create incentives and persuade the large number of academics at the university is also an issue.

One major hurdle in the work to create the single sign on portal has been the integration of library systems. This aspect of the game has involved publishers who are happy about giving access rights within a campus domain but are not about students viewing their material off campus. This is because of copyright considerations and publishers do not want to give off campus authentication. All course material had to be copied to WebCT rather than offered through direct access. This storage of material used a considerable amount of server resource. Computer services have therefore created an authentication system that enables off campus access to library materials. This was a move designed to appease the publishers and relieve the need to copy course material. It is however something of a rouse, as A7 explains:

*"The authentication is some sort of proxy set up that kids people you are on Campus."* (A7 56 – 57)

Participants from library services see online access to materials as an important advantage. Yet there is the belief that the physical library should never be replaced by a digital one. The physical size of a university library is crucially related to the quality of the university: the largest libraries symbolic of the best universities.

There are advantages for all players in having all university systems joined up as seamlessly as possible. The MLE manager explains that:

*"... this is one of the advantages of the institution wide approach and that centrally supported system is that we can work with library, computing, MIS, and the academic staff at the chalk face to provide as joined up a service as we can."* (A6 97 - 100)

Here the MLE manager sees the advantage of joining up systems as seamlessly as possible in terms of providing an improved service. But when the game is being led by decisions made centrally it can be difficult for other players. For example a librarian explains in referring to the authentication for online post graduate courses.

*"The people who make decisions are very back of house and they don't necessarily see the front of house implications for decisions that they take." (A1 80 – 83)*

These back room decisions are taken with an agenda for increasing income through post graduate online courses. As the librarian describes, decisions are taken with this in mind:

*"The rise of the post graduate online courses are bringing up issues to do with connectivity and authentication. It feels like the decisions about connectivity and authentication are made in separate sections of the university and they need to be joined together." (A1 71 – 73)*

There are several tactical moves that central computing services employ to strengthen the position of the central system. One move has been to direct more and more of the university's work processes through the university portal, thereby exerting a pressure to adapt processes for the centralised information system. A1 explains how this pressure is being felt in various different constituencies throughout the university:

*"They are trying to make it more important. And they are making more and more working tools only available through (the portal). So the course management system, Wizard, which carries all the details about the course, that you can now only access through the portal. I think students can only access their emails through the portal." (A1 90 – 95)*

A second move has been to prioritise central systems over local bespoke systems. Here the medical learning technologists have found that it has been difficult to

get central support to integrate the medical VLE with central systems as the central VLE is prioritised over local systems:

*"We find in this college that we are treated a little bit as second class citizens in that with these one to one joins we talked about, we always come second down the list. Because WebCT gets the join first and we get it sometime down the line. Bargaining power I suppose." (A2 90 – 94)*

As far as the goal of integrated seamless system is concerned, the central learning technology section is in alignment with central computing services and game 1. However, it is also the leading player of game 2 and does not work to impose a centralised VLE in the academic game. As the MLE Manager explains:

*"We make the offering but cannot impose it. The medics have been quite clear that anything we have suggested including WebCT does not meet their needs." (A1 160 – 163)*

Attempting to implement a standard, centralised VLE is not a game which learning technologists think can be won, as the university's history of making institutional wide decisions regarding technology is fraught with disagreement over technological choice. A1 talks of how difficult the discussions over WebCT were, and even though there was a decision, they is no obligation to abide by it. People feel justified in not using it.

The extent of the discussions regarding WebCT indicates the potential for resistance. A1 describes an actual tactic as: *"people resist by pretending it isn't happening"* (A1 103). This tactic can work because no one has stipulated that courses have to be on WebCT, there is no minimum presence required on WebCT.

Although the architecture is thought to be excellent, the educational institution is not willing to embrace it.

*"You know the infrastructure here is absolutely top class. But that doesn't necessarily mean that every individual lecturer is comfortable ...mmm...with making...with using...they will use it and teach it to more or less an extent, but...a lot of them...will be...(8 sec pause) giving lectures(loss of fluency) giving them the handouts...believing very fervently in face to face tuition."* (A5 159 – 164)

This situation where central services push ahead with a 'standard' MLE configuration with no mandate from the university in general to impose a central system, especially a standard VLE of the perceived low quality of WebCT, relates to game two at the university: the attempt by the learning technology community to manage technological innovation through a mandated institution wide decision. This game has become more important as the ML landscape has changed dramatically. With fewer suppliers and fewer products, the possibility of technological lock in with one solution has increased. Also, the distinction between VLE and MLE is, according to the MLE manager, is now blurred, making it possible that the 'standard' MLE frame can be adopted through the adoption of a VLE such as WebCT.

### **7.7.2 Game 2: Autonomous ICT Socio-technical Alignment**

Game two is concerned with making the best decision relating to MLE, for the 'entire' institution. This goal is driven by those who align with a process orientated frame and are critical of the 'standard' MLE frame. Leading players in this game are the learning technologists at the medical school, the central learning technology section and the e-learning community across the university, in particular those in the library, who work closely with the medical learning technologists. The game to create an institution wide decision has a historical trajectory in the efforts to create an institutional decision on technology adoption exemplified by the institution wide email decision that was made some time ago and is described in the historical context section of this case study. The MLE review, which was undertaken in 2006, aims to inform an institutional decision on MLE suits the institution. As a game strategy the review seeks to control

alignment within the boundary of the university by avoiding alignment to MLE major players.

The game is associated with internal resources such as in house expertise, bespoke VLE's and university funding of e-learning rather than the flow of resources into the university from MLE players. Funding for the MLE strategy has come internally. The e-learning fund buys time out for staff to carry out e-learning projects and this in turn adds substance to the university's annual e-learning conference as staff have an opportunity to showcase their achievements. This has been an important element in the life of the e-learning community at the university. In general, the university is not at present seeking major MLE funding from higher education funding agencies. JISC funding is considered to be too small to have a significant influence, though it does seem to be associated with a 'JISC set' of e-learning specialists who play this game.

The evolution of the medical school VLE is associated with resource flows which are entirely separate from resources associated with JISC MLE networks. The General Medical Council sets the rules for the medical curriculum to which the system is aligned, it gives legitimacy to the school and can apply stringent measures if standards are not conformed to.

The expertise to develop the VLE system was developed within the school. The development of the system has been undertaken by a dedicated internal system architect and support staff, who have developed an expert knowledge of medical VLE systems.

Game two centres on a view that the technological trajectory at university A should be directed by an MLE frame that is contextually suited to the university. This is demonstrated by the move to undertake the MLE review which is described by the MLE manager as an attempt to make a decision that is best for the university without being pressured into it:

*"We are implementing Vista now, but associated with that is the feeling that next time we have to do something about our VLE/MLE we want to be sure that we*

*are taking a decision calmly and in the fullness of time rather than because we didn't have much choice. So there has been an institution wide review group set up to really do a requirements study all over again for MLE and VLE.” (A6 2 – 6)*

An aligned aim is that any decision about the technological direction of the university should not be imposed but created. Players therefore aim to create the conditions for a consensus based institution wide decision. This aim recognises that the level of technical literacy at the university is generally low and that most academic staff do not have anything to base an opinion on.

Strong opinions exist in factions who hold ‘religious’ type allegiance to a particular technological approach, such the Open Source faction or the ‘off the shelf’ faction, but these are too factional to be useful for creating an institution wide decision. Therefore, a move of the game has been to get academics ‘on board’: to get them at least using the technology so that when they are asked to consider an option they will have something to base their opinions on.

A further aim of the game is to avoid alignment with the technological trajectory associated with ‘standard’ MLE. This involves avoiding the elements described in the section on framing MLE at the university that relate to that frame, including, an inflexible interface, mechanised distance learning and a consequence loss of the university’s perceived quality.

Amongst some learning technologists, particularly in the library and the MLE manager there is a desire to make sure MLE development is led by people who understand the kind of process led university A framing they talk of. Therefore, it should be developed by people who understand the student interface and the process led approach in general. In this regard the librarian, A2, is concerned that the push for e-learning that is gathering pace at university through the support of some senior management will be driven by ‘*back room*’ groups who do not understand the ‘*front of house*’:

*"The people who make decisions are very back of house and they don't necessarily see the front of house implications for decision that they take." (A2 81)*

The push for e-learning has gathered momentum at the university through the growth of post graduate courses, and with the e-learning fund there is some keenness in senior management to see more e-learning at the university.

However, there is a concern amongst several of the participants that this could mean the growth of distance learning. In particular, the librarian A2 seems to be saying that if the push for e-learning is led by the 'backroom people' there is a greater possibility of creating passive learning situations, something associated with distance learning. This is because, according to A2, these people do not understand the difference between distance learning and well designed e-learning. A2 comments that such an opinion is controversial at A, and would not like to be identified with it.

The objectives of the MLE strategy are to avoid the business systems analysis thinking associated with the 'school' of information systems that is influential within central computing services. Though this type of thinking may be, according to A6, appropriate to some aspects of the university, it should be allowed to dominate the overall approach to MLE.

An assumption is that is that e-learning is at an immature stage at the university and consequently there is a general lack of understanding about the difference between e-learning and distance learning. As A1 explains:

*"I think there is a lot of overlap of ideas between what e-learning is and what distance learning is, but there is a confusion I think between distance learning and e- learning. I think it is still fairly immature in most of the university. There is an idea that is you put the stuff online that counts." (A1 41 - 46)*

This may be interpreted as a naivety amongst staff that could lead to the MLE game gaining influence. Online provision is not thought to be immature is at the

medical school. And it is an aim of the game to use the medical school VLE as an example of the correct way to create a VLE: a technological exemplar.

The approach is mature because it recognises the nature of the university rather than trying to change it or standardise it to a particular model. The medical school has built its VLE in alignment with how learning technology players generally view the nature of the university. This is illustrated by contrast with the view of the university encapsulated by the JISC MLE frame. A2, from the medical school, asserts that: *“they (JISC) have a very simplistic view of what an educational establishment is, how it is put together and what are its constituent parts.”* (A2 34 – 35)

A2 goes on to explain how the nature of the university is framed in relation to the medical VLE and in contrast to the JISC MLE frame:

*“We are a holistic organisation that really doesn't fall apart in the way that MLE's would expect. And each individual institution, although it will have common factors, like HR and finance, what ever, if you actually look at how they work, which bit does which bit, they will be quite different in each organisation. And will be different within the same organisation over time because all organisations are constantly refining rules. So an MLE in that context is not a thing but a state of mind that allows information to flow more freely to support processes.”* (A2 40 – 46)

In contrast to the sophisticated and highly regarded medical VLE, WebCT is considered a ‘clunky’, inflexible and low quality tool that represents the lowest common denominator in terms of online tools. Thus avoiding being locked into a WebCT led trajectory is very much related to this aim. A4 tells of how the university was able to capture student’s ICT desire ten years ago when they offered students an email account. It is unlikely that a tool like WebCT can do the same, as a range of online ICT tools and e-learning tools that are available free of charge on the web are considered by A4 as far superior.

This relates to the third aim of the game, to manage student ICT practice in a way that both captures their desire and serves the purpose of the university. There are various play options in relation to this aim. First, the university could incorporate emerging ICT practice within the university but with the problem of heterogeneous platforms emerging. Second, academics could occupy new ICT spaces which students want to use or third ICT spaces could be defined by the university. However, the university would rather give an email address to a student and know that it works than have the student give the university an address. As A4 says:

*"We would want students to play by our rules because we know how things can go wrong. We would much rather give students an email address than them give us an email address that doesn't work."* (A4 60 – 63)

The upgrade to WebCT Vista has been accepted by game players as a short term measure. Though this decision was made under pressure, and without institution wide agreement, players see advantages in it for this particular game. The first reason for accepting WebCT is that it allows the university to dictate the rules of ICT use, even though the WebCT tools are poor:

*"So the tools in WebCT are crude, but they work!"* (A4 64)

The second reason is that it moves academic's practice forward because student ICT practice is seen as being far advanced of academics:

*"... the great thing about buying WebCT is that it probably moves academics along way forward. At one level the students are way ahead of us, the whole web 2.0 agenda is desperately exciting, at another level I think one has to cautious."* (A4 57 – 60)

The adoption of WebCT has contributed to the aim of creating a university wide technological constituency that may be able to take a university wide decision about technology adoption, based on experience:

*"I think what adopting WebCT did was to move us all on. We now have a position on which to base our experiences about why WebCT is a dog and what we might want to do next."* (A4 121 – 123)

Also, it would be best to wait until MLE is framed for the university before trying to mobilise resources for an alternative option.

The MLE Manager rejects the student satisfaction survey as a legitimate research tool because asking students what they want does not measure learning effectiveness. In addition A6 asserts that the area is full of superficial research with no meaningful longitudinal research on students and the digital environment:

*"The one thing we really don't have is good enough information on the students and their changes that the digital environment has made to student expectations and indeed student comfort zones. There is a lot of speculation but as yet not a lot of good research on it."* (A6 192 – 196)

This kind of research takes some years to do because it has to be longitudinal over the course of a number of years and this kind of research is not yet available, though some is beginning to emerge from the USA, which is generally ahead of Europe in technological adoption.

Popular research on student interaction with the digital environment can be merely speculative, as A6 says:

*"I don't know if you have heard of people talk about digital natives and digital immigrants? But it's very trendy at the moment to talk about how 18 year olds are completely different to us. But most of that has come through a number of visionary and exciting speculative articles in the e-learning literature if you like and very interesting but not based on hard research."* (A6 195 – 200)

The game of making an institution wide decision that is best for the institution is centred on the MLE review. This appears to be a relatively risk free exercise in

its self, though it will not carry the power to actually make a decision – it can only recommend. However, this is only part of the game. Other game elements and moves involve a level of conflict and risk. The approach to WebCT adoption for instance, although creating one system for all, moving academics on technologically and creating a baseline from which to work, carries the inherent risk of strengthening a deterministic frame to influence the trajectory of MLE. As A4 comments:

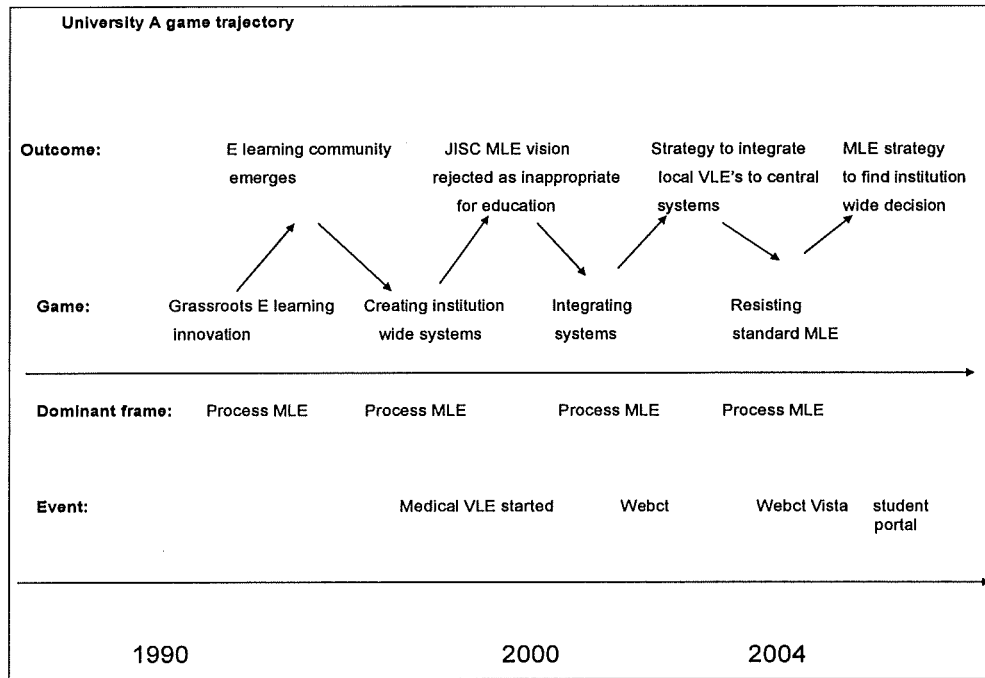
*“You've got to put something out there, I think the trick is to move forward without irretrievably committing us to a particular trajectory.” (A4 126 - 127)*

Adopting WebCT with little consultation, as A4 describes, ‘*disgruntled*’ some which may create the kind of passive resistance that is described but that cannot help in the goal of the game. The gamble is that the university, now it has been adopted, will be able to change the trajectory associated with WebCT.

## **7.8 Summary**

The presence of ‘standard off the shelf’ MLE artefacts does not mean that the MLE game is dominant. Though university A has adopted MLE artefacts, an institution wide agreement on this system was not even attempted since it is already dismissed as a short term option before the university can frame its own vision of MLE.

The educational technology community in the university has been and is concerned with resisting the technological determinism of the MLE game of commercialisation. The MLE Trajectory at University A is detailed in figure 7.1.



F

figure 7.1 MLE Trajectory at University A

The analysis of case study data creates a technological trajectory for university A that is patterned by the consideration of the efficiency and effectiveness in which the idea of one big central database is rejected as inappropriate in the university A context, and higher education in general. As the MLE TAF is rejected, an important idea in this trajectory has been that an institution wide technology adoption decision would underpin technology adoption that suites the university as a whole. As detailed in case study A, the first attempt at an institution wide decision was in 1996 and concerned the adoption of an institution wide email system. There was a great difficulty in getting different schools and departments to agree on a single email system and give up their own particular locally adopted systems, but an agreement was achieved. The idea continues to frame technology adoption decisions. For example, one participant says that WebCT was introduced with little consultation because it was thought that an agreement between technological factions in the university would be too difficult to achieve. Table 11 illustrates the MLE game at university A

Whilst the acquisition of technological artefacts follows a 'standard MLE' trajectory such as at university N, with WebCT updated to WebCT Vista and a

student portal aiming for single sign access to all services, this does not mean that the MLE hierarchy is a dominant influence in technological choice at the university. Unlike the other case study analysis, the MLE 'hierarchy of games' in the case study did not create the alignment of any participants to the MLE major players in the MLE landscape.

Key university groups reject the core MLE vision of the virtual university: the totalisation of online processes to equate on and off campus provision. Place is considered a key asset for university and a boundary is drawn between distance learning approaches and established university on campus approaches.

Reaffirming the university boundary, that is now threatened by MLE, has meant counter framing MLE and demobilising the MLE constituency at the university. Counter framing MLE has involved reaffirming the value of autonomous socio-technical alignment. The local socio-technical trajectory has been dominated with the desire to create an institutional socio-technical constituency that is not technologically determined but retains control of the technological trajectory.

This game to retain autonomy is ecologically related to the MLE game: it needs to develop the central infrastructure which is controlled by MLE players. E-learning policy has sought to control the ecology between games through establishing rules of relative responsibility between the two groups of players. These define the alignment of the student interface as responsibility of the e-learning community and as such off limits to MLE players.

## ***8 Discussion of Analysis***

### **8.1 Introduction**

In the preceding chapters we have demonstrated MLE as a process of socio-technical interaction within the university and in the wider ‘ecology’ of higher education. We have utilised a number of theoretical lenses to understand this processes in three university case studies. In this chapter the research proceeds to draw key insights regarding MLE related interaction. These relate to the nature of MLE intention and associated patterns of interaction. Insights regarding the roles of key players in universities demonstrate how MLE has fundamentally challenged and changed the practice of educational technology by crossing organisational boundaries, redefining established ones and repositioning educational technology from a diffused and sometimes ‘stand alone’ periphery position to be at the centre of the work of universities.

The chapter begins with an illustration of the influence of the MLE landscape on MLE development in the case studies as An Ecology of Games. This combines the CM and Ecology of Games analysis. This helps to understand the socio – technical interaction in the case studies. The chapter then presents four key insights regarding the interactions shaping MLE development.

### **8.2 The ‘Managed Learning Environment Game of Commercialisation’**

In this section MLE is described through the metaphor of the ecology of games. This forms the kind of ‘giant’ game that can be envisaged to help understand the dynamics that shapes a technology which Dutton (1992) describes in relation to the governance of the internet (see Section 3.5.4). Table 8.1 illustrates the array of games used in the case studies to make up an Ecology of Games metaphor for the MLE landscape.

Macro games	Online educational delivery Major supplier game Copyright game Licensing game
Meso games	Political game University status game
Organisational games	Online totalisation Autonomous ICT development

Table 8.1 Array of MLE Games Illustrated in the Study<sup>7</sup>

The analysis illustrates the strategies of key players in the MLE landscape who are aligned with the MLE TAF as a 'hierarchy of games'. This notion of a 'hierarchy of games' is introduced to refer to a hierarchy of actors, with two dominant players pursuing their interests by cascading MLE resources and technology down through sectoral and institutional levels of higher education through networks of actors aligned with MLE. Table 8.2 illustrates this hierarchy in which government agencies and major suppliers play at the top of the hierarchy.

Arena	Hierarchy of Games
Macro (Government, Major Suppliers)	Major Supplier Game ↔ Political Game
Meso (JISC)	↕ Commercialisation of Higher Education
Micro (Universities)	↕ Online Totalisation

Table 8.2 MLE 'Hierarchy of Games'

<sup>7</sup> These levels are relational and interrelated, i.e. they are not absolute, but interpretative categories used to compare games of different sizes.

In this hierarchy, top level games of government politics and global suppliers' games combine in a game that the research terms the 'commercialisation of higher education'. Further down the hierarchy at the sectoral level, JISC (together with other sectoral funding agencies) pursues goals that interact with these higher level games. Within this MLE game arena the MLE TAF comes to reflect the interests of dominant players: a content delivery system capable of delivering packaged education through the application of suppliers' standard commercial systems in the educational context. This technological configuration is seen to reflect a synergy of interests. Here global suppliers supply 'off the shelf' systems based on the kernel of commercial models, already developed for the commercial sector. These commercial systems in turn suit a government aiming to create efficiencies in higher education through individualisation and distance learning.

The notion of a 'hierarchy of games' is unique to this research. However, Firestone (1989) makes the point that educational policy games are linked by the downward flow of resources and regulation and the upward flow of demands in a way that corresponds with this. The research draws a parallel between regulation and the way dominant players frame MLE: a representation of MLE that limits technology choices at local levels to those that serve the interests of dominant players.

Figure 8.3 illustrates how this research envisages resource flows through the hierarchy of games. Resources are envisaged as artefacts, expertise and ideological resources. It shows how flows concerning the supplier and the case studies involve a downward flow of MLE resources whilst upwards flows involve commercial relationships and exemplars of generic MLE systems. On the government side of the illustration, regulation and targets flow down through MLE framing and funding aims to stimulate and regulate MLE players. There is an upward flow of standardisation work involving the creation of case study exemplars of MLE adoption and development. These flows can be seen as circular in their effect creating 'virtuous networks', in which local innovations are fed back to universities through a loop of innovation. The flows of resource are seen as mutually reinforcing, so that as a university exploits one resource

they will be a pressure to engage in all flows. For example, if a university engages in the major supplier flow they will experience the need to demonstrate MLE as a working technology in the political flow.

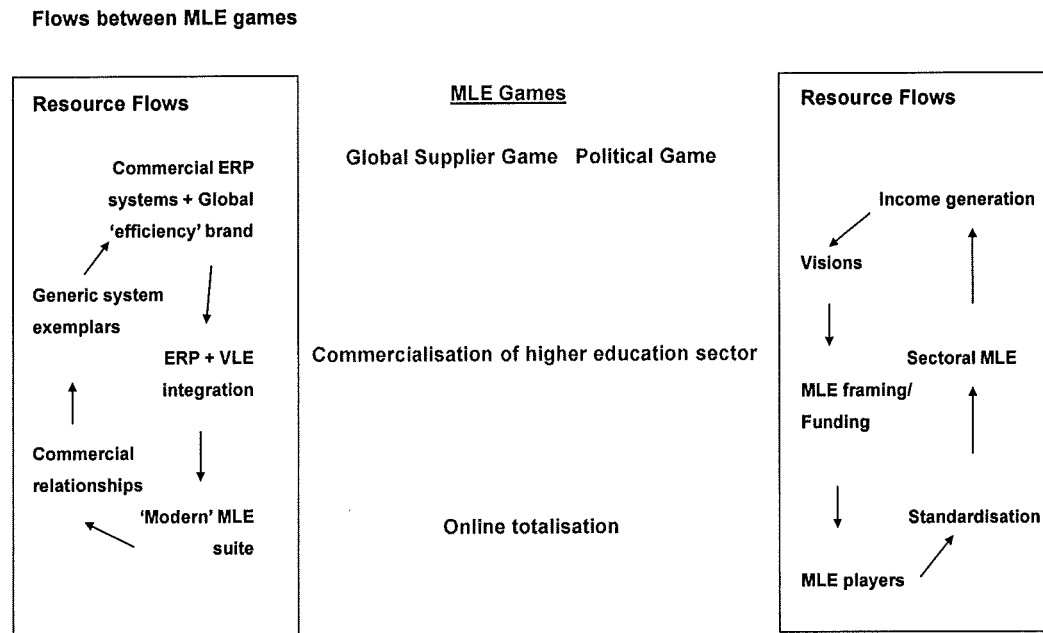


Figure 8.1 Resource Flows between MLE Games

### 8.2.1 The UK Government as 'Managed Learning Environment Player'

The Director of Finance and IT at the modern university makes the point that the government has said that it wants all universities to become financially sustainable and as whole become more 'business like'; 'tacitly' encouraging them to become more competitive, as seen in Case Study M, Section 6.6.2 Ecology of Related Games.

As noted in Chapter Two, the idea of MLE as a national vision for educational organisation based on commercialisation is prevalent in government discourse. The Dept. for Education and Skills (DfES) (2005), for example, promotes the individualisation of e-learning, emphasising 'personalisation', 'choice', 'flexibility' and 'independence', aiming to give every student and learner an individual learning portal or space through they can access an e-learning market

place. In this 'personalised learning space' the learner, it is envisioned, can engage with and organise a life time of learning experience by accessing learning material, storing course material and online connection with learning providers.

In government MLE discourse learner centeredness has now been translated into a business frame and become a discourse of commercialisation: in common, they focus on learner choice and organisational transformation. These are now themes of government MLE discourse that illustrate how the MLE game is infused with the ideas of commercialism.

### **8.2.2 Global Suppliers as 'Managed Learning Environment Players'**

The role of global suppliers of educational software and business management software is now a crucial element of MLE development and their role in the MLE game arena is intertwined with the interests of government MLE players in which global suppliers aim to win a greater role within the higher education sector. For example, the MLE Manager at university N, comments that global software companies view higher education as a new market that they want to get into and this has been a motivation behind their involvement in advanced MLE developments at the university.

Global suppliers of business management software and educational software partner in order to integrate their products to form a suite of products that constitute a global generic MLE system. In this regard, the MLE landscape has seen the partnership of established players in educational technology and global software suppliers as global suppliers now seek to integrate their generic products with successful educational technology systems already well established in universities. The MLE Manager at the ancient university also makes this point when describing the 'MLE landscape' as involving a tendency to fewer products and fewer suppliers.

In this supplier game, global suppliers are interested in selling an MLE suite of systems. For example, the modern university case study illustrates how the

global supplier in the VLE tendering process sought to scale up what they were offering to the university. As alluded to in Case Study N, Section 5.6, global suppliers are interested in creating universal generic enterprise solutions, which are more than a one off purchase, requiring continual development in an ongoing commercial relationship with the university (Pollock *et al.* 2007). The same authors point out that suppliers aim to build systems that meet the dual requirements of local and general applicability, with localised testing on early adopters acting as a pilot for generic solutions. Here suppliers working with a development community from universities modify the 'kernel' of an existing commercially orientated system.

The 'supplier game' links with the game of online totalisation in which universities seek efficiencies internally and through income generation. The new university's strategy aims to be the most modern, the most technologically advanced university in the sector. The MLE Manager at university N, for example, describes how the university has achieved the first integration of global software products in an MLE suite, suggesting also that this work has helped their suppliers who are looking to get into the education market. Suppliers will therefore seek a university which proactively engages in the work of creating a generic solution (an 'early adopter') as a possible showcase system.

As demonstrated in Case Study N, Section 5.6, participation in the supplier game does not guarantee a win for the university. They have to prove that they are worthy of supplier attention and play a game of courting suppliers to win their attention, required to update systems. University N, for example, plays a game involving being seen to be proactive in these networks of practice. Pollock *et al.* (2007) describe how suppliers categorise universities according to the willingness of players to participate in the work of 'generification'. Early adopters are thus chosen and given far more attention than other less favourable categories.

As we have seen in Case Study N, this enthusiasm for the vision of online totalisation of university processes helps players win the attention of suppliers to develop new upgrades in new areas of online provision. In this way the

university gets the upgrade and the supplier adds to the generic system. The kudos of getting the first integration of global software products has been a strong motivator for key MLE players at the new university. That this achievement is important to global players is evidenced as it is praised as a strong exemplar of a technologically advanced university by a global supplier in their international website (Microsoft Website). Playing for this prize has attracted the attention of global suppliers and sends out a strong symbolic message of commitment to the MLE game to all players. In turn this leads to securing funding and all the benefits to MLE players of being seen to be on the winning team.

Belonging to a specialist group strengthens a player's professional identity by which they can win credit by leading technological development. They are also likely to acquire professional expertise that will be valuable in their career in the MLE landscape. For example, the Head of Registry at the new university tells of how his work in the university is heavily influenced by his involvement in a specialist group in one supplier network based on the vision of e administration (see Case Study N, section 5.6). This network of practice specialises in transferring university student administration processes online.

### **8.2.3 The Joint Information Systems Committee (JISC) as 'Managed Learning Environment Player'**

In the MLE game, JISC translates government policy into technological visions for higher education and creates networks that spread the MLE frame through networks of practice and funding.

For example, in response to the lifelong learning agenda, JISC developed the objective to establish cross institutional architectures to deliver learning which can provide generic solutions of benefit to the whole JISC community. As illustrated in this Chapter Two, section 2.4.4.1, it has been explicitly tasked with implementing MLE across the higher education sector. Within this programme, JISC identify various aspects of importance then offer funding for projects aimed

at exploring these in developmental projects in universities. Universities compete for funding and they can win substantial funding for MLE projects. This was the case at the new university, where five staff members are funded. In this way, the MLE vision is further developed in universities through these projects. Project experience is fed back into the JISC network that helps frame the technology as a generic solution and MLE advocates emerge who can carry out further MLE work. This 'MLE game of commercialisation' is summarised in Table 8.3 that describes the game elements with reference to Table 3.8 Dimensions of an Ecology of Games.

***'Commercialisation of Higher Education' Game***

*Players: Government, Global Suppliers*

*Aims: lessen dependency on government funding, increase numbers and range of students, dominate higher education IT supply*

*Objectives:*

*Create national MLE system based on the e commerce business model*

*Strategy:*

*Engage government agencies to create MLE*

*Create a generic suite of MLE systems through merging suppliers*

*Tactics:*

- 1. Use discourse of transformation based on e- learning revolution*
- 2. Reward universities that engage in MLE development, threaten those who do not*
- 3. Frame technology as efficient*
- 4. Use power of global brands*

*Prizes:*

*Political leverage*

*Selling pre developed standard business product to university sector means less development costs*

**Table 8.3 'MLE Game of Commercialisation'**

Table 8.3 describes how MLE is shaped by the strategies and interests of major players in the MLE landscape who work to configure a generic MLE socio-technical configuration. At the local level aligning to MLE can bring prizes to groups and individuals so that there is a mutuality of interest between local and major players. However, we have seen that MLE generates local resistance by those whose interests do not align with MLE. The Ecology of Games and CM analysis demonstrate the dynamics of MLE socio-technical alignment, including process of misalignment and realignment which reflect situations of tension and disharmony, changes or re accommodations (Molina, 1995, 1999). This analysis helps to formulate several key insights regarding MLE development in this study.

### **8.3 Key Insights**

Through considering the analysis presented, the results of this study highlight four insights regarding the MLE adoption and implementation process.

#### **8.3.1 Insight One: Managed Learning Environment Implementation through Mobilisation for a 'Vision'**

The MLE approach has become a key influence in the way that universities think about implementation of ICT by challenging the established way of framing educational technology innovation. Educational technology practice has been framed, before the influence of MLE, and continues to be by some participants, as local and specific. This practice is mirrored across the sector in the belief that IT initiatives do not succeed if they aim to be transformational in the short term and are applied from above or outside.

However, this study concludes that this ideal of localised socio-technical alignment through negotiation has been superseded by a focus on mobilisation for alignment beyond the walls of the university. MLE political and commercial intention, as illustrated in the MLE 'hierarchy of games', means that a 'successful' MLE initiative enacts the dynamics of MLE alignments beyond the walls of the university.

In the case studies we have seen how this has involved the dynamics of alignment to major players outside of the boundary of the university by committed coalitions of advocates within the university, for example the MLE coalitions in the new and modern universities are reliant of MLE networks of resource and practice.

For these players this has involved mobilisation around for the MLE vision involving 'online totalisation' through centralisation of systems, dismissing the local and the particular in favour of advocating the generic and the universal. As illustrated by the growing influence of MLE networks to define social and technical configurations in the case studies presented, local and specific views become irrelevant in comparison with MLE.

In the case studies, the implementation of suppliers' standard systems is framed in a way that negates local negotiation and advocates aggressive alignment of the local to incoming technology.

In enacting the dynamics of these alignments, negotiation of ICT developments shifts from the local to sites that are controlled by major MLE players. MLE projects in the case studies are directed by these new MLE networks beyond the walls of the university. For example, supplier networks mobilise members around an 'e-vision' of totalising online provision and moving the management of the entire student life cycle online. These work in tandem with policy networks such as the JISC MLE networks that direct and legitimate MLE advocates as they mobilise support and carry out the work of realignment. In this work local advocates take ideas about MLE development from policy networks and develop them in local settings. JISC is, in turn, keen to study how this works and create case studies of successful MLE development.

Here is an example of the pressure to demonstrate to MLE players outside the university that MLE 'works' in local sites and the case studies show how this restrains critical evaluation and alternative discourse in sites of MLE action.

We have seen how the MLE approach is adversarial and splinters ICT actors into opposing camps as is particularly evident at the modern university. Through this

MLE mobilisation process non MLE advocates are positioned as a threat. For example, in the modern university, MLE has come to be framed as revolutionary development led by a coalition of advocates against “*many people not grasping the huge changes MLE involves.*” (Head of IT & Finance). Here MLE socio-technical alignment is aggressive, aiming to completely replace legacy systems with no local negotiation. Instead of negotiation, there is a focus on embracing the MLE vision of the future to overcome fear of change.

MLE mobilisation amplifies certain ‘problems’ and identifies blame. We have seen how key MLE policy shapes non MLE academic technology practice as an inefficient traditional ‘cottage industry’ approach to course development (MacFarlane, 1992). In the case studies this translates to the threat of central services legislating for the use of MLE technology. This threat implicit in MLE creates resistance in itself, even without actual functioning legislation. Some participants see MLE as a constraining framework that will take away their freedom to explore new technologies.

This shift of focus beyond the walls of the university creates resistance in the university as technology choices move from established university structures to new networks of practice. MLE development is interpreted by resisters as unstructured technology adoption: a process of bringing technology into the university through the back door in which MLE action is seen to have a momentum that defies structured decision making.

In the ancient university, where a coalition of MLE resisters is confident and able to mobilise resources, we have seen a defensive alignment that attempts to draw a boundary between the university and the wider landscape. Here the traditional pattern of localised and specific educational technology alignment is defended. In this case study we have seen a strategy to generate a technology frame that can align key groups within the university and chart a path of development that is autonomous of the MLE approach.

MLE adoption and development at the ancient university shows that the experience of a locally developed e-learning system, that is seen to achieve the

correct socio-technical alignment adds significantly to the mobilisation potential of the defensive coalition. However, even for a coalition committed to resisting the dynamics of MLE, a counter frame based on creative localised technology adoption and implementation is not a 'golden rule'. As a way of aligning groups and creating an institutional socio-technical constituency to counter standard MLE, tactics and strategies can be technologically deterministic, non negotiated and short term.

In summary, this first insight relates the primary mobilising aspect of MLE to patterns of alignment and non alignment within the research study universities. This involves the shift of ICT control to new networks of practice. Localised negotiation is reprioritised as new alignment tactics threaten old educational technology practice. Some actors accept and work with a new paradigm of educational technology practice whilst others resist a change to the established ideal of localised negotiated alignment.

### **8.3.2 Insight Two: Managed Learning Environment Development as Commercialisation**

The second insight relates to the way that MLE positions educational technology at the centre of commercial intent. The study has illustrated how an MLE socio-technical constituency of policy makers, major suppliers, technologists, senior university managers and administrators form a web of interests that gives momentum to the commercialisation of higher education. Pollock and Cornford (2002) comment that perhaps the initiation of the virtual university is associated with a 'commercial ethos' (p359); this research offers an interpretation of how the initiation of the virtual university through MLE is closely associated with the commercialisation aims of dominant MLE players.

We have seen how MLE advocates are driven by the commercial imperative. For example, the Head of Student Services at the modern university explains how MLE systems are closely associated with the commercial ethos and join up

different aspects of university processes to support all aspects of income generation.

MLE involves more than creating a student centred learning environment. The study shows how MLE development is driven by the core expectation of raising income through the transfer of university processes online. Consequently, the focus of MLE action is on the commercial markets for online packaged learning.

MLE intent aligns university processes with online systems so that the university compete in the online learning market. This sees MLE development follow the 'standard' trajectory that is illustrated as one fork of development in the MLE trajectory in higher education (see Chapter Two, Section 2.6) involving the creation of a commercial portal through which potentially many education related services can be sold, from packaged courses to bus tickets.

This focus on the market for packaged online learning colonises the university with new levels of intent to commercialise the campus. Here the strategy is to capitalise on the campus as a resource in the process of creating reusable online learning media by creating and testing packaged online courses on campus before offering to remote locations. The drive for commercialisation though technological development is associated with the way that actors involved in MLE development in the case study universities define their interests. This leads to the third research insight.

### **8.3.3 Insight Three: New Levels in the Higher Education Playing Field - Distinction, Not Equalisation.**

MLE has created new distinctions between the case study universities and reinforced old ones. The intent to create a 'level playing field' in higher education in the UK that emerged through MLE policy has not come to fruition. We have seen how the case studies universities create distinction in a stratified online learning market and in higher education in general (see Chapter Seven, Section 7.5). In Scotland, universities have not aligned with attempts to create a national collaborative approach to competing in the global online learning

market. The MLE landscape shows that most universities have tended to prefer to control their own online learning development (see Chapter Two, Section 2.5).

For example, educational technologists within the ancient university differentiate the university from universities on a standard MLE trajectory in terms of quality (see Chapter Seven, Section 7.5). It is unlikely that the university would participate in government sectoral level plans for an e-learning market based on the 'standard' MLE platform, as this is associated by key players in the university with inappropriate standardisation and low quality distance learning practice. If other universities follow this strategy then sectoral MLE will lead to a further differentiation between universities: perhaps tending towards a two tier higher education sector between MLE universities and perceived higher quality universities.

The new university is the one university in the study that engages in inter university MLE cooperation. The new university has taken up the challenge as one of the few universities in Scotland that are envisaged as embarking on a transformative MLE trajectory. This is associated with a new distinction: as the new university redefines itself in university strategy as a 'modern' university, the ancient university redefines its traditional status. Having defined its competitive advantage as closely tied to the value of its physical campus and therefore committed to maintaining it, the ancient university forks away from the 'modern' universities.

If the MLE framework creates efficiency by reinvigorating the distance learning frame, it also brings forth the quality issues long associated with distance learning and aspects of higher education discourse interprets 'standard' MLE practice as lower quality. For example, Offers (2008) comments that in standardising educational delivery to be 'teacher proof', students are approached as passive consumers of knowledge. Noble (1998) for example, argues that commercially and technologically driven decisions in the shaping of higher education will lead to the disengagement of academic staff from the learning process. They will be involved in the development of courses, but once the course is packaged, they will lose input. Such quality issues are particularly

evident in counter framing of MLE at the ancient university. This dynamic may reinforce distinction further.

In summary, commercialisation has not encouraged cooperation and resource sharing in educational technology practice. The drive for commercialisation has reinforced distinction and standardisation and so contributed to pressure to change educational technology practice. This leads to the fourth research insight regarding the changing educational technology practice in the case studies.

#### **8.3.4 Insight Four: Managed Learning Environment Development and New Gatekeepers**

From this research it is argued that MLE has redefined the boundary between educational technology and the university and the university and its external environment. This has blurred the boundary between educational technologist, IT management and university administration, bringing in new gatekeepers in the local practice of MLE. As noted in the evaluation of socio-technical research in Chapter Three, socio-technical research suggests that wide spread ICT could create new gatekeepers, such as the technology administrators and technical support staff who control access to digital library resources and make decisions about technology upgrades (Dutton *et al.* 2004; Kling & Hara, 2000). This study further demonstrates how new gatekeepers have become key in the local negotiation of socio-technical alignment<sup>8</sup>. These new players threaten the importance of what was the core socio-technical alignment in educational technology practice: that of the student interface.

Two points illustrate this process of redefinition. The first is that MLE has broadened the practice of online educational technology from a separate and sometimes periphery position to the centre of the business of the university. The imperative of MLE advocates is to bring online educational and managerial practice to the heart of what the university should become: an electronic interface

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<sup>8</sup> Because the study does not include interpretations from academic staff, the role of academic staff in MLE related interaction in the case study universities is not developed, yet may be significant.

that gives students everything they might want and equates campus and off campus delivery. Here the role of the campus is an MLE managerial and administrative centre, a venue for commercial activities and a place where students can meet, not the centre of the educational process.

The technological trajectories of the universities show how, from a separate and often periphery position, off campus education has moved onto the campus and is being positioned at the centre of the educational process. This broadening of educational technology has changed the role of educational technologists and threatened gate keepers of established university boundaries. Educational technologists are seen as *e-learning police* who enforce technological policy.

Educational technologists have to negotiate this break down in established barriers carefully, balancing legislative demands to align with MLE with the established ideals of local negotiated socio-technical alignment. This balances their core expertise with new centralised paradigms of innovation associated with MLE.

Educational technologists also manage the boundary between the university and external players. As we have seen in the new university, with new MLE networks there is the pressure to amplify the MLE frame for resonance outside of the university rather than inside. Here, working with wide networks of influence can be as important as considering internal stakeholders.

The MLE Manager at the new university explains how his role has become concerned with managing university boundaries that are challenged through MLE. This involves anticipating dissonance between standardised technology processes, such as those with WebCT, and university practice. Adopting standard processes involves brokering communication and negotiation between service boundaries in the necessary reordering of practice for MLE.

In addition to educational technologists, IT and Student Administration Managers have become MLE gatekeepers. They have become part of the broadened practice of educational technology, working at the boundary of the

campus to totalise online practice and the boundary of the university to interact with major players and the wider ecology associated with MLE.

The boundary dynamics of the campus also brings in new gatekeepers from the wider ecology of internet governance. Software suppliers and publishers, for instance, control crucial software licensing and copyright agreements that can either allow or limit off campus student access to software and data resources.

The redefining of education technology has also mobilised established gatekeepers to defend established boundaries of practice so that potential new MLE gatekeepers are restricted from educational technology practice. In the ancient university boundaries are drawn around the student interface so that groups other than educational technologists are restricted from decisions regarding socio-technical alignment and the student interface.

In the review of e-Learning 2004 – 2007 at the ancient university, a boundary is drawn between IT management and educational technology. The colleges, with their own educational technologists, retain responsibility for aligning student processes and educational technology. Central services are tasked with providing a high quality e-learning infrastructure to support e-learning developments of colleges. However, the case study demonstrates how central computing services are seen to be threatening this boundary by directing more and more of the university's work processes through the university portal, thereby exerting a pressure to adapt processes for centralised systems.

The case studies demonstrate how it clearly does matter what is underpinning the student interface, as in MLE development educational and administrative systems are inseparable. The dynamics of MLE development are tending to change the boundary between these types of expertise as their roles merge together.

## 8.4 Summary

In summary, this chapter has tied together the dynamics of the MLE landscape with a comparison and contrast of the case study analysis to illustrate patterns of socio-technical interaction associated with MLE adoption and development. This analysis has led to four key insights regarding MLE developments within and across the case studies. Expectations and mobilisation are key dynamics of MLE in the universities and are associated with the shift of focus from locally negotiated socio-technical alignment to the networks of practice that cross the walls of the university. New networks of practice, the centralisation of online practice and commercialisation challenge the core expertise of educational technology.

The locally negotiated alignment of education technology and the teaching process is reprioritised in favour of alignment with networks of practice beyond the university that involve a new set of gate keepers in shaping the local configuration of ICT. In this process core expertise of educational technology is evolving into a new form of expertise that is more holistically focused and developed in networks and arenas that are internal and external to the university. The MLE framework is therefore being shaped in multiple locations, multiple levels and across a trajectory of events and interactions. Very different approaches to MLE have been interpreted in the studies which have been shown to be not separate, singular attempts to innovate technology, but highly relational and interrelated.

## ***9 Conclusions***

### **9.1 Introduction**

This chapter concludes the study by evaluating the analysis and discussion that underpin the insights set out above in Chapter Eight, and then considers the findings presented in relation to the research aims presented in Chapter One. This Chapter then presents a critical evaluation of the research process that has led to the development of the insights referred to above.

The discussion includes some lessons learned that will be of interest to other researchers undertaking studies from a similar research perspective in this area. Finally, several suggestions are made for further work that could usefully build upon the findings of this thesis.

### **9.2 Revisiting the Research Aims**

Chapter one described the research aims that would be developed through answering three research questions. The following section evaluates how these objectives have been met.

This first aim was to evaluate the global, national and higher education context of MLE developments in order to evaluate key dynamics that may influence MLE developments in the three case studies. In this respect, the research has illustrated how MLE is interpreted by key actors on the MLE landscape as a vision of internet working in higher education which has come to be shaped by political and commercial intent. Political intention for the reorganisation of higher education mirrors the high expectations that have been generated globally around internet working but smoothes over the complexity of aligning people and technology in local contexts. The analysis has interpreted the trajectory of MLE development as forking, as analogous to having two alternative, and it has been argued quite distinct, trajectories, namely: a trajectory that is associated with a

socio-technical constituency that is dominated by major suppliers of standard 'off the shelf' ICT systems and aligned to the MLE vision of internet working and an alternative that is associated with an autonomous approach to MLE related development that involves bespoke, decentralised ICT development in universities. This path is associated with a critical view of the 'standard' MLE trajectory. Different approaches to adopting and developing the MLE framework, it has been argued, are contingent on local context and actors, yet the globalised nature of IT development and technologically led political intent enmesh these localised actions.

In respect of the second part of the research aim, to explore and evaluate socio-technical theory in order to develop a theoretical framework that can help to understand the case studies and the influence of the broader MLE context, through evaluation of the MLE landscape, together with an evaluation of socio-technical research concerning case studies of MLE related development, a theoretical framework was developed that frames the influence of the MLE landscape on MLE adoption and development in the case studies. MLE development in the case studies was thereby framed as the process of socio-technical alignment to an MLE Technology Action Frame and networks of influence and resource flow.

Thirdly, the research aimed to investigate MLE adoption in three case studies in Scotland and account for their trajectories of MLE development, thereby, drawing insights into the nature of MLE development in the study. In this respect, through charting MLE development as an emerging process of socio-technical alignment, the research has demonstrated the key role of boundary dynamics and gate keepers in MLE development within universities. It has illustrated how key actors negotiate the boundary of the university and the dynamics of the MLE landscape. We have shown through the theoretical framework how this process of negotiating the boundary of the university and the MLE landscape impacts on areas of MLE development within the university such as the expectations of MLE technology amongst key groups and their approach to adoption and implementation.

This research uniquely combines the Ecology of Games perspective with Computerisation Movement theory. Dutton (2005) first made the case that it might be useful to embed the conceptions of social movements, technical invention and public policy within a framework of action that sees technological shaping as an unfolding outcome of players pursuing a diverse range of objectives and strategies. This research has found that this theoretical combination provides a richer description of MLE than would be possible singularly.

The dynamics of MLE 'playing field' are important influences on MLE development in the case studies. The strategies of players and likely outcomes are interpreted by actors in universities and interact with mobilisation processes for MLE. In this way, the metaphor of an Ecology of Games helps to illustrate of the dynamics of technical, social and policy choices shaping the development of an ICT in the case studies. Aspects of an Ecology of Games – games, rules, strategies and players – offer a 'grammar' for describing the system of action shaping technological change (p4, Dutton 2005). When used as a metaphor of socio- technical action this adds extra dimensions to the CM conceptualisation of localised action.

The advantages of this combination relate to the contingency and patterning of technological innovation (Williams & Edge, 1996). First, the addition of the Ecology of Games with the CM perspective helps to illustrate contingent local MLE action. Through this metaphor it is possible to see inter and intra organizational alignment as a process which attempts to integrate, accommodate, or modify the different stances of the participants against the influence of governance and commercial pressure. It shows how, for example, key players in the ancient university defines its interests and chart a different path. It illustrates, for example, how short term 'technical wins' and rhetorical moves combine in a local system of action. Perhaps the most interesting aspect is that the metaphor offers a way of illustrating how broad aims and objectives of macro policy translate to sub goals at institutional level. For example, how governance and commercialisation lead to a local imperative of totalising online provision.

The analysis offers insights into how new technologies can be framed through critical discourse in combination with player moves drawn through the Ecology of Games analysis. Kling and Iacono (1994) make the point that critical discourse can frame new technologies in response to the perceived failures or incongruence of technology in use. This research demonstrates that critical MLE discourse extends beyond interpretation of technology failure or incongruence to include evaluation of the dynamics of its broader social context. Critical discourse for example criticises the roles of players, from dominant players such as JISC to university level players: their limiting effect on the potential framing of MLE and their political/commercial agendas. Therefore, a new critical discourse of MLE, rather than just limited to the situated application of technology - its efficiency or effectiveness - may be seen through the perspective of the Ecology of Games to include consideration of the strategies and interests of MLE 'players' and what they mean for local contexts of ICT innovation.

At macro level, it illustrates the contingency created by the interaction of an ecology of players. The future shaping of the MLE involves the influence of an ecology of MLE influences such as influences illustrated by Dutton (2005): copyright, digital rights management, content provision and economic development. Outcomes of these games will influence the trajectory of MLE development in universities. For example, the outcome of supplier monopoly regulation will influence the ability of suppliers to form partnerships or merge.

Secondly, the combination illustrates the patterning effect of technological expectations that are generated through widespread collective framing. The approach takes a macro level construct from computerisation theory, the Technology Action Frame (TAF), and characterises it as a regulator and motivator of technology adoption across the ecology of games that is embedded with the interests of dominant players. The core activities of a CM – that of maintaining a core discourse about a form of ICT and mobilisation – are activities that create an MLE Ecology of Games within a wider ecology of educational, policy and commercial games. This gives the Ecology of Games the important addition of the process of collective interpretation of technology expectations and use.

The research finds that MLE adoption is accompanied by imported technology frames from the broader context of development. It contrasts with the notion that a group has a distinctive technological frame representing their particular experience, interaction, and understanding of technology (Orlikowski & Gash, 1994). This may be a methodological advance that reflects the changing nature of technological developments such that standard commercial systems are globalised in a process of 'generification' and that technology adoption in the public sector has become highly politicised.

The addition of the 'hierarchy of games' analysis with the CM analysis brings a new perspective on the work of CM advocates importing technology frames that mobilise organisations to adopt new ways of working associated with computerisation (Iacono & Kling, 1998). Indeed, the MLE vision is a motivating element. But in a 'hierarchy of games' the MLE TAF acts as much as a regulator of lower games by ensuring the interests of dominant players are followed in local settings. Whilst the MLE TAF does motivate, the MLE game enables players to work towards the adoption of MLE technology in their local setting in a way that goes beyond that conceived by the MLE CM. For example the analysis shows that it provides powerful macro level alliances for MLE players in local contexts that enable them to get 'standard MLE' technology into their university.

This thesis has described the changing roles of ICT gatekeepers and the dynamics of their interaction with the wider political, commercial and technological landscape in a manner that extends the understanding of socio-technical alignment for online working. This extends the socio-technical understanding of the adoption of internet working in the university by investigating the influence of the boundary dynamics of the university and its wider context on MLE development.

As discussed in this thesis, the gap between expectations and realisation is likely to persist. This is because raising expectations is a crucial aspect of MLE socio-technical alignment, motivating players and offering a mobilisation resource in local settings. A more balanced view of technological expectation may be

achieved through a genuine negotiation between all MLE key players, both old and new. In this respect the continuing setting of boundaries is unhelpful. The research shows how MLE development can involve separate networks of administrative and pedagogical practice that rarely combine in structured decision making. In the case study universities division rather than cooperation is evident to varying degrees. Evolving the approach to MLE development would require acknowledging the need to change expertise for both administrative staff, who may more fully understand the impact of online administration on the educative process, and educational technologists, who may modify core practices.

### **9.3 Research Challenges**

This section evaluates the challenges that were encountered during the research process. These relate to, for example, undertaking the fieldwork and working with the theoretical framework.

#### **9.3.1 Undertaking the fieldwork**

Finding and including participants in the research was a key research challenge. A contact letter was produced and emailed to participants. Some contacts required up to three emails to get a reply, but persistence does pay off. Subsequently, the contact letter was modified according to the potential participant's role in their university by mentioning my interest in their particular area and how important it could be before the research. This was found to work better than just a general reference to an institutional MLE, which for some people is a rather remote and general concept.

Each interview has a unique set of circumstances. The type of institution, the position of the participant, the circumstances of his/her appointment, the history of development, the attitude of participants to academic work, the time and place of the interview within the work for that day, agenda or lack of agenda concerning the interview are all factors amongst many which influence the

interview. The participant will create a particular kind of narrative according to these many factors. Some participants were, for example, disgruntled with their role in MLE development. It was challenging to deal with this kind of attitude in the interviews.

Many of the participants were academics who had undertaken research in this area and, consequently, there was a degree of interest in the interview process and research process. The researcher tried to ignore this since it is stressful enough to interview experts in the field. However, one tactic employed was a technique described by McCracken (1993) as playing a little dumb at the beginning of the interview and also to start with the history of MLE development as a non threatening opening. This was found to be useful in starting the interview. The exception was at university A where the participants seemed to want answers from the researcher concerning aspects of MLE development as much as answer questions concerning MLE developments at the university. This was challenging in itself, since this was experienced by the researcher as a kind of test of expertise. This goes to underline how the interviews are mutually constructed by participants and researchers rather than the interviewer accessing 'answers' to questions.

Never the less, interviews need to have some structure in the form of areas to be covered. This is because interviews are a relatively short time and there is a balancing act between letting the interviewee talk at length on something they are interested and directing the interview to categories of interest to the research.

Some of the issues involved in MLE adoption and development can be controversial and politically sensitive. For example, a number of interviewees were uneasy about discussing the role of JISC, from a straight refusal to engage because they did not consider it relevant or to nervousness about criticising its role. The researcher had to become experienced at being diplomatic about this kind of occurrence and not letting it affect the interview's smooth running.

Concerning technical equipment, tape recorders broke down on several occasions but with new batteries were revived. Subsequently, for all interviews a spare mini

tape Dictaphone was taken. One must always carry spare batteries however as back up.

In general, the fieldwork involved a new mode of working and challenges compared to the desk research phases, in effect a transition to managing fieldwork that required greater control and monitoring of the research process.

### **9.3.2 Working with an Ecology of Games**

Early stage decisions regarding the theoretical framework meant that the adoption of the Ecology of Games did not influence the interview data gathering process. Inclusion would, for example, have led to interview protocol development to explore the wider ecology of related games, which is underdeveloped in the research. Time constraints of the research did not allow a round of re interviewing to develop this area.

It is pertinent to critique the thesis along the lines that adopting a predominantly social analysis of MLE gives the impression that MLE is completely socially determined. It is the case that MLE players are concerned with technical rationality in MLE development. Technological breakdowns are perceived to deeply influence the way that people interact with MLE development. However, interpretations of technical breakdown or broader technical rationality occur in a broad framework of social action. In other words, whether a technology 'works' technically is not wholly technologically determined, but socially constructed in the context of development. This goes to underline that the social and technical elements of MLE are essentially inseparable.

The accessible nature of the games metaphor can lead to problems and well as strengths. Because the metaphor of games is universal there is perhaps a tendency for interviewees to adopt the metaphor of a game to describe the subject under discussion. Here there is the danger that the researcher might latch onto a game interpretation too readily, neglecting a thorough process of game definition.

This level of accessibility may lead to an advantage in the research process such that research participants can understand and critique an analysis of their own action. Through this a depiction of an Ecology of Games gains some face validity if the participants find it credible (Dutton, 1992). Unfortunately, the time constraints of this research did not allow this, but would be useful in future research as a way of validating an Ecology of Games analysis.

### **9.3.3 Working with Computerisation Movement Theory**

The research process encountered the following issues in working with the CM framework. The evaluation of socio-technical theory in this thesis equates national discourse and the discourse of educational technology with an MLE TAF. The research was concerned that the influence of such a construct in participant's interpretations should emerge from the data rather than being imposed. Through this, participants' technological frames were constructed in a broad way, without being too specific about frame elements. What emerges is a pattern of advocating a 'standard MLE' technology and a pattern of 'standard MLE' critique that includes criticism of the roles of dominant MLE players with the expression of an alternative trajectory of technology based on autonomous technological choice.

There may have been a problem in the early stages of analysis in labelling all those who interpret MLE in a 'standard' way as CM members. However, membership of the MLE CM requires more than interpretative alignment, it requires action to mobilise and maintain the core ICT discourse. The Ecology of Games analysis helps to identify key players through their role as boundary gate keepers and this in turn strengthens the CM analysis by focusing on the critical social and technical relationships between different participants, as opposed to simply identifying a set of participants.

#### **9.3.4 Data Analysis**

The process of data analysis concerning an Ecology of Games presented several research challenges. Because the data analysis technique required a degree of flexibility and visualisation that was not possible on the software, it was necessary to find additional methods of analysis. Games emerge through a time consuming sorting of elements into possible games. This process was rather like putting together a jigsaw puzzle and required the use of word tables. These were easier to manipulate for visualisation of these elements together as games than was possible with the software. The software was more useful for cross comparison of single categories that helped inform the Ecology aspect of the analysis. For example, issues and resource flows between games were analysed using the software.

Again, word tables were used to create the master participant analysis tables shown in which were useful to the analysis process in offering a visualisation of all the participants in several pages. These were then used in conjunction with the software to pursue avenues of analysis, in particular, the CM analysis which required a visualisation of all participants in relation to the reference Table and then further analysis using the software.

#### **9.3.5 Areas for Future Work**

To build on this study, future work in this area might fruitfully involve a more focused study on the way groups and individuals experience pressures to change their expertise as a result of MLE development. Having used a cross case study method, a more in depth case study building on the work already carried out may prove valuable. This would involve focusing on new networks of practice.

This suggests a single, more depth, case study analysis, however, this could usefully be contextualised within an Ecology of Games associated with MLE. This would involve research out with the university as a focus to include investigating the interactions between players in the broad game ecology. These

would include an investigation of the interaction between government and global suppliers for example. Such a study should offer an analysis of the broader context of MLE development through influences such as publishing and copyright and the software licensing.

Future work may build on this by utilising a framework built on the socio-technical boundaries. These are the *practices and conventions through which* the boundaries between the social and technical (and boundaries created in the interaction of the social and technical) are *sorted out* (Bloomfield & Vurdubakis, 1994). This may further develop the analysis of the way that socio-technical boundaries (related to the university, in the university and around socio-technical expertise) and MLE development are mutually shaping.

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## **Appendices**





## ***Appendix 1. Research Participants***

### **New University**

- N1: Head of Communication and IT
- N2: Assistant Head of Communications and IT
- N3: MLE Manager
- N4: Educational Development Officer
- N5: Educational Development Officer
- N6: Head of Registry

### **Modern University**

- M1: Head of Educational Development Unit
- M2: School based learning technologist
- M3: Director of Student Services
- M4: Director of Finance and IS/IT
- M5: VLE Coordinator
- M6: Assistant Principle, Learning and Teaching

### **Ancient University**

- A1: Librarian involved in e learning community
- A2: Assistant Principal (e-learning & e-health), Director of Learning Technology Section,
- A3: Learning Technologist, College of Medicine and Veterinary Medicine
- A4: Senior Lecturer, Teaching and Assessment
- A5: Manager of Communication and Training Services within Information Services
- A6: MLE manager
- A7: Senior librarian

## ***Appendix 2. Letter of Introduction***

Dear

I am a doctoral research student with the School of Computing, Napier University, undertaking a research thesis in the area of Managed Learning Environments in higher education. I am writing to you to ask if you would take part in this research project. The research takes the form of comparative case studies on the adoption and implementation of Managed Learning Environments within three different Scottish universities.

The study will consider a wide variety of adoption and implementation issues, both within universities and across the sector as a whole and your expertise and experience within this area would be a valuable source of information for the study. It is hoped that the resulting work will offer useful insights into both technical and organisational issues involved in what has become a rapidly growing approach to educational provision in higher education. As such the results of the study would be made available to you and I would hope that you may find them useful.

It is my hope that I would be able to conduct short interviews (approximately 40 minutes) with yourself and colleagues who have been involved in this kind of initiative. The research will be undertaken between December 2005 and May 2006. If you would consent to your involvement in the study I would anticipate that you could act as my contact point within ..... and provide me with contacts for colleagues who you feel would be suitable for involvement. All interviews will remain confidential and anonymous, with the transcripts freely available to yourself and participants.

If you agree to take part in this study, may I suggest an initial meeting with myself to further discuss the proposal and your and colleagues availability during the research period.

I look forward to your reply and thank you for your attention.

Yours sincerely,

David Edwards  
Research Student

### ***Appendix 3. Research Ethics Prompt***

#### ***1. Explain the nature of the research project***

#### **2. The researcher will:**

- comply with all legal considerations for this study.
- comply with the Napier University code of Practice on Research Ethics and the university's policies on Health, Safety and Equal Opportunities.
- not compromise the principles of non-maleficence and beneficence, legal obligations and any pre-existing rights in the conduct of research.
- consider the principles of justice and the fair treatment of participants in the study.

#### ***3. Your participation***

The research will take place in your office environment and is designed to cause as little disruption as possible. If, at any time you feel the progress or your work is being interfered with, or if you simply feel uncomfortable about the research, please let me know. You are able to withdraw from the study at any time.

#### ***4. The data***

Your responses will be gathered together collectively as grouped information. The information will then be analysed. The results of the analysis will be used towards a PhD thesis, which will be presented in verbal presentations and publications. There will be no links between your responses and you as a participant.

The collection, storage, disclosure and use of research data will comply with the Data Protection Act 1998. Data analysis from the study will form part of the researcher's PhD and papers for presentation and publication. The information gathered will be made available upon request to the supervisory committee, external examiners and other researchers as part of the PhD process.

## ***Appendix 4. Interview Protocol***

### **Interview Protocol**

1. How long have you been involved in the development of the MLE?
2. When did you first become aware of the concept?

3. General MLE concept:

How do you view the general concept of the MLE?

VLE development?

Systems integration?

In general, is MLE a good thing?

Probe for efficiency and cost

4. How do you see MLE development your university

The history of MLE development?

The future of MLE development?

VLE development?

Systems integration?

5. How do you think it is changing the established roles within the university?  
(Registry, schools, centralised administration, standard processes ect)

The role of the student? How do you view the reported benefits?

6. Stumbling blocks:

What have the difficulties been in development (can tell me examples of)

What have been the successes (examples)

Do you for see any future difficulties?

7. Communication:

How has the discussion/communication about MLE/e learning gone?

The requirements gathering process/ stakeholder consultation process? In the  
SAP implementation

## 8. Learning Process:

What do you think are the problems involved in e learning?

9. Do you think e learning and personalised learning improves the learning process for the student?

How does the student experience change with MLE? Examples?

The Influence of National Organisations such as JISC:

Does JISC influence development at university N?  
How?

## ***Appendix 5. Example of Protocol Development***

Interview Protocol, 20 June

1. How long have you been involved in the development of the MLE?

2. When did you first become aware of the concept?

3. General MLE concept:

How do you view the general concept of the MLE?

VLE development?

Systems integration?

Management Efficiency/Learning efficiency?

4. MLE at university n:

How do you see MLE development at university N?

The history of MLE development?

The future of MLE development?

VLE development?

Systems integration?

Is it just about e learning?

5. How can you evaluate MLE?

6. Will MLE 'transform' the university?

7. Stumbling blocks:

What have the difficulties been in development (can tell me examples of)

What have been the successes (examples)

Do you for see any future difficulties?

8. Communication:

How has the discussion/communication about MLE/e learning gone?

9. Learning Process:

Blended learning?

How much face to face is appropriate?

10. What do you think are the problems involved in e learning?

Do you think e learning and personalised learning improves the learning process for the student?

11. The Influence of National Organisations such as JISC:

How does JISC influence development at university N?

## *Appendix 6. MLE Trajectories*

1992 - The JISC was established as a joint undertaking of the English, Welsh, Scottish and Northern Ireland Higher Education Funding Councils (or their equivalent) following a letter of guidance from the Secretaries of State inviting them to work together on networking and specialist information services. "A key characteristic is the involvement of academic and technical staff from across the sectors. Indeed, all members of the Sub-Committees are drawn from the community and this is in keeping with the maxim that the sector "owns" the JISC."

A major challenge facing the JISC when it was first established was to support a much larger community of institutions, comprising of the ex-polytechnics and higher education colleges, along with the universities served by the JISC's predecessor bodies, the Information Systems Committee (ISC) and the Computer Board.

1992 - Decision of UK Further Education to join the JISC and not develop their own network. i.e. they will connect to the SuperJANET established by JISC.

1995 **JTAP** programme exploring the requirements for underpinning applications of relevance to the needs of the higher education community and those identified by JISC. – involved 117 projects with a budget of £8 million.

1996 JISC published its first formal **Five Year Strategy, 1996 - 2001**.

1996 - Report of the Learning and Technology Committee. Further Education Funding Council: 1996 [Chairman: Sir Gordon Higginson]. Coventry, Further Education Funding Council. Established a view that IT would enhance all aspects of college services and systems with benefits for the extended community of learners.

1999 – 2002 - Initiatives such as the National Grid for Learning, the University for Industry, Scottish Knowledge, the e-University and many others funded by the Higher Education Funding Councils and Department for Education and Skills

1999 - The JISC's user community was expanded again in 1999 when the further education funding bodies became funding partners.

2000 - Managed Learning Environments remained very much a key concept in the UK but with very few examples of integrated learning and management systems, and no examples of a full-scale MLE.

2000 – The **Follett Review** of the Joint Information Systems Committee cited a number of developments that required the JISC to change both its governance and its management arrangements. The first of these is the major growth in the

use of digital teaching and learning materials, and the provision of content to millions of students, along with sophisticated Managed Learning Environments.

### **Follet Report recommendations concerning MLE:**

“The JISC must focus energy and resources upon developing sophisticated Managed Learning Environments and ensuring that systems exist to deliver learning materials to the desk top. Earlier in 2000 a BECTa report ("Business Models in e-Learning" by Gavaghan and Dodgson) summarised the importance of e-learning to FE and it could have extended the arguments into HE. The report concludes that if FE is to achieve its (and the government's) aims "the solution lies in harnessing the opportunities to the fullest extent of Interactive Learning Technologies". The report predicts rapid movement towards e-learning that includes curriculum design, branded educational content, broad and easy access to background information and assessment combined with centralised tracking and administration. I recommend strongly that the JISC form a Sub-Committee devoted to Learning and Teaching. An analysis will be needed of the division of responsibilities between this Sub-Committee and the DNER Sub-Committee. (re organisation driven by e business model, MLE is realisation of this model)

2000 - Community consultation and agreement of definitions  
JISC began to discuss the definitions of MLE activity with the education community in early 2000 through a series of strategic workshops which provided the community with a forum for the discussion of definitions of MLEs. One of the key quotes to emerge from that exercise was:  
‘The hard truth is that without an MLE/VLE a University is not sustainable far into the 21st century’

2000 - The JISC, recognising that the implementation of an MLE is a difficult area, established the MLE Steering Group (MLESG) to take forward the crucial task of agreeing definitions for VLE and MLE. The Steering Group recognised early in its work that the immaturity of both the products and the thinking about their use was causing confusion in the sector, as was the vocabulary being used.

2000 – The UK e-University is launched

2001 - The University and Colleges Information Systems Association (UCISA) survey of VLE use in the UK reveals that for 76% of respondents, VLEs are cited in their institutional strategy documents such as their information strategy and their teaching and learning strategy (UCISA, 2001). This increasingly centralised view of learning technologies has meant that substantial resources are being put into the development or purchase of new learning technologies that will support students and teachers across the whole institution.

2001 - JISC Managed Learning Environments Information Pack published

2000 – 2002 - MLESG has examines the cultural and technical

issues an MLE implementation will raise for a FE college. The FEFC asked the JISC to advise colleges and help them to implement MLEs but it did not recommend any particular product because every college has its own specific needs. Recommending a single VLE for the whole community would have damaged the market by limiting options for the future.

2002- "Issues concerning the development of VLE, Issues of systems integration, support, new roles and overlapping responsibilities between different departments are leading institutions to consider a more coherent and strategic vision for their use of ILT: a managed learning environment"

2002 - The Writtle College project has worked extensively to implement its new Information strategy by mapping the current information storage and transfer that takes place through disparate information systems and making a single source of accurate information available to staff. The INSIDE project has mapped out all information processes and flows between a department and central administration and used this as a basis for rationalising the information flow process to be more accurate and timely. This has laid the basis for the development of a student module registration system where students can self-register and select modules online.

2003 - Dept. for Education and skills consultation white paper: Towards a Unified e-Learning Strategy

2004 – The UK e – University offers its first online course

2004 (6 months later) – The UK e-University folds

2004 - The higher education minister, Kim Howells, joined the crowd in heaping abuse on the corpse of the e-university this week, calling it "rubbish" and typical of the ill-fated dotcom boom.

2005 - Commons education select committee condemns UK e – university as a "disgraceful waste" of public money

2005 - Dept. for Education and Skills, Harnessing Technology: Transforming Learning and Children's Services

2005 - Universities are being encouraged to accept all their applications online ahead of a 2006 deadline when paper forms will be all but abolished

## **University N MLE Timeline Development**

1983 - 'In 1983 the institution even then had established itself as a provider of open and flexible learning opportunities. Over the ensuing years, I have seen University N evolve its conception of flexible learning which, together with developments in technology, a large increase in student numbers and an increasingly diverse student population, has resulted in flexible and online

learning being a central component of the university's learning and teaching strategy into the 21st century".

A journey in flexible learning: "not always been smooth, but always interesting – with the underlying philosophy continuing to be the provision of learning opportunities at a time, place and pace which suits the learner's needs and circumstances". Senior manager's history of MLE development in library newsletter.

1980's – 'Back in the early 1980s, University N's main involvement in flexible and open learning was the Learning-by-Appointment (LBA) Centre that was situated in an annexe of the Library and catered, in the main, as a community learning facility for the general public. Self-instructional courses (mainly bought-in) were available in languages (the most popular), computing, science, mathematics and many other subjects and topics. Course materials were text-based, or a combination of programmed learning texts with tape, video and computer-assisted learning programmes. Up to the early 1990's - Over the 1980s and early 1990s, the LBA Centre evolved into the Opening Learning Centre (OLC). While still having a community-based focus, the OLC increasingly tried to meet the needs of University N students with the provision of remedial, study-skills and extension materials. ' Senior manager's history of MLE development in library newsletter. 2006

1980's – 'Saw the development and validation of University N's first distance learning programmes. The Postgraduate Certificate in Librarianship was initially developed and run from within the Library itself. This was a popular course comprising paper-based learning units with (optional) monthly study days at University N. The programme operated around the UK and a version for Mauritius was later developed. Other developments at the time included paper-based flexible-learning programmes in Economics (for the UK and Mauritius) and Accounting. 'Senior manager's history of MLE development in library newsletter. 2006

1990's - During the 1990s, the OLC closed as a separate entity with its resources being incorporated into the Library.

The 1990s saw an increase in flexible programme development activity.. Other flexible programmes, supported by paper-based materials, included flexible learning versions of the MBA, various postgraduate programmes in Law and some developments in Construction and Engineering. Flexible 'teaching packs' were also developed (e.g. in Engineering and Computing) to support our Further Education and overseas programmes. Senior manager's history of MLE development in library newsletter. 2006

1992 - The Postgraduate Certificate in Learning and Teaching in Higher Education was first validated in 1992 and has run successfully as a flexible learning programme from EdDev ever since.

Late 1990's – 'Many of the flexible learning developments occurred within 'hotspots' in the university, and were largely opportunistic and not strategically driven or co-ordinated. University N University Flexible was established in the

late 1990s in an attempt to co-ordinate and focus activities more centrally but was short-lived and failed to make an impact at a strategic level. In the late 1990s, University N used the computer-mediated conferencing system FirstClass® to complement its otherwise paper-based delivery' Senior manager's history of MLE development in library newsletter.

1998 – Report from the MIS Steering Group: A Framework for the development of management information systems:. . . . .Integration is properly identified as a key factor contributing both to the consistency of the information delivered by an organisation's management information systems and to the eradication of unnecessary manual processes, but again this is complicated in practice. In an "ideal" environment, each data-item would (logically) only be entered once and only held once in a single, corporate database. However, this is not at present an achievable objective (there are no fully-integrated HE management systems currently on the market) nor is it yet a sensible one for University N to pursue in the medium-term. [2] Insofar as low-level integration is technically achievable in relation to some aspects of the business, it is not at present an affordable option. [3] In any event, the key objective must be to ensure that our data is consistent. Improving the technical integration of our information systems is simply one of the ways in which we can help to achieve that goal.

1999 - Learning Information Services Strategy: emphasises customer focus.

- Supports University Vision
- Complements University strategic initiatives
- Focuses on whole learning community
- Supports NUFlex and Faculties
- Emphasises access to information
- Shift to electronic resources
- Continue investment in print
- Develop multi-purpose Learning Centres
- Faculty-based provision of resources
- 24 hour opening on one campus
- Develop Service Level Agreements
- Monitor through Performance Indicators
- Improve "research" to delivery speed
- Work in partnership both internally and externally
- Create appropriate staffing structure to deliver LISS
- Develop staff skills and expertise
- Better communication and liaison with users

Learning Information Services Strategy (1999)

2000 - EdDev formed from the former Educational Development Unit (EDU) and University N University: E Initiative

2002 - . Based on funding provided by SHEFC through their Knowledge Economy initiative, an early decision was taken to implement WebCT as the software platform for the Virtual Learning Environment, a vital component of the MLE which allows online interaction between the student and the tutor. WebCT (Web Course Tools) is a virtual learning environment (VLE) to provide on-line support for any module.

2002 – “With the investment in WebCT, we now have an industry-standard, virtual learning environment (VLE) capable of hosting materials electronically supported by a range of communication, assessment and administrative tools. Several hundred modules are currently supported by WebCT – and the concept of ‘blended learning’ combining the best of online and face-to-face learning is the focus for learning both on- and off-campus.

Much of the current activity revolves around supporting our students – but the potential for new markets including new Masters-level provision, international activity and CPD will increasingly be underpinned by technology-supported learning.” MLE report (2002)

2003 Suggested Structure MLE Paper

2003 MLE action plan

2003 Phase 1 of the MLE (Academic Year 2003-2004) involved all modules being populated to a basic level in WebCT and all students being able to access their own modules.

2003 - Previous evaluations in autumn 2003 provided an interim review of staff and student feedback. Four key recommendations were made at that time: • The strategic decisions behind WebCT must be clearly communicated to all relevant staff • WebCT and E-learning needs to be successfully ‘sold’ to staff and students • The university must affirm its commitment to WebCT and E-learning • Communication of developments in WebCT and E-learning needs to be improved and provided on a regular (monthly) basis

Managed Learning Environment (MLE) Evaluation Consultants Report 2004

2004 - Managed Learning Environment (MLE) Evaluation Consultants Report: The objective of the Strategic Plan is to transform the pedagogy of University N University through the use of digital tools.

2005 – MLE newsletter

2005 – Library Services launch Project N. It encompasses the traditional catalogue functions but also enhances access to electronic resources. An important element of these developments will be closer integration with other University’s systems such as Nimrod and WebCT and also the new financial system, Agresso. Smoother and quicker exchange of data should provide students with an improved interface to a range of University services. Library newsletter 2005

2005 - Over the next 2 academic sessions University N is replacing the WebCT service with WebCT Vista. Over this period there will be a gradual movement of modules from WebCT to WebCT Vista. WebCT Vista is being piloted by University N Business School and from this Semester all Business School 1st year Modules will use WebCT Vista. (MLE newsletter )

2005 Onwards - by 2006-7 all students will be provided with an individualised student portal (also known as Student Intranet) to allow online access to student

records, email and WebCT, from which they will be able to access learning materials and resources. Over the next two years, we will also evolve our Virtual Learning Environment (VLE) by investment in WebCT Vista – a more robust, intuitive and flexible learning environment. MLE newsletter

## ***Appendix 7. Initial Coding Categories***

<b>Participant Biographic Information</b>
Position
Role
How long aware of the MLE concept
How long involved in MLE type development
What kind of involvement
How long in institution
<b>Initial coding categories based on constructs derived from the literature review</b>
Definition/understandings of MLE
Pedagogical issues: understanding of e learning, the history of educational technology, Distance Education, the development of strands of educational technology approaches to pedagogy, quality, keywords,
Presence of national discourses: user centred learning discourse, business enterprise systems discourse, enterprise university discourse. Reference to and influence of. Points of conflict
Analysis of localised institutional discourse: keywords, motifs. Points of conflict
JISC discourse: reference to, influence of, points of conflict.
Trajectory of adoption, dates, events, people: Stages of technological adoption, reference to innovation and choice,
Cost and Efficiency notions associated with MLE: reference to efficiency, cost saving, ability to grow without increasing physical space
Organisational Change: understandings, metaphors etc.

## ***Appendix 8. Development of Early Coding Tree***

QSR N6 Full version, revision 6.0.  
Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 1:50 pm,  
May 19, 2006.

REPORT ON NODES FROM Tree Nodes '~/'

Depth: ALL

Restriction on coding data: NONE

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(1 3) /basedata/interviewees/document/document type  
(1 3 1) /basedata/interviewees/document/document type/strategy  
(1 3 1 1) /basedata/interviewees/document/document  
type/strategy/genres  
(1 3 2) /basedata/interviewees/document/document type/internal  
communication  
(1 3 2 1) /basedata/interviewees/document/document type/internal  
communication/genres  
(1 3 3) /basedata/interviewees/document/document type/newsletter  
(1 3 3 1) /basedata/interviewees/document/document  
type/newsletter/genres  
(1 3 4) /basedata/interviewees/document/document type/interview  
(1 3 4 1) /basedata/interviewees/document/document  
type/interview/gender  
(1 3 4 1 1) /basedata/interviewees/document/document  
type/interview/gender/female  
(1 3 4 1 2) /basedata/interviewees/document/document  
type/interview/gender/male  
(1 3 4 2) /basedata/interviewees/document/document  
type/interview/work area  
(1 3 4 2 1) /basedata/interviewees/document/document  
type/interview/work area/ed dev  
(1 3 4 2 2) /basedata/interviewees/document/document  
type/interview/work area/C&IT  
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type/interview/work area/academic  
(1 3 4 2 4) /basedata/interviewees/document/document  
type/interview/work area/management  
(1 3 5) /basedata/interviewees/document/document type/network  
activity  
(2) /cases  
(2 1) /cases/N  
(2 2) /cases/M  
(2 3) /cases/A

- (2 4) /cases/JISC
- (2 5) /cases/GOV
- (2 6) /cases/ACA
- (2 7) /cases/PRESS
- (3) /participant relationship with MLE
- (3 1) /participant relationship with MLE/circumstances of gaining awareness/understanding
- (3 2) /participant relationship with MLE/how long aware
- (3 3) /participant relationship with MLE/understanding of MLE
- (3 3 1) /participant relationship with MLE/understanding of MLE/representation
- (3 3 2) /participant relationship with MLE/understanding of MLE/identification
- (3 3 3) /participant relationship with MLE/understanding of MLE/Action
- (4) /trajectory of adoption
- (4 1) /trajectory of adoption/personal adoption
- (4 2) /trajectory of adoption/institutional trajectory
- (4 3) /trajectory of adoption/drivers
- (5) /organisational change
- (5 1) /organisational change/description of change
- (5 2) /organisational change/metaphors of change
- (6) /pedagogical issues
- (6 1) /pedagogical issues/distance learning
- (6 2) /pedagogical issues/e learning
- (6 3) /pedagogical issues/blended learning
- (6 4) /pedagogical issues/quality
- (6 5) /pedagogical issues/traditional
- (7) /interview details
- (8) /cost & efficiency related to MLE
- (9) /entities
- (9 1) /entities/significant people
- (9 2) /entities/technical systems
- (10) /relationships
- (10 1) /relationships/p to p
- (10 2) /relationships/p to i
- (10 3) /relationships/i to i
- (10 4) /relationships/i to s
- (10 5) /relationships/p to t
- (11) /processes
- (11 1) /processes/tendering

QSR N6 Full version, revision 6.0.  
Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 2:39 pm,  
Jun 1, 2006.

REPORT ON NODES FROM Tree Nodes '~/

Depth: ALL

Restriction on coding data: NONE

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- (1 3 1) /basedata/interviewees/document/document type/strategy
- (1 3 2) /basedata/interviewees/document/document type/internal communication
- (1 3 3) /basedata/interviewees/document/document type/newsletter
- (1 3 4) /basedata/interviewees/document/document type/interview
- (1 3 4 1) /basedata/interviewees/document/document type/interview/gender
- (1 3 4 1 1) /basedata/interviewees/document/document type/interview/gender/female
- (1 3 4 1 2) /basedata/interviewees/document/document type/interview/gender/male
- (1 3 4 2) /basedata/interviewees/document/document type/interview/work area
- (1 3 4 2 1) /basedata/interviewees/document/document type/interview/work area/ed dev
- (1 3 4 2 2) /basedata/interviewees/document/document type/interview/work area/C&IT
- (1 3 4 2 3) /basedata/interviewees/document/document type/interview/work area/academic
- (1 3 4 2 4) /basedata/interviewees/document/document type/interview/work area/management
- (1 3 5) /basedata/interviewees/document/document type/network activity
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QSR N6 Full version, revision 6.0.

Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 3:51 pm,  
Jun 6, 2006.

REPORT ON NODES FROM Tree Nodes '~/'

Depth: ALL

Restriction on coding data: NONE

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 portal

- (14) /honesty
- (15) /belief
- (16) /feeling
- (17) /hoping
- (18) /concern
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- (23) /things going wrong

QSR N6 Full version, revision 6.0.  
Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 12:30 pm,  
Jun 5, 2006.

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Depth: ALL

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- (4 3 1) /trajectory of adoption/drivers/resource
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QSR N6 Full version, revision 6.0.

Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 1:21 pm,  
Jun 6, 2006.

REPORT ON NODES FROM Tree Nodes '~/'

Depth: ALL

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QSR N6 Full version, revision 6.0.  
Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 6:30 pm,  
Jun 8, 2006.

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 the forefront of adoption

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(9 3 2)	/entities/students/on campus students
(9 3 3)	/entities/students/staff/phd
(9 4)	/entities/departments
(9 5)	/entities/lecturers
(9 6)	/entities/senior management
(9 7)	/entities/class room
(9 8)	/entities/JISC
(10)	/relationships
(10 1)	/relationships/p to p
(10 2)	/relationships/p to i
(10 3)	/relationships/i to i
(10 4)	/relationships/i to s
(10 5)	/relationships/p to t
(10 6)	/relationships/s to s
(10 7)	/relationships/t to t
(11)	/processes
(11 1)	/processes/tendering
(11 2)	/processes/matriculation
(11 3)	/processes/assessment
(11 4)	/processes/Data cleansing
(12)	/National/international

- (12 1) /National/international/initiatives
- (13) /systems configuration/implementation
- (13 1) /systems configuration/implementation/student portal
- (13 2) /systems configuration/implementation/configuring business  
process to system
- (13 13) /systems configuration/implementation/systems  
configuration/implementation/integration
- (14) /honesty
- (15) /belief
- (16) /feeling
- (17) /hoping
- (18) /concern
- (19) /confusion
- (20) /uncertainty
- (21) /local discourse
- (22) /disappointment
- (23) /things going wrong

## ***Appendix 9. 'Worlds' and Computerisation Movement Codes***

Licensee: C & IT Services.

PROJECT: MLE adoption in higher education, User david edwards, 11:10 am,  
Aug 24, 2006.

REPORT ON NODES FROM Tree Nodes '~/'

Depth: ALL

Restriction on coding data: NONE

(1)	/basedata/interviewees/document
(1 3)	/basedata/interviewees/document/document type
(1 3 1)	/basedata/interviewees/document/document type/strategy
(1 3 2)	/basedata/interviewees/document/document type/internal communication
(1 3 3)	/basedata/interviewees/document/document type/newsletter
(1 3 4)	/basedata/interviewees/document/document type/interview
(1 3 4 1)	/basedata/interviewees/document/document type/interview/gender
(1 3 4 1 1)	/basedata/interviewees/document/document type/interview/gender/female
(1 3 4 1 2)	/basedata/interviewees/document/document type/interview/gender/male
(1 3 4 2)	/basedata/interviewees/document/document type/interview/work area
(1 3 4 2 1)	/basedata/interviewees/document/document type/interview/work area/ed dev
(1 3 4 2 2)	/basedata/interviewees/document/document type/interview/work area/C&IT
(1 3 4 2 3)	/basedata/interviewees/document/document type/interview/work area/academic
(1 3 4 2 4)	/basedata/interviewees/document/document type/interview/work area/management
(1 3 4 2 5)	/basedata/interviewees/document/document type/interview/work area/learning technology
(1 3 4 2 6)	/basedata/interviewees/document/document type/interview/work area/library/information services
(1 3 5)	/basedata/interviewees/document/document type/network activity
(1 3 6)	/basedata/interviewees/document/document type/promotional
(2)	/cases
(2 1)	/cases/N
(2 2)	/cases/M
(2 3)	/cases/A
(2 4)	/cases/JISC
(2 5)	/cases/GOV

(2 6) /cases/ACA  
 (2 7) /cases/PRESS  
 (3) /participant view of MLE  
 (3 1) /participant view of MLE/circumstances of gaining awareness/understanding  
 (3 3) /participant view of MLE/understanding of MLE  
 (3 5) /participant view of MLE/view of their role  
 (3 24) /participant view of MLE/personal opinion  
 (4) /trajectory of adoption  
 (4 1) /trajectory of adoption/personal adoption  
 (4 2) /trajectory of adoption/institutional trajectory  
 (4 2 1) /trajectory of adoption/institutional trajectory/constraint  
 (4 2 1 1) /trajectory of adoption/institutional trajectory/constraint/resource  
 (4 2 1 2) /trajectory of adoption/institutional trajectory/constraint/unsuitable change trajectory  
 (4 2 1 3) /trajectory of adoption/institutional trajectory/constraint/not seen as urgent need  
 (4 2 1 4) /trajectory of adoption/institutional trajectory/constraint/senior management  
 (4 2 1 5) /trajectory of adoption/institutional trajectory/constraint/group ownership of systems  
 (4 2 1 6) /trajectory of adoption/institutional trajectory/constraint/institutional culture  
 (4 2 1 7) /trajectory of adoption/institutional trajectory/constraint/islands of use/bespoke systems  
 (4 2 2) /trajectory of adoption/institutional trajectory/choice  
 (4 2 3) /trajectory of adoption/institutional trajectory/drivers  
 (4 2 3 1) /trajectory of adoption/institutional trajectory/drivers/resource  
 (4 2 3 2) /trajectory of adoption/institutional trajectory/drivers/expansion/growth  
 (4 2 3 3) /trajectory of adoption/institutional trajectory/drivers/from the top/senior managers  
 (4 2 3 4) /trajectory of adoption/institutional trajectory/drivers/student expectation  
 (4 2 3 5) /trajectory of adoption/institutional trajectory/drivers/national initiatives  
 (4 2 3 6) /trajectory of adoption/institutional trajectory/drivers/being at the forefront of adoption  
 (4 2 3 7) /trajectory of adoption/institutional trajectory/drivers/student retention  
 (4 2 3 8) /trajectory of adoption/institutional trajectory/drivers/supplier  
 (4 2 3 9) /trajectory of adoption/institutional trajectory/drivers/enthusiasts  
 (4 2 3 10) /trajectory of adoption/institutional trajectory/drivers/system configuration  
 (4 2 3 11) /trajectory of adoption/institutional trajectory/drivers/information age discourse  
 (4 2 3 12) /trajectory of adoption/institutional trajectory/drivers/efficiency

(4 2 3 13) /trajectory of adoption/institutional trajectory/drivers/support  
 (4 2 3 14) /trajectory of adoption/institutional  
 trajectory/drivers/automation  
 (4 2 3 15) /trajectory of adoption/institutional  
 trajectory/drivers/supplying business market  
 (4 2 3 16) /trajectory of adoption/institutional trajectory/drivers/linking  
 with other institutions  
 (4 2 3 17) /trajectory of adoption/institutional trajectory/drivers/distance  
 education  
 (4 3) /trajectory of adoption/view of overall trajectory  
 (4 6) /trajectory of adoption/integration  
 (5) /Institutional context  
 (5 21) /Institutional context/local discourse/regime of truth  
 (6) /pedagogical practice/ issues  
 (6 1) /pedagogical practice/ issues/distance learning  
 (6 2) /pedagogical practice/ issues/e learning  
 (6 3) /pedagogical practice/ issues/blended learning  
 (6 4) /pedagogical practice/ issues/quality  
 (6 5) /pedagogical practice/ issues/traditional  
 (6 6) /pedagogical practice/ issues/attendance  
 (6 7) /pedagogical practice/ issues/student centredness/focused  
 (6 8) /pedagogical practice/ issues/support  
 (6 9) /pedagogical practice/ issues/face to face contact  
 (6 10) /pedagogical practice/ issues/staff who dont use e learning  
 (6 11) /pedagogical practice/ issues/tutorials/personalised timetabling  
 (6 12) /pedagogical practice/ issues/liscencing  
 (7) /interview details  
 (8) /cost & efficiency related to MLE  
 (10) /relationships (D)  
 (10 3) /relationships (D)/i to i  
 (10 4) /relationships (D)/i to s  
 (10 5) /relationships (D)/p to t  
 (10 6) /relationships (D)/s to s  
 (10 7) /relationships (D)/t to t  
 (10 8) /relationships (D)/i to t  
 (13) /systems configuration/implementation  
 (13 1) /systems configuration/implementation/student portal  
 (13 2) /systems configuration/implementation/bespoke systems  
 (13 3) /systems configuration/implementation/lock in  
 (13 4) /systems configuration/implementation/configuration around  
 webct/integration  
 (14) /business processes & learning process change for MLE  
 (14 1) /business processes & learning process change for  
 MLE/standardisation  
 (14 2) /business processes & learning process change for  
 MLE/configuring business process  
 (15) /feeling  
 (15 1) /feeling/apprehension  
 (15 9) /feeling/fear  
 (15 14) /feeling/honesty

(15 15) /feeling/belief  
 (15 17) /feeling/hoping  
 (15 18) /feeling/concern  
 (15 19) /feeling/confusion  
 (15 20) /feeling/uncertainty  
 (15 21) /feeling/Feelings  
 (15 22) /feeling/disappointment  
 (15 25) /feeling/tension  
 (16) /e learning world/educational technology world  
 (16 1) /e learning world/educational technology world/the  
 vision/guiding discourse/ideas/values  
 (16 2) /e learning world/educational technology world/the  
 environment/business case  
 (16 3) /e learning world/educational technology world/technological  
 exemplar  
 (16 4) /e learning world/educational technology world/Diagnostic  
 (16 5) /e learning world/educational technology world/practice  
 implementation paradygn/ technology adoption paradigm  
 (16 6) /e learning world/educational technology world/collective  
 activity/networks  
 (16 7) /e learning world/educational technology world/significant  
 players  
 (16 8) /e learning world/educational technology world/views of other  
 worlds, incl insts.  
 (16 9) /e learning world/educational technology world/areas of non  
 resolution/controversy  
 (16 10) /e learning world/educational technology world/ideology  
 (16 11) /e learning world/educational technology world/identification  
 (16 12) /e learning world/educational technology world/evaluation of  
 MLE/research  
 (16 13) /e learning world/educational technology world/understanding  
 of MLE  
 (17) /enterprise computerisation world  
 (17 1) /enterprise computerisation world/the vision  
 (17 2) /enterprise computerisation world/the environment/business  
 case  
 (17 3) /enterprise computerisation world/guiding  
 discourses/ideas/values etc  
 (17 4) /enterprise computerisation world/Diagnostic  
 (17 5) /enterprise computerisation world/practice implementation  
 paradygn/technology adoption paradigm  
 (17 6) /enterprise computerisation world/collective activity/networks  
 (17 7) /enterprise computerisation world/significant players  
 (17 8) /enterprise computerisation world/views of other worlds  
 (17 9) /enterprise computerisation world/areas of non  
 resolution/struggle  
 (17 10) /enterprise computerisation world/ideology  
 (17 11) /enterprise computerisation world/one system/master  
 logic/enterprise logic  
 (17 12) /enterprise computerisation world/identification

- (17 13) /enterprise computerisation world/portal
- (17 14) /enterprise computerisation world/evaluation of MLE
- (17 15) /enterprise computerisation world/Technological exemplar
- (18) /Governance
- (19) /system ownership
- (20) /national discourse

**Appendix 10. Summary of 'Standard' and 'Process' MLE**

	<b>standard MLE</b>	<b>Process MLE</b>
<b>Configuration</b>	Configuration of standard MLE products  Standard interface	Integration of heterogeneous systems
<b>Pedagogy</b>	Content led online learning  Packaged modular delivery	Contextual pedagogy  Curriculum led  Beyond the classroom support
<b>Guiding values</b>	Efficiency: - standard processes - creating flexible learning process for students - growth without variable cost - exploiting markets through packaged learning	Effectiveness  Constructionist model: - ICT for community of learners - Keep up with student ICT desire
<b>Representation of university</b>	Heterogeneous but capable of being standardised.	Heterogeneous and holistic: cannot be standardised
<b>Creating MLE</b>	Legislated implementation	Managed local innovation
<b>Organisational issues within frames</b>	MLE is divisive: seen by advocates as a threat to academic status and so they expect resistance from academic staff.  Legislated use is highly controversial  Technological efficiency: system breakdowns can damage acceptance levels	Local creative innovation may not be synonymous with managed outcomes  Legislated use unacceptable  Level of consensus between opposing socio technical constituencies needs to be found: an institution wide decision is ideal.
<b>Autonomy</b>	Reliance on suppliers and funders	Retaining autonomy and avoiding standard trajectory
<b>Key metaphor</b>	Technological backbone  Transformation	Exoskeleton  Flexibility

***Appendix 11. Master Participant Analysis Table***

## Appendix 12. IT Manager Game Table

Game	Online Delivery Early	Online delivery Middle	Online Delivery Late. Online totaliser
Date	Late 1998	2002/2003	2005
Juncture	Fizzling out of E initiative Introduction of First Class	Introduction of Webct Campus Implementation of CITS	Webct Campus replaced by Webct Vista
Goal	An institutional VLE	Introduce central student management system  Improve institutional VLE	Full online delivery through student portal:  “...deliver as much as possible to students - what we do electronically - - deliver as much as possible of what we do via the web. And the then just have a single entry point.... The idea is that will equate on and off campus learning as far as possible. So everyone will just get effectively the same”  Online service support e learning. Creates flexibility of shift from on campus to off campus learning.
Key players	/C&IT Ed Dev Some schools FirstClass	C&IT Ed Dev (MLE manager) SHEFCA Senior Management Registry A senior manager Business school CITS Webct	Microsoft Sharepoint CITS e-vision Webct Vista Ed Dev (MLE manager as key)) Portal Manager Software suppliers Business school
Sub issues (Sub games)	<p><b>1. Technical Choice</b></p> <p>“... I think there was 2 product solutions came out of that. One was WebCT and one was first class. Err in actual fact technically we would have gone with WebCT at that point. In reality we went with first class on the views of the educational development people”</p> <p>“So we had a service for MLE/VLE type work from some where around 1998</p>	<p><b>1. System integration</b> CITS and Webct integration</p> <p><b>2. Implementing CITS</b></p>	<p>1. Integrating systems to the portal: Ripping away the front page of other systems so you go straight in. The library system and student records are problematic here</p> <p>2. Personalisation: producing a personalised timetable</p> <p>3. Software for e-learning: Equating on and off campus learning as far as possible. Specialist software tends not too be web based i.e. can not be delivered through portal. Educational software licenses are given on the basis of campus lab use, not any where/ any time access. Student license can be sort for uk students not international ones.</p> <p>Goal:</p>

	<p><i>perhaps it was the wrong decision not to go with WebcCT but it would have been very early at that point."</i></p> <p><b>2. Islands of usage</b>  <i>"it had moderate usage, I suppose islands of usage, you know I wouldn't say the usage was vast but there was islands of it, certainly maths was quite keen of it and I know there was a few people quite keen on it."</i></p> <p><i>"I guess in the university there have been other developments at school level. The school of computing had its intranet, a home built VLE type provision. Mmm bio med did some things similarly"</i></p>		<p>4. Information quality          Better quality and quantity of information to feed into MIS system, supplying planning and market research.</p> <p>5. Demand on Technical infrastructure:          Increases on campus demand for pc's. Some would like to persuade students to bring in laptops but this is unlikely and impractical.</p>
<b>Actions</b>	Technical review of VLE products	Implementation of CITS and Webct Campus	Upgrade to Webct Vista Student portal
	Webct		

**Appendix 13. Sub Player Game Table for Head of Registry University N**

<b>Game:</b> <b>Sub game:</b>	<b>Online delivery/student self service</b> <b>Online timetabling</b>	<b>Online delivery/student self service</b> <b>online graduation ticket</b>
<b>Date</b>	2005	2005
<b>Juncture</b>	Online matriculation	Online matriculation
<b>Goal</b>	Allow students to choose courses around their time constraints	
<b>Key players</b>	Registry Students	HESA career's service Registry students Postal service
<b>Sub issues</b>	Blocking of modules into half days	
<b>Rules</b>	Timetable created to better suite student commitments	Have to get tickets out to students in one week
<b>Play tactic</b>	Changing established timetabling practice and offering timetable information	Cut out postal service
<b>Issues</b>	Customer service Institutional competition	<i>Control: "Now for us that is a huge benefit because you have a week from publishing of results to graduation and the logistics of sending out 2000 tickets and hoping the post office deliver them was a huge, huge issue."</i> <i>Information: "provide the career's service destination on leaving survey which we are required to do for HESA, the statistical agency. So that's done online, also they can check their fee levels ect. They can then download mitigation forms, appeal forms etc all online."</i>

## Appendix 14. Analysis of Resource flows and Issues

### University A

#### Resource, networks and issues

#### University A

	expertise/knowledge	funding	artefacts	Issues
A1	<p>Lively e- learning community in University A</p> <p>Each college has an e learning advisor</p> <p>Off the shelf systems are maintained for you, you don't need that level of expertise locally.</p>	<p>Principle's e- learning fund, buys time out</p>	<p>Webct</p> <p>A lot of the e learning development is on the back of the widening access thing, e.g. to artefacts</p> <p>High quality University A brand</p>	<p>Technophobia/computer literacy</p> <p>Enough on campus equipment</p> <p>Off campus: broadband needed, off campus authentication, copyright</p> <p>Plagiarism, how can you be sure people are doing the work</p> <p>Creating a feeling of belonging</p> <p>dislike of electronic library, no physical status</p> <p>Culture of doing thing s yourself</p> <p>Horried to be told to use webct, not worthy of University A</p>
A3	<p>E-learning network</p> <p>New e-learning Msc</p>		<p>Skype, myspace</p> <p>Qassessment</p> <p>Webct</p> <p>Communicate with students through institutionally defined email address</p>	<p>Webct is controlled interaction of student and inst through ICT</p> <p>Webct is lowest common denominator</p> <p>VLE allows bad teaching</p> <p>Web 2.2 agenda</p>
A4	<p>Principle's e-learning strategy group</p> <p>JISC funds workshops and projects across university sector</p> <p>The higher level</p>	<p>JISC funding, not much, same group involved in bidding for temp contracts</p>	<p>Referring to e-learning for staff:: but I'm having trouble getting resources to do that cos we haven't done that before and</p>	<p>Medical faculty building their own system</p> <p>MLE doesn't save money, the opposite, though some think it does</p> <p>Extends walls of lecture theatre</p>

	more likely to take part in JISC, e.g. Vice principle	University A does not really seek funding from JISC	its an uphill struggle.	Distance learning can be used as business model  Changing lecturers practice through training not possible: too many  Face to face training too expensive, so e learning should be used
A6	skilled and knowledgeable staff is the most important resource.  JISC have a lot of models, check lists and so on.. I would use them as a guide, a starting point, some way to order data.		Vista is an easy upgrade of campus in terms of resource  Portal	Centre cannot impose  If schools have resource they can do as they wish

### Resource Flows

#### Summary: University A resource flows

The evolution of such a successful bespoke system is associated with the following resource flow. General medical council sets the rules for curriculum. This powerful player gives legitimacy to the school and can apply stringent measures if standards are not conformed to. The medical curriculum is not compatible with a modular approach. The educational heuristic is more sophisticated than content driven standard systems such as WebCT can handle. This consideration rules out standard system and necessitates bespoke development.

The expertise to develop such a system was found within the school. The development of the system has been undertaken by a dedicated internal system architect, with a expert knowledge of medical VLE systems, at this time probably the world expert on the medical VLE systems.

Distance learning courses that are suitable for systems such as WebCT are not seen as core business. Though expensive to develop they are seen as ways to supplement income and play to research strengths.

On the minus side, the school loses the support of central services and is de prioritised in integration schemes with the wider university through lack of bargaining power.

In general university A is not at present seeking major MLE funding. Funding for the MLE strategy has come internally.

There is a perception that WebCT is not very well used across the university. Although this is so, integration is quite well advanced in comparison with the other case studies, in particular the in house authentication system.

The traditional university master frame is evident in the objection to the greater use of online teaching and WebCT in particular. There is little to no evidence of the online totaliser frame or student centred MLE. 'Widening access' at university A means widening access to artefacts.

## University N

Microsoft and Tier 2 Consulting do portal integration, Microsoft want to get into the education market, its sales driven

We refer to some of the reports that JISC produce that we can pass up to our senior managers

The Knowledge Economy initiative has funded the MLE project

Education Market: growth is seen as off campus provision. Post grad courses, professional development market, corporate market.

Linking courses with other institutions

Expertise:

Don't have expertise to build own system

TESOP: network of e learning practice funded by JISC

Resources out:

Software licenses

On campus demand for pc's

WebCT cost

	expertise/knowledge	Funding/finance	artefacts	Issues
N3	<p>Microsoft and Tier 2 Consulting do portal integration</p> <p>Turn It In UK (peer referencing and student referencing aid)</p> <p>middle management area where resources need to be put in place. Many of the</p>	<p>Printing cost passed on to students</p> <p>Post graduate market</p> <p>The Knowledge Economy initiative has funded the MLE project manager and all the support for N staff, 4 online learning advisors and</p>	<p>Vista</p> <p>Microsoft 'Sharepoint' portal</p> <p>Microsoft want to get into the education market, its sales driven</p>	<p>Communication between university groups who come together through MLE</p>

	<p>staff at N and other institutions do not have the skills readily at hand to use the software.</p> <p>we refer to some of the reports that JISC produce, that we can pass up to our senior managers.</p>	<p>myself as project manager.</p> <p>growth is seen as off campus provision.</p>		
N4	<p>you could build your own VLE product. For N I don't think we would have the staff available to do that.</p> <p>UCISA, a network of people working in IT in universities.</p>	<p>business customers who might want to fund people on MSc or MBA programmes. will be looking for that type of thing for their staff or the people they are sponsoring</p> <p>linking with other institutions. So you might be offering a module in another college</p> <p>Offering content abroad</p> <p>Distance learning students</p>	Oracle database	Face to face contact lost
N1	UCISA, a supplier led network of people working in IT in universities	<p>Systems costs</p> <p>Global e learning market</p>	<p>Student Software licenses:</p> <p>On campus demand for pc</p> <p>Student laptops</p>	Equating on and off campus provision
N5	<p>TESOP: network of e learning practice</p> <p>Teaching fellows technologically driven</p> <p>Ed Dev programme</p>			<p>E learning not being correctly aligned with teaching practice</p> <p>MLE is just for money making</p>

### Resource Flows

### **Summary: University N Resource Flow**

There is a flow of MLE resource between major suppliers, funder's and MLE advocate arenas. Amongst the MLE advocates at the university one big win has been the portal development in which the university is seen to be the first to get an integration between standard systems , WebCT and portal software to create the student portal. This win helps feed an ecology between the university and a number of larger arenas through which resources flow to the university such as supplier networks (Microsoft), government and funding agencies. The MLE manager notes that Microsoft have been looking to get into the educational market with their portal technology and it is with a note of pride that the MLE manager talks of the university's partnership with Microsoft in this mutual goal.

It may be that the supplier relationship is enhanced by the university being the first to achieve integration between Vista and the Microsoft Sharepoint Portal, with the university in turn procuring preferential attention from the supplier and the accolade of being 'ahead of the game'. This accolade of being the 'most modern' university aligns well with government intentions to create an online learning arena, as described in chapter one.

CITS, the student records database supplier, have developed a network of practice concerned with innovation in online working in universities through their software development. Registry is an active member of the network and the head of registry explains that's only by being an active member can the university attract supplier resources that may keep online innovation ahead of the competition. Thus, proving a commitment to the network and totalising online provision ensures the continued attention of the supplier through offering upgrades and supportive work.

A national funding agency has funded the MLE manager and four educational development officers. Accordingly, proving that MLE works and is worthy of funding, is the prize for both parties. This imposes constraints on the evaluation of MLE within the educational development unit and may go some way to explaining the way the unit displays such close alignment with the MLE frame

and associated advocates within higher education policy, such as JISC, and major suppliers.

For educational development officer, N4, JISC offers a resource of expertise in course design and evaluation and good practice on how to embed technology into every day practice. They also produce tools, such as plagiarism detection tool which the university has adopted. Examples of good practice which are produced by JISC are particularly helpful as they are much more 'real' (N4 145) than just reading articles.

The university is a leading player in a JISC funded e learning practice project that is working to improve the quality of e learning practice in a number of universities through a shared network of practice. The project helps develop experts within the university and shows how the university is working in wider MLE arenas to legitimate e learning. The projects guiding paradigm of creating MLE champions from which widespread adoption will cascade is part of the JISC MLE frame. Individuals so have the opportunity to advance their careers both in the university and within wider arenas of MLE development through becoming champions and change agents, roles which relate to networks of resource flow between game arenas with a shared MLE goal.

There is another side to resource flow from single major players that is perceived by participants as being less positive. With reference to JISC, N4, the educational development officer, comments that:

*Having one agency that is so dominant may not always be helpful from the idea that there are lots of different ways to do things. (N4 150)*

Here a single dominant interpretation of innovation represented by JISC is seen to constrain the use of technology which could otherwise be used in other ways. Constraint is felt in the parsity of dialogue associated with an arena which is dominated by one player:

*I think there would be a richer dialogue if we had two or three bodies which are as dominant as JISC. (N4, 267)*

Having made these observations regarding the constraining influence of JISC N4 draws back from being seen to be critical (*My comment about drawbacks is just a general observation...458* ) and as if in explanation restates how dominant and powerful JISC has become within the MLE arena:

*They are dominant but they do a lot of good work, they fund a lot of work that is needed. They provide an excellent support network and they have a lot of key figures involved. (N4, 460 – 463)*

These examples of resource flows demonstrate how the MLE game at N is ecologically connected to larger, more powerful games which offer prizes to these local MLE arenas and individual players who align themselves with larger arenas.

## **University M**

### **Market:**

Stand alone modules

Modulised content

### **Expertise:**

New VLE project officer

Looking for MLE manager

JISC expertise in project management and MLE, practice network

### **Revenue:**

10 000 students overseas

Accommodation revenue

The learning and teaching infrastructure fund and the strategic infrastructure research fund improve infrastructure of learning, teaching and research.

	expertise/knowledge	Funding/finance	artefacts	Issues
M3	<p>Quality controlled institutionally standard information</p> <p>New VLE project officer</p> <p>Looking for the right expertise for MLE manager</p>	<p>10 000 students overseas</p> <p>Fines</p> <p>Accommodation revenue</p> <p>Revenue from online business</p>	<p>Stand alone modules for CPD</p> <p>VLE for whole uni</p> <p>Central database</p> <p>Student ID cards</p>	Schools want to retain their own systems
M4	<p>Knowledge transfer to students</p> <p>Capture data once provides a phenomenal amount of data to outside organisations.</p> <p>Member of Scottish universities finance directors group, the British finance directors group. involved in projects that the Scottish Funding Council want input</p> <p>JISC expertise in project management and MLE, practice network</p> <p>MLE knowledge: Newsletter, lectures, training</p>	<p>Distance learning market</p> <p>On campus, post grad student market</p> <p>About a third of income comes from government, the rest comes from research, overseas students, or catering and residencies.</p> <p>the learning and teaching infrastructure fund and the strategic infrastructure research fund improve infrastructure of learning, teaching and research. Student admin system funded</p> <p>The government, which in the past has substantially funded universities, has said that it wanted all universities to become financially sustainable, by</p>	<p>Modulised content</p> <p>Oracle based financial ERP system</p> <p>Loose shadow systems</p> <p>I can give you (schools) Business class, high bandwidth systems, resilient to attack</p>	Academic resistance

		which they mean they should make enough cash		
	<b>expertise/knowledge</b>	<b>Funding/finance</b>	<b>artefacts</b>	<b>Issues</b>
M2	<p>We have an education development. There is no technology as part of their remit. We don't have that usual educational technology unit.</p> <p>Educational technology unit split off 5 years ago to form interactive university</p> <p>Microsoft haven't done too bad in being a monopoly that's restricted us to what we've done.</p> <p>Lack of technical expertise in staff</p> <p>New university lecturers now get a training, they form a community, it becomes part of something that they believe is important in that job. When people start to share their ideas about all areas of teaching things will improve. And we have to do that with technology and traditional.</p> <p>JISC collates, supports and disseminate Information, spreads good practice, mainly connects with technology support units,</p>		<p>Standards</p> <p>Freedom of information act</p> <p>Standard Microsoft products</p> <p>I make a decision about whether I use the web resources, the lab, lectures, or tutorials, whether I will send students off to do supported learning in the context of that module and my resources.</p> <p>Human contact</p>	<p>Educational technology should be evolution</p> <p>University at stage of implementation for efficiency</p>

## Resource Flows

## Summary of University M Resource Flow

Data concerning actual costs of systems and implementations is, for reasons of commercial confidentiality unavailable. M1 says that the decision to go for the smaller scale VLE, was based in part on funding limits. Since the university now has adopted a full academic suite system it may be the case that the funding situation changed at some time during the tendering process, for example, it may be that the new chair of the IT/IS group, M4, was responsible for bringing new funding to the project. M4 mentions two significant sources of funding for the new student administration project coming from Funding Council's Learning and Teaching Infrastructure Fund and the Strategic Infrastructure Research Fund. Funding is granted on a formula basis on the basis that projects fits the objectives of improving the infrastructure of learning, teaching and research.

Perhaps it is noteworthy that M4 talks of the collaborative work undertaken with the Funding Councils and professional networks of finance managers, in that M4 is an established member of this network of practice. M3 talks about the difficulty of getting funding for the new VLE, but describes the process of getting funding for the new student administration system, in which M3 was directly involved, in a way which seems less difficult.

*"It's been quite a difficult task to the university to provide the funding for the VLE. The business case for the new student management system has now been accepted, I gave a presentation to the planning and management group. We are aware that the university doesn't have limitless funds. So it is quite a tall order to drive a new system and be aware that there financial limitations." (M3 72 – 77)*

With regard to this change in funding situation for the VLE it is uncertain what is to account for the change in funding availability for the full academic suite VLE. It may be that M1's interpretation that the initial decision to go for a basic VLE was resource led is inaccurate or that the supplier cut prices, a reconstruction of the is not possible.

There is a shared opinion between M3 and M2 that expertise in MLE is rare because it spans the socio technical sphere, not just the technical or just the educational elements of ICT use:

*"I mean at the moment they are looking at CV's for a project manager and it seems to have more to do with their technical expertise rather than affinity with the user". (M3 102 – 103)*

M2 describes the skills of her role as being relatively unique. That is, someone who has a good grasp of the technology but also understands teaching and learning process and thereby understands the need to be led by the learning side rather than the technology. However, there is no evidence that M2's expertise has been called on by MLE project groups.

Instead, M4 uses expertise from JISC. M4 was very pleased with this 'free' resource provided by JISC, explaining that they had been invited in to talk about project management methodology and subsequently acted in a consultant role, offering ongoing advice on project methodology. M4 felt that the relationship was a reciprocal one, a virtuous circle, with university M providing an exemplar of how the JISC MLE approach can 'work':

*"They were quite interested in what we were doing because we were taking ideas that they had, making them our own and implementing them. So they were very keen to understand how that had worked. This meant there was another case study institution that they could cite as evidence that the thing was working." (M2 152 – 156)*